DOCTOR OF HISTORY

A History of Earthquakes in the Luzon Island, Philippines during the 19th and 20th Centuries

Historical seismology, bureaucratic responses, and socio-cultural interpretations of disasters

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CHAPTER 1

Introduction

"Earthquakes shake the land, overturn the strongest edifices, and sport destructively with the power of man…The destructive ravages and changes produced by earthquakes are nowhere more remarkable than in the Philippines. They have overturned mountains, they have filled up valleys, they have desolated extensive plains; they have opened passages for the sea into the interior and from the lakes into the sea."

- Sir John Bowring, *A Visit to the Philippine Islands* (1859)[1]

a. Topic and Objectives of the Study

Earthquakes are part of the geographic and geological reality of the Philippines archipelago. The country's location in the Pacific region, as well as its tectonic foundation, reinforce the existence and prevalence of this natural environmental process. Earthquakes hound human communities; they are a hazard that unearths a community's weakness and vulnerability, yet they also expose adaptive capacities of people when such natural events occur, in the context of various political, social, and cultural conditions. Rescue efforts, aid and relief distribution, infrastructure reconstruction projects, and corresponding urban planning policy reviews are some of the visible responses by government institutions as part of post-disaster rehabilitation measures. On the side of the affected population, reliance on cultural beliefs, religion, and spirituality serves as the core foundation of their resilience and disaster adaptation mechanisms. In this context, one can reconstruct a history of human societies and their interactions with the adverse environment. Furthermore, it is conceivable to write a history of hazards and disasters, focusing on how people and communities perceived and responded to such environmental challenges.

This work is a history of hazards, calamities, and the corresponding post-disaster response and risk mitigation measures the Filipino society do and use across centuries of enduring interaction to earthquakes. With the archipelago's fixed geological foundation, together with its complex political, social, and cultural milieu in various historical periods, how did the Filipino society - the state and the local population, cope with the threats of these dangerous terrestrial movements? Up to what extent did earthquakes modify the landscape of communities and influence their ways of living? How did they rebuild ravished villages and towns? What are the measures they implemented to mitigate the effects of earthquakes and their aftershocks?

This dissertation discusses a history of significant earthquakes that hit the island of Luzon during the second half of the 19th century, until the last decade of the 20th

[1] Sir John Bowring, *A Visit to the Philippine Islands* (London: Smith, Elder & Co., 1859), pp. 75 and 81.

century. It narrates the history of earthquake occurrences through an analysis of various historical materials such as government records, newspaper reports, scientific studies, and numerous local accounts containing information about the experiences of and responses done by different sectors of the Philippine society about select earthquakes. This work examines the nature and effects of earthquakes to the political dynamics, economic activities, and the social life of affected communities. The earthquakes studied are the following: the 03 June 1863, 18-20 July 1880, 20 August 1937, 02 August 1968, 17 August 1983, and 16 July 1990.

Table No. 1
Summary of intensities and epicenters of earthquakes studied

Date	Intensity	Epicenter
03 June 1863	Intensity 10 in Rossi-Forel Scale	Manila
18-20 July 1880	Intensity 7/9 in Rossi-Forel Scale	Central and Southern Luzon
20 August 1937	Intensity 6/7	Casiguran Bay
02 August 1968	Intensity 6/7 in Rossi-Forel Scale Intensity 7.5 in Richter Scale	Casiguran-Singalan Bay, Aurora
17 August 1983	Intensity 7 in Rossi-Forel Scale Intensity 5.3 in Richter Scale	Laoag, Ilocos Norte
16 July 1990	Intensity 7.7 in Rossi-Forel Scale	Nueva Ecija

Table No. 2
Summary of damages and casualties of the earthquakes studied

Earthquake	Estimated Damage to Infrastructures	Deaths and Casualties
June 1863	1172 buildings destroyed	Est. 400 deaths 2000 injured
July 1880	30 public buildings in Manila 112 towns affected	Est. 20 deaths Est. 50 injured
August 1937	Est. 25 buildings affected	Est. 35 injured
August 1968	Almost 40 government and public buildings, affected Casiguran, and some provinces in Southern Luzon	280 deaths, 286 injured
August 1983	87 structures destroyed, 212 partly damaged	19 deaths, 190 injuries
July 1990	Est. 30 large structures in Baguio and Cabanatuan Est. 10,000 houses Est. 28 bridges	Est. 1650 deaths 3300 injuries Unaccounted missing individuals

Moreover, this research is an attempt to make a historical assessment of the level of vulnerability and adaptive capacities of Filipinos at the onset of natural hazards and environmental disasters, through a qualitative analysis of historical accounts and

records, and scientific works and studies. Thus, this work used concepts and approaches of some subfields in environmental history, namely historical seismology, and history of disasters. By doing so, this research endeavor takes into consideration the qualitative value of seismological data, the historical information provided by statistical and scientific reports, as well as the scientific usefulness of local stories and accounts from people and communities affected by earthquakes.

This dissertation attempts to provide answers to the following questions:

1. Why do the earthquakes of 03 June 1863, 18-20 July 1880, 20 August 1937, 02 August 1968, 17 August 1983, and the 16 July 1990 historically notable and significant? How did these earthquakes affect cities and towns in Luzon? What were the magnitude and extent of each earthquake?

2. Given the geographical nature of the Philippine archipelago and the frequency of geological activities in the region where it is located, how did Filipino communities make sense of earthquakes as a natural environmental process? Did they consider this hazard as part of their individual and community life?

3. What were the post-disaster responses and mechanisms of community rehabilitation implemented by state institutions? What were the policies on disaster risk mitigation implemented, and how did government agencies craft such programs to alleviate the unfavorable effects of earthquake occurrences? Can we identify patterns of continuity, or distinguish similarities in responses manifested by the government, or even, the local population? Can we recognize an evolution of disaster responses and practices across time?

Lastly, this dissertation examines the relationship between people and natural hazards in general, by contemplating on the people's mentalities towards these threats, and problematizing the character of these attitudes towards the natural environment through documented scientific information, vignettes of culture, and behavioral approaches. As an attempt to historically reconstruct the Filipino society's long history of hazards and disasters, this work envisions a new way of understanding human communities as part of the larger environment, how people shape nature, and how the natural world amplifies and tones down human activities across time.

b. Theoretical Guide of the Study

In the continuously growing domain of environmental history research, overarching themes, topics, and frameworks were developed in the past decades. For example, in Fressoz, et. al (2014) compilation work titled *Introduction à l'histoire environnementale*[2], it narrates the topics and themes that are part of the emergent scholarship on the history of environment. The main group includes environmental history as a general topic, together with specific technical-scientific studies on ecology, and environmental consumption and exploitation, global environmental history, and climatic history. Subtopics are environmental management, conservation and sustainability, pollution and environmental regulation and control, environmental justice, risks and catastrophes,

[2], Jean Baptiste Fressoz, Frédéric Graber, Fabien Locher, Grégory Quenet, *Introduction à l'histoire environnementale* (Paris: La Découverte, 2014)

glocal and international ecological systems, wars and their environmental impacts, resource conflicts, and climate change. From this, we can conclude that natural hazards and disasters are already part of the list the topics where scholars work on to expand the literature on environmental history.

At what vantage point, we can consider physical events involving nature as "historical"? How can be the "natural" be "historical"? Hazards turn out to be historical if considered disasters; events caused havoc to human groups and settlements. Natural hazards commonly refer to, on the one hand, as the "physical phenomena of destruction"; and on the other hand, natural disasters are defined as *"*confluence of the social, economic and political development of naturally occurring events.*"*[3] Hazards refer to the potential for damage that exists only in the presence of a vulnerable human community.[4] The potentialities attributed to hazards are directed to the causal flow of the physical environment-social impact.[5] With this, disasters, as dictated by a definite hazard, occur because of the chance recurrences of natural threats, modified in detail but fortuitously by human circumstances.[6] Thus, using what Hewitt (1983) calls the *"*dominant view," disasters are by-products of hazards and are attributed to nature.[7] Certain theoretical concepts can serve as guides to holistically understand how natural hazards are historical from the context of human experience and human's appreciation of their environment. French historical thoughts, anthropological theories, and contemporary environmental history hypotheses provide notional direction to the flow of historical analysis, but a premium is given on the basic tenets of historical research. Archival materials and other primary sources, and relevant studies and historical materials are used extensively as the basis of the historical narrative. Moreover, in what they stand for, theories and theoretical concepts are used to explain phenomena, processes, and events. The purpose of theories is to simplify, the goal of history is to reveal what happened in the past.

b.1 Earthquakes as "Historical Events"

The history of earthquakes, or natural hazards in general, falls into the discipline of environmental history. The study of the natural environments includes the method of analyzing how communities and societies changed physical landscapes, as well as how the structure of the earth dictated the form, nature, and flow of human settlements. Hughes (2009) defines environmental history as:

> The task of environmental history is the study of human relationships through time with the natural communities of which they are part, to explain the processes of change that affect the relationship. As a method, environmental history is the use of ecological analysis as a means of

[3] Alvin Jason Camba, "Religion, Disaster and Colonial Power in the Spanish Philippines in the Sixteenth and Seventeenth Centuries", *Journal for the Study of Religion, Nature, and Culture* 6.2 (2012), p. 216.
[4] Kenneth Hewitt, *Interpretations of Calamity: From the viewpoint of human ecology* (Massachusetts: Allen and Unwin, Inc., 1983), p. 5.
[5] Ibid.
[6] Ibid.
[7] Ibid., p. 6.

> understanding human history. It studies the mutual effects that their species, natural forces, and cycles have on humans and the actions humans that affect the web of connections with non-human organisms and entities…An environmental, historical narrative should be an account of changes in human societies as they relate to the changes in the natural environment.[8]

From this outlook, this study profoundly argues the value of human aspect in reconstructing histories of natural hazards in the Philippines. By using the physical environment-human being relationship as a framework, the narrative will attempt to present conniving and competing facts and mentalities on the reconstructed narrative of historical events. The research study falls into the dimension of history and geography; as these two disciplines merge as ideological pillars in environmental history. Geographic knowledge is used as a vital construct in examining the influence of the physical environment to human history. As a body of knowledge, geography includes above all the study of the physical environment…and the prime goal in interrelating it the historical reconstruction is *to discover in what ways and to what extent this environment affected history.*[9] Morever, Hughes (2009) insists on the importance of geographical setting, and the reciprocal influence of human societies and the environment on a global scale.[10]

The natural sciences can extensively explain environmental in a detailed and mathematical manner. Reconstructing the history of the environment by centering on natural hazards produces a broader and wide-ranging intellectual landscape of events. The inherent nature of certain ecological sciences produces the laws governing the natural phenomena and or catastrophes; on the other hand, as this study will use, the configuration aspect refers to the 'series of states that have uniquely occurred through the interaction of intrinsic processes with historical circumstance: the context of the process. In other words, the *configurational* (aspect) refers to the particular history of an area and how that history altered that area.'[11] As Camba argues, hazards and disasters *"*present an opportunity for a society to reflect both on its relationship with nature and on its relationship with itself.*"*[12] A configurational approach to the occurrence of natural hazards is used by the study to extract historical ideas and mentalities from the disastrous events, thus making the research and all encompassing attempt to look at the history of Filipino environment.

Hazards and disasters, as historical realities, have been subject of recent historical studies on the Philippine environment's past. Historian Greg Bankoff has made several studies on the history of environmental calamities in the Philippines. In one of his works, Bankoff (2009) describes hazards as Filipinos' "frequent life experience":

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[8] J. Donald Hughes, *An Environmental History of the World: Humankind's changing role in the community of life, 2nd Edition* (New York: Routledge, 2009), p. 4.
[9] W. Gordon East*, The Geography behind History* (London: W.W. Norton & Company, 1995), p. 2.
[10] Hughes, *An Environmental History of the World,* p. 32.
[11] Rob Inkpen, "The Philosophy of Geology" in Avezer Tucker (ed.), *A Companion to the Philosophies of History and Historiograph*y (John Wiley and Sons Blackwell Publishing Ltd., 2011) p. 325.
[12] Camba, "Religion, Disaster and Colonial Power in the Spanish Philippines in the Sixteenth and Seventeenth Centuries", p. 217.

> Largely shaped by the interrelationship of the natural with human, of the physical with the social is the history of the archipelago…For Filipinos, hazards and disasters are simply accepted aspects of daily life, what can be called *frequent life experience*. That is to say; disasters should be perceived not as an abnormal occurrence, as it usually depicted through the epistemological lens of the Western social sciences, not as a normal, everyday event. (Hassan, 2000, p. 121-140). It is so ordinary that Filipino cultures are partly the product of adaptation by communities to these phenomena through processes that permit the incorporation of the threat into daily life, or what can be called the *"*normalization of the threat*"*.[13]

According to him, obvious is this observation that it can be pragmatic in a lot of historical and cultural manifestations. This "way of life", the way Filipinos look at disasters, is a significant aspect in the development of Filipino life, as it is found in a lot of historical records, design, and construction of infrastructures, agricultural systems, settlement and subsequent relocations and migration patterns.[14] Given these modalities, we can argue that hazards and disasters, as experienced by human communities, as time goes by, becomes social realities perceived, understood and interpreted in a very social manner. Disasters are "social texts"; though droughts, floods, earthquakes, and volcanic eruptions are physical phenomena, they are interpreted and conceptualized socially, thus hazards, and disasters are socially constructed and defined.[15] Endfield, et. al. (2009) adds, *"*the ways in which a particular event is perceived, experienced, and interpreted, however, determine whether it becomes inscribed into community memory as oral history, ideology, technological and physical adaptation, custom, artifact, or narrative. These different forms of remembering and recording the past experiences symbolize the chief modes through which information is transferred across generations.*"*[16]

Anthropologists illustrate our understanding of hazards and disasters, as they problematize the idea of human and human culture in between natural events. Disasters spring from the 'nexus where environment, society, and technology come together – the point where place, people, and human construction of both the material and nonmaterial meet.[17] It involves a combination of a potentially destructive agent from the natural and technological sphere and a population in a socially produced condition of vulnerability.[18]

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[13] Greg Bankoff, "Cultures of Disaster, Cultures of Coping: Hazards as Frequent Life Experience in the Philippines" in Christof Mauch and Christian Pfister (eds.), *Natural Disasters, Cultural Responses: Case Studies toward a Global Environmental History* (Plymouth: Lexington Books, 2009), p. 265.
[14] Ibid., p. 266.
[15] Georgina H. Endfield, et. al, "Documenting Disasters: Archival Investigations of Climate, Crisis and Catastrophe in Colonial Mexico" in Mauch and Pfister, *Natural Disasters, Cultural Responses*, p. 305.
[16] Ibid.
[17] Susanna Hoffman and Anthony Oliver-Smith, *The Angry Earth: Disasters in Anthropological Perspective* (London: Routledge, 1999), p. 1.
[18] Ibid., p. 4.

The historical reconstruction of disaster events that are vastly explainable through scientific norms, which also falls into the understanding of human cultures, fundamentally requires the strict application of research rudiments in the science of the past: context and sources. As Hoffman and Oliver-Smith (1990) explain, "the historical background of disasters comes to light through chronicles, archives, and annals. The relevatory documents may not particularly concern disaster; often they focus on political and economic matters, especially demographic shifts and food production. Even so, they disclose the creation of vulnerable segments, the policies, the prejudices, and actions that comprise the disaster conundrum and the minute and sometimes surprising ways in which societies recover."[19] One approach to comprehensively reconstruct the historical development of Filipino society in the context of human-natural hazard relations is by pointing out the traditional/cultural systems of Filipinos that, undoubtedly, influenced how they responded or how mentalities and behaviors toward hazard flourished through time. Components such as the following would be valuable: natural hazards such as typhoons, earthquakes, volcanic eruptions, and their epiphenomenal hazards; the political and socioeconomic systems which include institutions, power relations, source of living and settlement structures; and traditional belief systems such as folk traditions, epics, oral histories, and local chronicles.

Different colonial regimes, at the onset of hazards as an important consideration in establishing and developing their version of overseas colonies, indeed, imposed their ideas on the environment to compensate the necessities and prerequisites of a “pacified” territory. As Grove (1995) argues that as when colonialism started, "…the environmental experiences of Europeans and indigenous peoples living at the colonial periphery played a steadily more dominant and dynamic part in the construction of new European evaluations of nature and in the growing awareness of the destructive impact of European economic activity on the peoples and environments of the newly ‘discovered' and colonized lands…In this way, the commercial and utilitarian purposes of European expansion produced a situation in which the tropical environment was increasingly utilized as the symbolic location for the idealized landscapes and aspirations of the western imagination."[20] The colonizers viewed territories as an arena where they can manifest the ideals of colonial expansion. As Adas (1989) puts it, "…the civilizing mission, then, was more than just an ideology of colonization beyond Europe. It was the product of a radically new way of looking at the world and organizing human societies. Though aristocrats had continued much to the scientific and technological breakthroughs that underlay this new approach to the material world, it was the European bourgeoisie who acted on its premises to revolutionize production and social organization and to transform individual behavior and consciousness."[21]

This dissertation treats each earthquake studied as a unique phenomenon of its own: each has their effects, the government and the people treated each tragedy as a unique societal experience, and they were read, understood, and interpreted as a turning point - a historical experience. But this approach is not an absolute one; the dissertation recognized the facts that by studying these earthquakes, the chronological aspect of it leads us to an understanding of the evolution of knowledge of the earthquake as a

[19] Ibid., p. 5.
[20] Richard Grove, *Green Imperialism: Colonial expansion, tropical island Edens and the origins of environmentalism* (Cambridge, Cambridge University Press, 1995), p. 3.
[21] Michael Adas, *Machines as Measure of Men: Science, technology and the ideologies of Western dominance* (Ithaca: Cornell University, 1989), p. 205.

hazard and a disaster, as well as development, or stagnation, of responses and mitigation measures implemented during the post/earthquake period.

b.2 Historical Seismology

A fundamental critical pillar in the field of disaster history, like in any other fields in historical research, is data recovery. What makes it orthodoxly exceptional is that in historical disasters, both the qualitative and quantitative data should be recovered as extensive as possible. In some societies, hazards and disasters are considered part of people's daily life, and this makes the documentation of each calamity more complicated, and sometimes, futile. In some cultures, they have considered typhoons and earthquakes as a "normal" component of their every day dealing with the environment. Thus, their experience makes it more cultural, than the conventional historical treatment of an event wherein the experience is considered unique as it is. Despite these observed limitations, the historiography of natural hazards, as a component of environmental history, shows us a not so voluminous resource compendium. Most of the available accounts about historical earthquakes were the works of the scientists and engineers in different time periods. Thus, this is where the rigors of historical seismology are considered.

Guidoboni and Ebel (2009) defines historical seismology as the documentation, enumeration, and cataloguing of earthquakes and identifying their location in a certain period in the past; taking into consideration the accounting the effects of earthquakes to the physical environment and human infrastructures, and the value of such documentation in the study of those societies.[22] The manners in which disaster are documented and presented are indispensable in disaster history research, as in any historical event, these documentations are to be read as actual primary source materials about those disasters. The social, political, economic, or psychological dimensions of an earthquake event or disaster thus become an integral part of the conventionally numerical nature of seismological documentation.[23] Furthermore, highlighting the experience in Japan, Ishibashi (2004) defines historical seismology as, "…seismological observation and analysis by historical materials not by seismograms but by historical materials…(historical seismology) is an integration of historiography and earthquake science…"[24]

Seismologist and geologist Jean Vogt, one of the pioneers in late 20th century historical seismology in Europe, argues that being an expert on earthquakes with a good grasp of history makes the discipline of seismology a broad, multidisciplinary field:

> …field knowledge of former earthquakes is fundamental for the understanding of liquefaction, earthquake-triggered landslides, rockfalls, tsunamis and risk assessment in these specific fields. Centuries-old descriptions of such processes are often vivid, precise and directly useful for practical purposes. Also, historical research brings to valuable light

[22] Emanuela Guidobini and John Ebel, *Earthquakes and Tsunamis in the Past: A Guide to Techniques in Historical Seismology* (UK: Cambridge University Press, 2009), pp. 6-7.
[23] Ibid.
[24] Katsuhiko Ishibashi, "Status of Historical Seismology in Japan", *Annals of Geophysics* 47(2-3): 350.

> information on traditional prevention techniques, the knowledge that is valuable to architects, not only for the restoration of historical buildings in seismic areas but also in a more general way. Further, useful information on mental problems (catastrophism, early haphazard prevision, etc.) can be found. In short, a sense of scientific, technical, economic, social, and political responsibility requires the best possible all-round knowledge of historical seismicity and its background.[25]

Vogt rejects the criticism of historical seismology as a kind of historical amateurism.[26] He defends it by using the Rankean argument of positivist thought and critical treatment of sources, which placed history as a formal academic discipline. He furthers that information can be found anywhere – from religious, political and commercial reports; and reading, rereading, interpreting it by the bounds of historical paradigm, especially chronology, are vital measure to be taken, that is why he considers historical seismology "as a field of responsibility by both seismologists and historians."[27] The sense of "togetherness" that historians and seismologists should be cultivating was further Vogt: "While seismologists desperately need historians' help, they should correct some historians' excesses [when they concern themselves with disastrous earthquakes only]. On the other hand, seismologists are often frightened by seemingly irrational complex problems of tracing sources in a mosaic of depositories."[28]

Since the 1980s, seismologists, geologists, and historians were trying to standardize the methodology of historical seismology, through international conferences and scientific seminars. To mention one was the symposium held on 11/12 1983 at the Imperial College in London, wherein the participants hoped that the "meeting would establish methods for handling microseismic data through all the stages from retrieval to end/use for engineering purposes, and the workers in each field would be aware of the needs and constraints facing the others."[29] The meeting advocated for a critical review of source data, particularly the statistical seismological information indicated in accounts such as a private diary, public news, official documents from the government, and secondary sources.[30]

In a recognized seminal work titled *Lse Tremblements de Terre aux XVII et XVIII Siècles: Le Naissance d'un Risque* (2005), Grégory Quenet presents a historical synthesis of the earthquake occurrences in France during the 17th and 18th centuries, based on 560 manuscripts and 200 communications with the Academie Royale des Sciences de Paris.[31] In an estimated 751 earthquakes recorded in France during the said centuries, 27 are deemed "destructive", and qualify as turning points in the geographical and economic landscape, and warrant scientific changes and movements

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[25] Jean Vogt, "Some glimpse of historical seismology", *Technophysics* 193 (1993): 2-3.
[26] Ibid., p. 2.
[27] Ibid., p. 7.
[28] Jean Vogt, "Historical seismology – Some notes on sources for seismologists", in M. Stucchi (ed.)
Historical Investigation of European Earthquakes – Materials of the CEC Project "Review of Historical Seismicity in Europe", CNR, Milano, 1:15–24
[29] N. Ambraseys, et. al, "Notes on Historical Seismicity", *Bulletin of the Seismological Society of America* 73(6): 1917-1920.
[30] Ibid., p. 1917.
[31] Grégory Quenet, *Les Tremblements de Terre aux XVII et XVIII Siècles: Le Naissance d'un Risque* (Champ Vallon, 2005).

initiated by different societal actors and segments – thus a work on the "history and geography of risk".[32] It is evident in the work that he used the longue durée framework, but emphasized earthquakes as "events". Observable also is his linear-developmental-evolutionary themes in discussing how earthquakes were indispensable events in France during the said period. He explains that earthquakes were perceived as destructive events from the community to the national level; the responses also evolved, from the mere spectacle of nature to reconstruction and protection offered by different state segments; and lastly, the interpretation grew from plain religious attribution to the birth of a new era of scientific appreciation of nature. There is also a presentation of an understanding that earthquakes in France coincided with domestic and international political and cultural change. He argues that earthquakes in France in the centuries studied remained exceptional in its historical experience.[33] Furthermore, he states that (1) bureaucratic and legal practice gives shape to disaster in claims and lawsuit; (2) the seismic risk is therefore under construction, gradually becoming a textual, scientific, administrative and legal object, and (3) the discourse is enriched, the intertextuality weaves its links and the historical sources multiply.[34]

Summary, data recovery, documentation, and cataloging are given premium in this subfield of seismology. Using historical seismology, and adapting it to the limitations posed by a variety of earthquake experiences, depending on the geographic location, and cultural appreciation of societies to hazards, is useful in this research as it envisions the combination of the use of instrumental data and qualitative accounts detailing the stories of a disaster experience, by providing both the numerical nature of the hazard or calamity, as well as how it affected the lives of the people after such disaster. Documentation of the earthquake, periodization of scientific production between earthquakes, and the bridging of experimental data to the people and society's experiences are the visions of research endeavors focusing on historical seismology.

Though this study will reflect on approaches in historical seismology, such parameters do not limit the narrative presented. The dissertation recognizes the value of other methodologies and source materials that provide information and foretell the story of people and communities in times of earthquakes and earthquake-induced disasters.

b.3 *La Longue Durée* and a History of Environmental Hazards

A third theoretical guide is used in this study, which is primarily a product of French environmental and historical thought. The Annales School of History has been a primary force in the crafting and theorizing of environmental history. Lucien Febvre (1878-1956), Marc Bloch (1886-1944), Fernand Braudel (1902-1985), Jacques Le Goff (1924-2014), Georges Duby (1919-1996), Pierre Chaunu (1923-2009), pioneered the new geographical approaches in the study of history and laid the groundwork for the development of rich tradition of other aspects of history, such as of regional and rural in

[32] Ibid., pp. 15-73.
[33] Ibid., p. 476.
[34] "*La pratique bureaucratique et juridique donne forme à la catastrophe lors des demandes d'indemnisation et des procès. Le risque seismique est donc en construction, en devenant peu a peu un objet textuel, scientifique, administratif et juridique. Le discours s'etoffe, l'intertextualite tisse ses liens et les sources historiques se multiplient…*", Ibid., p. 475.

France.[35] The succeeding generations of Annales scholars include Emmanuel Le Roy Ladurie (1929-), Phillipe Aries (1914-1984), Erving Goffman (1922-1982), Pierre Bourdieu (1930-2002), Michel de Certeau (1925-1986), and Roger Chartier (1945-) contributed to the growth of anthropological history.[36]

A survey dissecting this aim of the Annales historian helps us understand their views about the environment and its place in the historical narrative of societies. Le Roy Ladurie argues that history is the synthesis of all social sciences (*sciences de l'homme*) turned towards the past.[37] This total history is an overarching framework on the historical integration even on the level of the micro-village study, of many levels of analysis incorporating the skills and tools of an array of ancillary disciplines.[38] A general theme of the annals historiography portrays an interaction of three fields: economies, societies, civilizations – dynamics of their triple relationship and their hierarchical and dialectical interdependence.[39]

Their works indicate the deep understanding and appreciation of the critical role of the environment in the historical development of societies. Ford (2001) argues, "geographical and historical approaches to the study of French landscapes and environment have tended to focus in the inhabited "milieu", on cultivated or agricultural landscapes."[40] Moreover, as Harsgor (1978) points out - the Annales historians aimed at reconstructing a "total history".[41] Burke (1990), in his study of the institutionalization and evolution of Annales historical thought, shares the same view, that the generation of French Annales historian is a "the construction of a new kind of history", by reclaiming vast area of history not usually covered by the conventional political narrative.[42] The Annales historians also pioneered the extensive use of an approach the scholars of their works call an histoire serielle (serial history), described as an analysis of trends over a *longue durée*; study of continuities and discontinuities within a series of relatively homogenous state.[43] Annales organized historical data in series to identify long run or recurring patterns, which must be interpreted and related to more qualitative evidence.[44] This approach covers the skeletons of fundamental economic analysis with the flesh of demographic, cultural, metal, and even psychoanalytical data; and the legacy of their work led to the foundation of some historical subfields, such as price studies, demography, sexual behavior, and even plant biogeography.[45]

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[35] Caroline Ford, "Landscape and Environment in French Historical and Geographical Thought: New Directions", *French Historical Studies* 24(1), p. 125.
[36] Peter Burke, *The French Historical Revolution: The Annales School, 1929-89* (Cambridge: Polity Press, 1990), p. 81.
[37] Michael Harsgor, "Total History: The Annales School", *Journal of Contemporary History* 13(1): 1-13, 1978, p. 2.
[38] Robert Forster, "Achievements of the Annales School", *Journal of Economic History* 38(1), 1978, p. 58.
[39] Harsgor, "Total History: The Annales School", p. 5.
[40] Ford, "Landscape and Environment in French Historical and Geographical Thought: New Directions", p. 125.
[41] Michael Harsgor, "Total History: The Annales School".
[42] Burke, *The French Historical Revolution,* pp. 105 and 110.
[43] Ibid, p. 111.
[44] Forster, "Achievements of the Annales School", p. 69.
[45] Harsgor, "Total History: The Annales School", pp. 3-5.

The Annales historians, following the Vidalian tradition of historical geography and landscape studies, advanced the use places and cultures in historical understanding.[46] Works and compilation studies by contemporary French historians, such as *Pour une histoire de l'environnement: Travaux du programme interdisciplinnaire de recherche sur l'environnement* and *Les Francais dans leur environnement* are influenced by the *Annales* intellectual tradition, and applied it in modern environmental problems and issues.[47] Reflecting on Febvre's (1925) arguments on the influence of physical environment to human history, this study will correlate specific ideas from the French environmental thought. He elaborates that "…man, a malleable being, submissive to the action of his natural environment acts on him and transforms him employing two powers, two sovereign forces: soil and climate. It is granted certainly that, heredity forms one of the factors in human evolution, but all the others are derived from habitat. These exercise their power at the same time on individuals and communities, and are not only productive agents in somatic transformation, but are equally the determinants of political and moral ideas and realizations – the very basis of history."[48] Fevbre argues that environment established possibilities for societies; he insisted that the humankind had a broad range of choices within which freedom and creativity operated, thus criticizing the conventional environmental deterministic approach.[49] Banking on this, the study works on the idea of geographic landscapes and natural hazards as a correlation between soil and climate. It will argue that, like the latter, geographic context and natural threats also dictate/had dictated and shaped the historical development of Filipino communities, given the frequency of hazards that hampers and devastate the archipelago. The study will define and consider inherent risks as notable historical events. As history is merely, or should be, empirical and partly theoretical, it is important to craft the subject matter of the study into units of reality. Natural hazards belong to the long-standing, unknown past truth. We should view these hazards as events or set of circumstances, that is isolated to the temporalities of human consciousness. Furthermore, Inkpen (2011) argues, the *"*isolation an event from a spatial and temporal continuum immediately highlights the explanatory framework.*"*[50]

But all may agree that the main contribution of the Annales School in historical studies is their treatment of time not only as an element of history but as a guiding principle in their approach to social change. Fernan Braudel'ds conception of time in his works articulates larger concepts of structure, conjuncture, event; millennium, century-cycle, noises, and currents.[51]Generally speaking, he argues the existence of a tripartite evolutionary phase and division of time in history: events, cycle, and *longue durée* (long duration). This tripartite nomenclature is his proposal of a hierarchy of "three interlocking historiographic time frames".[52] The last one captures and encaptures what Braudel, and the Annales scholars are globally known. For Braudel, this is "une histoire immobile" (for a very long

[46] Ford, "Landscape and Environment in French Historical and Geographical Thought: New Directions", p. 130.
[47] Ibid., 131-133.
[48] Lucien Febvre and Lionel Bataillon, *A Geographical Introduction to History* (New York: Alfred A. Knoepf, 1925), p. 91.
[49] Hughes, *An Environmental History of the World, p. 32.*
[50] Inkpen, "The Philosophy of Geology", p. 319.
[51] Forster, "Achievements of the Annales School", p. 63.
[52] David Henley and Henk Schulte Nordholt, "Introduction: Structures, Cycles, and Scratches on Rocks", in David Henley, and Henk Schulte Nordholt (eds.), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015), p. 3.

term), and “une histoire lentement rhytmee” (for changes over a mere century or two).[53] Le Roy Ladurie’s approach to events as reactions or responses to structural change in society was not far from Braudel's perspective of events as mirrors or as litmus papers revealing structural arrangements in societies.[54]

In 2015, the book *Environment, Trade and Society in Southeast Asia: A Longue Durée*[55] *Perspective* was published in honor of Dutch historian Peter Boomgaard (1946-2017), who pioneered an approach to Indonesian and Southeast Asian studies by focusing on the history of its environment, and how this influenced the development of localized and regional states and networks in the region. The book is "an invitation to undertake further exploration of Southeast Asian history concerning its longue durée.”[56] He confessed that the Annales School, particularly by the concept of longue durée, profoundly influenced him. The book “aims to underline the importance of persistent patterns and structures in Southeast Asian history, the effects of which are felt in multiple domains of human activity and at periods widely separated in time, including the present. These patterns and structures can help us to understand both the course of the region's history and what makes it distinctive with other parts of the world.”[57] The book tackled the role of environmental hazards such as earthquakes, volcanic eruptions, and tsunamis as sudden, more intermittent, and more violently destructive in their effects than in any war or economic crisis, but “still shape the history of the longue durée – whether because they occur at short and regular enough intervals to form systematic and predictable But even when intermittent, they can still shape the history of the longue durée – whether because they occur at short and regular enough intervals to form systematic and predictable…”[58] Two chapters in the book focus on environmental hazards as a longue durée experience in Indonesia. In the fourth chapter of the book, “Under the Volcano: Stabilizing the Early Javanese State in an Unstable Environment”, Jan Wisseman Christie “investigates the impact of volcanic eruptions on political relationships and religious attitudes in Central Java during the tenth century”.[59] Another one, the fifth chapter titled “History and Seismology in the Ring of Fire: Punctuating the Indonesian Past”, Anthony Reid “argues on the basis of recently discovered geomorphological evidence that northern Sumatra was very likely hit by a devastating tsunami around the beginning of the fifteenth century…noting that the recurring damage caused by eruptions, earthquakes, and tsunamis offers a new part of the solution to the old puzzle of low population growth in precolonial Indonesia.”[60] This work is one of the latest attempts to enliven the Annales tradition of historical studies, and one clear proof that the said school of thought advanced the early works on environmental history, furthermore influenced the rise of scholarship on environmental history.

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[53] Burke, *The French Historical Revolution*, p. 114.
[54] Ibid., p. 90.
[55] David Henley, and Henk Schulte Nordholt (eds.), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015).
[56] Ibid., p. 14.
[57] Ibid., p. 8.
[58] Ibid., pp. 7-8.
[59] Jan Wisseman Christie, Under the Volcano: Stabilizing the Early Javanese State in an Unstable Environment”, in David Henley, and Henk Schulte Nordholt (eds.), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015), p. 9.
[60] Anthony Reid, “History and Seismology in the Ring of Fire: Punctuating the Indonesian Past”, in David Henley, and Henk Schulte Nordholt (eds.), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015), p. 10.

c. State of the Arts: Methodology and Description of Sources

The dissertation is a historical reconstruction of the Philippine past wherein it considers earthquakes as "destructive events", using an approach I label as "qualitative historical seismology". The subject earthquakes are considered turning points, actual past events that cause changes to human communities, and shakes the status quo of structures and social orders. Although partly departing from the conventional approach in historical seismology wherein the primacy of seismological data is almost a default, this research takes into consideration this kind of data, but preference to the qualitative and accounts-based information is stated. The dissertation generally narrates historical realities about the Filipino environment through "model" events, such as earthquakes. By describing the Philippine experience during and after the six selected earthquakes, we can depict as part of the country's past where social and political epiphanies happened, both rooted on the exact earthquake disaster experience, or triggered and influenced by the tragedy that occurred. Unlike the typical structure of studies grounded on historical seismology, this study will not focus on one earthquake event or disaster, but on a series of earthquakes, encompassing almost 130 years. Through this, we can identify the changed or unchanged perception of people towards earthquakes, as well as pointing out the governing and prevailing psyche of communities about hazards and disasters.

The dissertation uses primary sources from several libraries and archives in the Philippines, Spain, and a portion from the United States. These primary sources used contain facts and data about the earthquakes studied, though the form of government records, scientific reports, and accounts and information from newspapers. This dissertation also includes secondary researches about specific topics that are relevant to the prime subject matter. The current research values the use of primary data the earthquake studied but included critical and valuable information and analysis from secondary materials. Through the use primary and secondary historical sources, this current research aims to present a reconstruction of the history of the Philippine environment and society by narrating and interpreting disastrous earthquake events, and how these shaped the lives of Filipinos after such calamities.

c.1. Government Reports, Newspapers, and Scientific Works on Historical Seismology in the Philippines, 19th-20th centuries as Primary Sources

The long history of earthquakes that hampered the archipelago were made available to the memory of the people not only because of its intensity and effect to towns and communities but also because the government and the people were able to document and account those events. Archival materials suggest that there are accounts of about these hazards emanating from local town chiefs, parish priests, as well as other members of communities.[61] Bundles of documents and narratives tell the story of people's experiences and sufferings during and after the onslaught of these hazards. Some of these narratives were published as official reports of colonial governments.

For all the earthquakes that happened studied in this dissertation, newspapers, and government reports were used to obtain information about how governments responded,

[61] A survey of select documents from the Archivo Historico Nacional in Madrid, the National Archives of the Philippines, and the Manila Observatory Library and Archives will reveal and support this hypothesis.

what was the extent of the damage to people and properties, and what were the effects of the immediate and extended terms programs set to rehabilitate destructed communities. For the June 1863 and July 1880 earthquakes, government reports from the Ministerio de Ultramar, and the Gobierno Superior Civil de Filipinas were used. These reports are valuable as they contain extensive information about the damage of the earthquakes, as well as how the Spanish colonial government in Manila and Madrid responded to this catastrophic event in their Pacific colony. Moreover, the study also used information from reports and news articles published at the Gaceta de Manila in the Philippines, during the period covered by the disaster, in 1863 and 1880. These newspapers are also a good source not only of approved government orders and programs but also of some opinion pieces about how some sectors of the colonial society perceived the government post-disaster rehabilitation project. The dissertation also consulted other primary sources at that time, such as accounts, letters, and reports from religious groups and non-Spanish residents of Manila at that time, some of them were European travelers, explores, and observers that went and stayed in Manila during the period of the said earthquake events. The Manila Observatory Archives (MOA) has its collection and compendia of transcribed materials, as well as copies of the documents as mentioned above.

These materials, which are published and unpublished works of the Jesuit scientist of the Manila Observatory are used in this dissertation. These scientific works are combined personal accounts, and scientific researches, which provide technical views of the earthquake phenomena. Other contemporary period sources were also used to enrich the narrative, build connections, and verify and corroborate information from other primary sources. Some of these are Philippine history books, dictionaries in Spanish and several local, native languages such as Tagalog, Cebuano, Hiligaynon, Kapampangan, Ilocano, Bicol, etc., and foreign publications indicating valuable information about the Philippines.

For the earthquakes in the 20th century, state, and local private newspapers and magazines were used to collect information and build the narrative of events. Daily publications such as the Manila Daily Bulletin (MDB), Manila Times (MT), Philippine Daily Express (PDE), Philippine Sunday Express (PSE), Bulletin Today (BT), and magazines like the Weekly Nation (WB), Sunday Times Magazine (STM), Times Journal (TJ) Philippine Panorama (PP), and Philippine Graphic Weekly Magazine (PGWM) were consulted in this work. It must be mentioned that during the era of authoritarian rule in the Philippines (1972-1986), one earthquake happened – the August 1983 north Luzon earthquake. And during this time, all the newspapers were government-run and sanctioned. All information published and released to the public underwent scrutiny by the government authorities, thus limited "problems" about government response can be observed. After the fall of the dictatorial regime in 1986, credible and critical Philippine media regained its control of many newspapers, and well a resurgence of as old and new newspapers was seen. Related to this, for the discussion on the July 1990 earthquake, the dissertation used the news articles and reports published at the MB, as this newspaper contained, as far as comparison with other papers is concerned, the most extensive documentation of the earthquake.

Published works on the history of hazards and disasters range in between studies of typhoons, risks, epiphenomenal threats caused by other hazards, and human-made disasters. For this dissertation, the studies made about earthquakes are given consideration. The approaches of these studies are scientific and socio-cultural. Some of

the works, in my view, set the foundation of the historically grounded materials on earthquakes. The scientific works were written and published during the 19th and early decades of the 20th century can be considered "amino narratives" - building blocks of a more extensive historical past. Given this, scientific studies are indeed important when we talk about the history and historiography of natural hazards and environmental threat to the human population. They strengthen our base in the construction of the historiography of natural hazards and disasters. These studies were made out of the first step of scientific understanding – research. And as the era of the birth of these researches were at the conjuncture of the Filipino society from a period of one scientific development to another, and from the widening acceptance of modern knowledge and mechanisms of knowledge production, they formed the nucleus of pioneering studies about the hazards they elaborated.

Two of the most commonly used catalogues on Philippine earthquakes provide a baseline work on historical seismology in the Philippines, namely: Miguel Saderra Masó's *Catalogue of Violent and Destructive Earthquakes in the Philippines (with an Appendix Earthquakes in the Marianas), 1599-1909*[62] and *Volcanoes and Seismic Centers of the Philippine Archipelago*[63], and William Repetti's *Catalogue of Philippine earthquakes, 1589-1899.*[64] In his catalog, Saderra Masó detailed 19th-century earthquake experiences in a modern way. In his study, he presented information systematically, from the date of occurrence, the quantitative strength of an earthquake based on the De Rossi-Forel scale, regions or areas affected, and a qualitative description of damages felt. Repetti followed Saderra Masó's pattern, with some changes in information presentation and qualitative description of tremors. These two accounts are a rich source of historical information about the earthquakes and volcanic eruptions in the 19th century. These not only details the devastations caused by tremors and explosions in the island of Luzon but also exemplifies the standard content of archival disaster narratives. But these accounts are less scientific, as one can characterize. These sources do not embody the scientific understanding of earthquakes as environmental phenomena.

The dissertation also presents a short discussion on how local and oral literary materials can be windows in looking at local, traditional, and indigenous perspectives on earthquakes as environmental and historical phenomena. In Chapter 2 of the dissertation, a survey of epics, myths, folklore, and other local history materials was made. The work used these sources as they contain the conventionally considered "traditional" and "indigenous" in Philippine history materials.

Comprehensive scientific and statistically inclined studies about Philippine earthquakes are also available; some works date back in the 19h century. Seismologists of the *Observatorio de Manila*, and the state's mining, and civil engineers, and geologists pioneered the field visits and documentation of the causes and effects of earth tremors. These include Saderra Masó's *La Seismologia en Filipinas: Datos para el studio de*

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[62] Miguel Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines (with an Appendix Earthquakes in the Marianas), 1599-1909* (Manila: Bureau of Printing, 1910).
[63] Miguel Saderra Masó, *Volcanoes and seismic centers of the Philippine Archipelago* (Manila: Bureau of Printing, 1911).
[64] William Repetti, *Catalogue of Philippine earthquakes, 1589-1899* (Berkeley, California: University of California Press, 1946).

terremotos del Archipiélago Filipino[65], "*Volcanoes and seismic centers of the Philippine Archipelago,*[66] and *Catalogue of Violent and Destructive Earthquakes in the Philippines, with an Appendix: Earthquakes in the Marianas Islands 1599-1909.*[67] Saderra Masó's works provide the latter scientists and researches historical data about the archipelago's geological past. His first book on seismology published in 1895, is a summary of studies made by the Philippine Jesuits on earthquakes and volcanic eruptions. It used data gathered in their seismic laboratory, but also cited some newspapers with wide circulation in Manila, such as *El Comercio* and *El Diario*. His subsequent publications in 1904 and 1911 were under the tutelage of the American colonial government and did use more extensive materials and studies, made by Spanish geologists and mining engineers, as well as American experts in geology and seismology.

Experts, seismologists, geologists made more than a dozen published scientific studies about Philippine earthquakes, and civil and military engineers commissioned by colonial governments since the late 19th century. Their works, some of which were their *magnum opus* as professionals, were published both as commissioned and personally initiated, date back as early as 1863 up to 1913. These works were products of post-disaster efforts of colonial governments to understand earthquakes and volcanic eruptions from modern science (in the 19th century), as well as lay down measures and mechanisms to reconstruct cities and town founded on rigorous scientific studies.

These materials can be thematically grouped into two: (1) studies about earthquakes and (2) studies about building reconstruction. For the first group, the works are: Enrique Abella y Casariego's *Terremotos de Nueva Vizcaya (Filipinas) en 1881, Informe acerca de ellos, seguido Apuntes Físicos y Geológicos tomado en en el viaje de Manila a dicha provincial*[68] (1884) and *Terremotos experimentados en la Isla de Luózn durante los meses de Marzo y Abril de 1892 especialmente desastrosos en Pangasinán, Unión y Benguet*[69] (1893), Antonio del García Canto's *Los Terremotos de Manila: Estudios historicossobre los grandes terremotos que han tenido lugar en el Archipiélago Filipino, desde su descubrimiento por Magallanes hasta el 3 de Junio de 1863*[70] (1863), José Centeno's *Memoria sobre los temblores de tierra ocurridos en julio de 1880 en la isla de Luzón*[71] (1881), and Miguel Saderra Masó's *La Seismología en Filipinas: Datos para el*

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[65] Miguel Saderra Masó, *La Seismologia en Filipinas: Datos para el studio de terremotos del Archipiélago Filipino* (Manila: Establicimiento Tipo-Lotográfico de Ramírez y Compañia, 1895).
[66] Miguel Saderra Masó, *Volcanoes and seismic centers of the Philippine Archipelago* (Manila: Department Commerce and Labor - Bureau of Census, 1904).
[67] Miguel Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines, with an Appendix: Earthquakes in the Marianas Islands 1599-1909* (Manila, Bureau of Printing, 1910).
[68] Enrique Abella, *Terremotos de Nueva Vizcaya (Filipinas) en 1881, Informe acerca de ellos, seguido Apuntes Fisicos y Geologicos tomado en en el viaje de Manila a dicha provincial* (Madrid, 1884).
[69] Enrique Abella, *Terremotos experimentados en la Isla de Luzon durante los meses de Marzo y Abril de 1892 especialmente desastrosos en Pangasinan, Union y Benguet* (Manila, 1893).
[70] Antonio García del Canto, *Los Terremotos de Manila: Estudios historicos sobre los grandes terremotos que han tenido lugar en el Archipiélago Filipino, desde su descubrimiento por Magallanes hasta e; 3 de Junio de 1863* (Madrid, 1863).
[71] José Centeno, *Memoria sobre los temblores de tierra ocurridos en julio de 1880 en la isla de Luzón* (Madrid: La Guinalda, 1881).

studio de terromotos del Archipiélago Filipino[72] (1895), *Catalogue of Violent and Destructive Earthquakes in the Philippines (with an Appendix Earthquakes in the Marianas), 1599-1909*[73] (1910), *Volcanoes and seismic centers of the Philippine Archipelago*[74] (1911), and "The Relation of Seismic Disturbance in the Philippines to the Geologic Structure"[75] (1913), which he co-authored with American geologist Warren Smith. For the second one: the works of Rafael Cerrero, *Memoria sobre las Armaduras destinada a sostener las cubiertas de los edificios*[76] (1862), Manuel Cortés' books, *Los terremotos, sus efectos en las edificaciones y medios practices para evitarlos en lo possible*[77] and *Apuntes para un proyecto de edificaciones con destino a familias obreras, estables, higiénicas y económicas en lo possible*[78] (1912), and Nicolas Valdés' works, *Descripción y resistencia de las maderas de construcción de las Islas filipinas*[79] (1858) and *Manual del ingeniero y arquitecto, Segunda Edición*[80] (1870). The materials in this group are not extensively cited in the dissertation due to its technical nature, but used some of its theoretical propositions in certain parts of the manuscript.

From a 19th century point of view, for whom are these works? These are not for ordinary people. These were made to circulate amongst the circle of experts and public officials, for policymaking. The "elite" nature of these works reinforces the "elite" notion of science during that time. As what the metaphor of the mysterious laboratory Rizal portrayed in one of the chapters of *El filibusterismo*, these works remained to be the for the benefit of the state, for the advancement of colonial sciences – sciences that were used for the benefit of the colonial state. Thus, this study offers a historical narrative beyond these studies. Although their content will be of great use, the study goes beyond the stories contained in the official reports and studies; it will correlate with other sources of information to reveal the spaces of the location population and the contestations of ideas and culture between groups of people involved in disasters.

In the 20th century, scientific institutions continued the work of producing scientific studies and reports about earthquakes, mainly, after those earthquakes happened. For the August 1937, August 1968, August 1983, and July 1990 earthquakes, institutions such as the Philippine Weather Bureau (PWB), later on the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), National Research Council (NRC), the Philippine Geological Society, the PHIVOLCS, and a lot of foreign

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[72] Miguel Saderra Masó, *La Seismologia en Filipinas: Datos para el studio de terromotos del Archipiélago Filipino* (Manila: Observatorio Meteorologico de Manila, 1895).

[73] Miguel Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines (with an Appendix Earthquakes in the Marianas), 1599-1909* (Manila: Bureau of Printing, 1910).

[74]Miguel Saderra Masó, *Volcanoes and seismic centers of the Philippine Archipelago* (Manila: Bureau of Printing, 1911).

[75] Miguel Saderra Masó and Warren Smith, "The Relation of Seismic Disturbance in the Philippines to the Geologic Structure", *The Philippine Journal of Science* 8 (4), 1913.

[76]Rafael Cerrero, *Memoria sobrelas Armaduras destinada a sostener las cubiertas de los edificios* (Madrid: Imprenta de la V. de D. J. C. de la Pena, 1862)

[77] Manuel Cortés, *Los terremotos, sus efectos en las edificaciones y medios practices para evitarlos en lo possible* (Manila: Ramírez y Giraudier, 1881).

[78] Manuel Cortés, *Apuntes para un proyecto de edificaciones con destino a familias obreras, estables, higiénicas y económicas en lo possible* (Granada: Tipografía de López Guevara, 1912).

[79] Nicolas Valdés, *Descripción y resistencia de las maderas de construcción de las islas filipinas (*Manila: Imprenta de Ramírez y Giraudier, 1858).

[80] Nicolas Valdés, *Manual del ingeniero y arquitecto, Segunda Edición (*Madrid: Imprenta de Gabriel Alhambra, 1870).

universities and scientific agencies produced their independent and collaborative research works about the about the above-mentioned earthquakes. These works are considered primary materials on the discussion of specific earthquakes. Seismologists, geologists, and civil engineers composed the teams that studied the earthquakes and wrote these reports. The manuscripts are technical and provide raw data, seismological and geological interpretation of the earthquake, as well as policy recommendations for the government.

For the August 1937 earthquake, the special volume issued by the NRC in their bulletin[81] contains the pioneering studies about this earthquake. These include the following: Ambrosio Magsaysay and Jose M. Feliciano's "Preliminary study of the earthquake of August 20, 1937", William C. Repetti's "Instrumental study of the earthquake of August 20, 1937, and Pablo A. Sales' "Fundamentals of earthquake-proof design and construction." For the August 1968 earthquake, Generoso R. Oca's comprehensive work, "The Geology of Greater Manila and its Bearing to the Catastrophic Earthquake of August 2, 1968"[82], S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi's "Luzon Earthquake of 2 August 1968"[83], a report made by a team from the United Nations Educational, Scientific, and Cultural Organization (UNESCO), which was commissioned the Philippine government, and A. R. Flores*' undated reports titled The Luzon Earthquakes of August 2, 1968 and April 7, 1970.*[84]

For the August 1983 earthquake, the scientific reports are *Laoag Earthquake of 17 August 1983 Summary Report* and *Assessment on the effects of the August 17, 1983 Earthquake in Laoag City*, made by the PAGASA and the Bureau of Mines and Geo-sciences in 1983.[85] For the July 1990 earthquake, a mix of local and foreign researchers produced the available scientific literature about this earthquake. These include: (1) *The July 16, 1990 Philippines Earthquake: August 1990*[86]*,* (2) *The Luzon, Philippines Earthquake of 16 July 1990: A Field Report by EEFIT*[87]*,* (3) *The July 16, 1990 Luzon Earthquake: A Technical Monograph*[88]*,* and (4) *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo. Descriptions, effects, and lessons learned.*[89]

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[81] *National Research Council of the Philippine Islands, Bulletin No. 14* (Dec 1937): 3-54.

[82] Generoso R. Oca, "The Geology of Greater Manila and its Bearing to the Catastrophic Earthquake of August 2, 1968." *The Philippine Geologist* XXII.4 (Dec 1968): 171-177.

[83] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi. "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969.

[84] A. R. Flores, *The Luzon Earthquakes of August 2, 1968 and April 7, 1970.* (n.d.): 483-492.

[85] R.G. Valenzuela and L. C. Garcia, *Laoag Earthquake of 17 August 1983 Summary Report* (PAGASA, 10 October 1983); N.G. Santiago and E.A Rillon, *Assessment on the effects of the August 17, 1983 Earthquake in Laoag City* (Bureau of Mines and Geo-sciences, December 1983). Unfortunately, no available copies of these works were found. Only a summary of their finds is available at the PHIVOLCS website: https://www.phivolcs.dost.gov.ph/html/update_SOEPD/1983LaoagEQ/index-laoag.html

[86] *The July 16, 1990 Philippines Earthquake: August 1990. California: EQE Engineering, 1990*

[87] Booth, E. D., A. M. Chandler, P. K. C. Wong, and A. W. Coburn, *The Luzon, Philippines Earthquake of 16 July 1990: A Field Report by EEFIT*. London: Earthquake Engineering Field Investigation Team, 1991.

[88] *The July 16, 1990 Luzon Earthquake: A Technical Monograph* (Inter-Agency Committee for Documenting and Establishing Database on the July 1990 Earthquake, 1992).

[89] Giovanni Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo. Descriptions, effects, and lessons learned* (Presidenza del Consiglio del Ministri, 1994).

To sum up, most of these books have long been available, but a recent initiative to digitize old texts and archival materials made these works more relevant and useful as historical materials. In the advent of environmental history as a growing field of research in the Philippines, more scholars can consider these reports not only as scientific reports, but also as valuable historical materials for the study of the Philippine archipelago's "disastrous past".

c.2 Sources from several archives

The study will trace the events and naturally driven disasters that shaped the Philippine past in the 19th and 20th century using archival materials. By analyzing these materials, newspaper reports, and scientific publications, the dissertation enables to present a history of earthquake occurrences in the archipelago, particularly in Luzon, extracting knowledge and facts on the how the government and the local population responded to the devastations and challenges posed by earthquakes as environmental hazards. This present work is a reconstruction of the country's past, focusing on the way natural hazards influenced and shaped the lives of Filipinos in different periods.

The dissertation uses primary sources that are found and can be collected from several libraries, archives, and online repositories in the Philippines, Spain, and the United States. These primary sources contain actual data, accounts, and facts about the occurrence of natural hazards and the subsequent effects of these events to different Filipino communities, both urban and rural, in the particular era covered by the study. As the period covered by the present study falls into the age of the Spanish colonial regime, it is an essential step to research several imperial libraries and archives.

c.2.1 National Archives of the Philippines (NAP), Manila, Philippines, and Biblioteca Tomás Navarro Tomás-Centro de Ciencia Humanas y Sociales-Consejo Superior de Investigaciones CientÍficas (BTNT-CCHS-CSIC), Madrid, Spain

The collections of 19th-century documents, records, and reports from the National Archives of the Philippines (NAP) and the Archivo de Filipinas of Biblioteca Tomás Navarro Tomás, Centro de Ciencia Humanas y Sociales-Consejo Superior de Investigaciones Científicas (BTNT-CCHS-CSIC) constitute the bulk of archival materials used in Chapter 3 of the dissertation. Through these documents, the dissertation presents a narrative of the official reports by the government about earthquake occurrences in the 19th century, containing information about the situation in devastated areas, extent of damage to public properties, measures implemented, communications with the central government in Madrid, budget released, mobilization of manpower, and other related information about the earthquakes. The original copies of documents can be found at the NAP; while the BTBT-CCHS-CSIC have digitized copies of the NAP collections, a product of a collaboration/modernization project in the 1990s funded by the Agencia Española de Cooperación Internacional para el Desarollo (AECID). The NAP documents about hazards and disasters are at default put into the *calamidades publicas;* the dissertation uses the bundles about *terremotos* (earthquakes), *obras publicas* (public works) and *erreciones de pueblo* (founding of towns). The NAP has its resource cataloging of sources. But for this work, the dissertation follows the cataloguing used by the BTNT-CCHS-CSIC, based on the guidebook titled *Guía Catálogo de la Sección de Documentos Españoles del Archivo Nacional de Filipinas* by Samuel Ruiz Carmona and

Patricia de la Hoz Pascua (2002).[90] The bibliographical entries of the sources from the Archivo de Filipinas of BTNT-CCHS-CSIC used in this dissertation follow the cataloging of the library, which is based in this guide by Ruiz and de la Hoz. The Archivo de Filipinas of BTNT, basically, is a digitized collection of the documents that can be found at the NAP. Arguing from the point of view of source access, this collection is a much-democratized one compared to the way materials were allowed to be used at the NAP. Its digitized nature helps in better appreciation, use, and distribution of materials, and its relatively better cataloging of materials lead researchers to enhanced surveying of the whole collection.

c.2.2 Archivo Historical Nacional (AHN), Madrid, Spain

The dissertation uses additional archival materials from the Archivo Historical Nacional (AHN). This archive houses 19th-century documents about Spanish history. In particular, the collection from the Overseas Ministry (Ministerio de Ultramar); the "Ultramar" Section of the AHN's collection is used, as this contains the records about the policies implemented in the Philippines, Cuba, and Puerto Rico, Spain's remaining colonies after the end of the independence wars in Latin America from 1800s-1820s. When the Spanish Overseas Ministry was abolished in 1899, all the documents of the ministry were kept at the AHN, starting in the year 1916. Moreover, this section is a rich source of materials about the reports 19th-century disasters in the Philippines sent by the Spanish civil government in Manila to Madrid. Filipino scholar writing about the political, economic, and social development of the Philippines during this period relied heavily on the documents of this collection, especially if there is a great need for official royal orders, decrees, and policies to be implemented in the Philippines, Cuba, and Puerto Rico. It also has copies of almost all diplomatic communications of the colonies to countries in Europe, Asia, and in the American region, where Spain had diplomatic and economic ties and relations.

For researchers who are starting their venture into Spanish archives, Patricio Nuchera's *Guía de Fuentes Manuscritas para la Historia de Filipinas Conservadas en España*[91]is a useful guide for researchers studying about the Philippines during the 19th century. This handbook lists down almost all the materials in the collections of archives and libraries in Spain, particularly about the Philippines. For researchers to access easily archival materials from Spanish archives, the Ministerio de Educacion, Cultura y Deporte of the Spanish government is maintaining an online archive of the digitized documents from the AHN collection, wherein researchers can download parts of specific collections, including diagrams, maps, and photos. Through the Portal de Archivos Españoles (PARES)[92], researchers can download some documents, maps, and sketches. Despite this, most of the collections are not entirely digitized, and researchers need to visit the archives and encode the documents manually to obtain the information the collections provide. The PARES is the most comfortable access to some collections not only of AHN, but also of the ten other Spanish state archives, both provincial, religious, and of

[90] Samuel Ruiz Carmona and Patricia de la Hoz Pascua, *Guía Catálogo de la Sección de Documentos Españoles del Archivo Nacional de Filipinas* (Sevilla: Publicaciones Digitales, 2002).
[91] Patricio Hidalgo Nuchera, *Guía de Fuentes Manuscritas para la Historia de Filipinas Conservadas en España* (Madrid: Fundacion Historico Tavera, 1998).
[92] See the website of the Portal de Archivos Españoles of the Ministerio de Cultura y Deporte of Spain <http://pares.mcu.es/>.

the monarchy.[93] The AHN documents found at the PARES are documents about the (1) "Old Regime" in Spain, which includes the monarchy, royal councils, and old universities, (2) contemporary executive, executive, and judicial institutions, (3) ecclesiastical institutions, both the regular, secular, and military orders, and (4) private archives and collections of certain individuals.

The dissertation used both the actual and digitized materials of the AHN. Other scholars who worked on the same topic as this present one, and others who worked on other subjects that tackle specific aspects about earthquakes, have also used the documents about that the dissertation used.[94] The Ministerio de Ultramar collection is a good overview of how the transoceanic bureaucracy between the Philippines and Spain worked, particularly on matters of urgent and vital interest of the state, such as disasters and calamities. Even though the collection provides a mine of information on the bureaucratic and administration point of view, one weakness of the documents in the collections is its "formality" – meaning these are mere summaries of all the layers of bureaucracy, for example, from one official or bureau in Manila to the designated Ministry official in Madrid. The metaphor of the "devil in the details" cannot be located, and researchers must corroborate it with "local" bureaucratic archival sources in the Philippines. Researchers using this particular collection must be critical in validating the orders, issuances, and decrees indicated in the Ministry collection, as these might have been just in paper, or didn't reach the Philippines at all. Moreover, documents and communications from Manila should also be tracked down to see if they are part of the summary of reports presented to the Ministry.

c.2.3 Biblioteca Nacional de España (BNE), Madrid, Spain

This dissertation work used a multitude of digitized books, manuscripts dictionaries, and published scientific reports from the Biblioteca Digital Hispánica[95] of the Biblioteca Nacional de España (BNE). This online archive/library contains thousands of digitized materials, encompassing almost half a century of Spanish and world history. Materials such as rare books, manuscripts, newspapers, magazines, and other prints materials, drawings, photographs, cartographic materials, even music and sound recordings, ranging from the social sciences and humanities, natural and applied sciences, literature and linguistics, religion and theology, philosophy, psychology, and biographical studies, are made available to the general public and can be downloaded freely. The dissertation also used some collection that is only for readers' use, such as some 19th-century archival materials, to corroborate with the documents accessed at the AHN.

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[93] See the website of Spain's Archivos Estatales Guidebook <https://en.calameo.com/read/00007533523c486877891>

[94] To mention some, Aitor Anduaga's works on the Spanish Jesuits and military engineers relied heavily on these documents from the AHN. The unpublished Trabajo Fin de Master of Ros Costelo about the Inspección General de Obras Publicas (IGOP), titled *Construyendo la Colonia: La Inspección General de Obras Publicas de Filipinas, 1866-1898*, from the Universidad Complutense de Madrid are some of these.

[95] See the website of Biblioteca Digital Hispanica of the Biblioteca Nacional De España <http://www.bne.es/es/Catalogos/BibliotecaDigitalHispanica/Inicio/index.html>.
http://www.bne.es/es/Catalogos/BibliotecaDigitalHispanica/Inicio/index.html

c.2.4 Manila Observatory Library and Archives (MOLA), Quezon City, Philippines

The collection of the Manila Observatory Library and Archives (MOLA) contains thousands of scientific reports and publications made by the Jesuit scientists during the time that they headed the Observatorio Meteorológico de Manila (OMM) from 1965 to 1901 and the Philippine Weather Bureau (PWB) from 1901 to 1944.[96] Its compendium has maintained a wide variety of sources and materials written and published by the weather agencies. From their collection, four types of sources are useful for the current research: (1) institutional records, (2) data records, (3) personnel data records, and (4) monthly and annual reports. Institutional records are published, and unpublished studies and reports made by the observatory on a variety of topics, such as meteorology, seismology, astronomy, and terrestrial magnetism. Data records are written reports on data collected about specific environmental and weather disturbances and phenomena such as climate, typhoons, earthquakes, volcano eruptions, and drought. Personnel data records are unpublished writings, correspondence, and studies made and written by the Jesuits directors and scientists of the observatory, such as Federico Faura, José Algué, William Repetti, Miguel Selga, José Coronas, and Miguel Saderra Masó. Monthly and annual reports are official reports containing data from different weather and rain station of the observatory and of the weather bureau. The MOLA maintains a website that includes digitized documents, that are a fraction of their whole collection; some institutional and data records, and maps are available for download.[97] Historians such as Greg Bankoff, Aitor Anduaga, and James Warren used the documents from this archive for their extensive studies on environmental history and history of science. This dissertation's author has relied on the materials of this archive to make his undergraduate[98] and master's thesis[99], as well as some publications about the institutional history of the OMM and the PWB.[100]

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[96] Upon the occupation of the United States of America to the Philippines, the *Observatorio Meteorológico de Manila* was reorganized, and an American Philippine Weather Bureau was established in 1901. The observatory served as the nucleus of the expanded weather agency.

[97] See the website of the Manila Observatory Library and Archives <http://archives.observatory.ph/>

[98] Kerby C. Alvarez, "Sa Saliw ng Init at Ulan: Isang panimulang pag-aaral sa epketo ng klima sa pagtatanim at produksyon ng palay sa Gitnang Luzon, 1900-1927", Bachelor of Arts in History Thesis, College of Social Sciences and Philosophy, University of the Philippines Diliman, 2010. A journal publication version of this, titled "Sa Saliw ng Init at Ulan: Isang Kasaysayang Agro-Klimatiko ng Gitnang Luzon, 1900-1927"*, Philippine Social Sciences Review* 63 (2), 2011, pp. 89-117, is available online, see the website of the University of the Philippines Diliman Journals Online <http://journals.upd.edu.ph/index.php/pssr>

[99] Kerby C. Alvarez, "*Observatorio de Manila*: Institusyong Pang-agham at ang ambag nito sa pagsusulong ng Meteorolohiya sa Pilipinas, 1865-1933", Master of Arts in History Thesis, College of Social Sciences and Philosophy, University of the Philippines Diliman, 2014.

[100] Kerby C. Alvarez, "Instrumentation and Institutionalization: Colonial Science and the Observatorio Meteorológico de Manila, 1865-1899", *Philippine Studies: Historical and Ethnographic Viewpoints* 64 (3-4), 2016: 359-384; Kerby C. Alvarez, "Ang Observatorio Meteorológico de Manila, ang Philippine Weather Bureau, at ang Sektor ng Agrikultura sa Pilipinas, 1865-1937: Isang Panimulang Kasaysayan ng Institusyunal na Agrometeorolohiya sa Pilipinas", *SALIKSIK E-Journal 5* (1), 2016: 1-50.

c.2.5 University of Michigan (UMich) Library Online

The University of Michigan Library's Southeast Asia Collection and Special Collections Library has vast collections of digitized and transcribed monographs, government documents, and images and photographs published in the United States of America, Spain, and the Philippines between 1870 and 1925.[101] Their collection focus on the wars involving the three countries, namely the Spanish-American War (1898), the Philippine Revolution, (1896-1902), and the Philippine-American War (1899-1902), and on the subsequent American administration of the country during the first decades of the 20th century. Earliest studies about the Philippines made by American officials and scholars have used materials put and have been part of these collections. The dissertation uses documents accessed and downloaded from this online archives, notably published books and manuscripts containing information about the earthquakes and geology of the Philippines, both in English and Spanish, and reports made by the American civil government in the Philippines, such as the Philippine Commission Reports (PCR) and Reports of the Governor General of the Philippine Islands (RGGPI). This website has been a reliable medium for history students in the Philippines whose research interests fall on the period covered by the archive's collections. This collection is an excellent repository of late 19th century and early 20th century materials about the American occupation of the Philippines. Its dynamic search engine, the collection provides entire photographic images of materials, as well as encoded HTML files. One must be careful that the content of the document changes depending on the format type one researcher chooses.

c.2.6 University of the Philippines Main Library (UPML), Quezon City, Philippines

The collections of newspapers and government reports found at the University of the Philippines Main Library are valuable in this work.[102] The digitized and microfilm copies of newspapers and magazines of the UPML provide first hand and daily reports and updates about the earthquakes that happened in the 20th century: the August 1937, the August 1968, August 1983, and the July 1990 earthquakes. The newspapers are in microfilm reels and can be viewed using a microfilm machine. One danger of this format of the collection is its deteriorating status, as some pages are not decent shot during the microfilming process.

Nevertheless, the collection is an excellent primary source for disaster documentation and disaster history research, as it provides actual raw data and information from the ground. In several works made by Bankoff, he used materials from the newspaper collections that are similar with UPML's and used the actual news articles that contain reports from the ground, during the days and weeks of particular disasters. For example, in his works such as *Cultures of Disaster: Society and Natural Hazards in the Philippines* (2003)[103], “In the Eye of Storm: The Social Construction of the Forces of Nature and the

[101] See the website of the University of Michigan Library’s “The United States and Its Territories, 1879-1925: The Age of Imperialism” Collection: <https://quod.lib.umich.edu/p/philamer/>

[102] See the website of the University of the Philippines Diliman Library <https://www.mainlib.upd.edu.ph/>

[103] Greg Bankoff, *Cultures of Disasters: Society and natural hazard in the Philippines* (London: Routledge, 2003).

Climatic and Seismic Construction of God in the Philippines" (2004)[104], and "Dangers to going it alone: Social capital and the origins of community resilience in the Philippines" (2007)[105], he qualitatively assessed the contents of the newspapers and considered the actual interviews and statements from residents and government authorities to argue and present his narrative about the meaning and interpretation of hazards and disasters. This dissertation follows this same approach, as a bulk of information about specific earthquakes in this dissertation relied on newspaper reports and stories. Stories about particular earthquakes run as headline news for several days, up to weeks. Thus, one can verify that indeed, these earthquakes that happened in Luzon were national in scope, as far as the print media is concerned, and has reported.

c.2.7 Philippine Institute of Volcanology and Seismology (PHIVOLCS) Library, Quezon City, Philippines

The library of the Philippine Institute of Volcanology and Seismology (PHIVOLCS) houses published scientific reports about the earthquakes that happened from the 1960s up to the present. Aside from these, researches can also access the annual institute reports that contain the projects and programs it implements concerning volcanology and seismology, as well as its available scientific database of earthquakes and volcanic eruptions. Various official reports and sources about the 1968, 1983, and 1990 earthquakes that the dissertation used were accessed through the PHIVOLCS Library. The website of PHIVOLCS has available scientific reports of recent earthquakes, as well as seismological data and maps.[106] The developments in democratizing scientific data for public dissemination are in the process, and the PHIVOLCS website is a good start for opening up geological and volcanological data to broader access. One researcher can download seismic reports, seismic maps, and compiled and digitized studies on large earthquakes, done by PHIVOLCS itself, or with collaboration with international seismological institutions and organizations. The studies can be used as primary materials, as they contain actual raw data, quantitative and qualitative, about specific earthquakes.

[104] Greg Bankoff, "In the Eye of Storm: The Social Construction of the Forces of Nature and the Climatic and Seismic Construction of God in the Philippines". *Journal of Southeast Asian Studies* 35 (1): 91-111, 2004.

[105] Greg Bankoff, "Dangers to going it alone: Social capital and the origins of community resilience in the Philippines", *Continuity and Change* 22(2) (2007).

[106] See the Website of the Philippine Institute of Volcanology and Seismology (PHIVOLCS) <https://www.phivolcs.dost.gov.ph/>.

c.3 Review of Related Literature

A survey of the literature on the history of disasters and historical seismology provides us the themes and extent, and approaches and methodologies, in looking at the earthquakes as historical events and as a subject matter for historical investigation. The classifications used in this review of the literature are as follows: (1) select works on the history of disasters, (2) select works on historical seismology; and (3) specific works on historical earthquakes in the Philippines.

c.3.1 On Environmental History and History of Disasters

The field of environmental history, though has achieved extensive progress in natural and social science research, is still a discipline in the formative stage in the Philippines. The study of the environmental situation in the Philippines has become not just a scientific endeavor, but also, a social science agenda. Disasters such as typhoons and earthquakes have been in country's fate primarily due to its geographical location.

One major work on environmental history is Richard Grove's *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1800* (1995). The book tackles three main historical phenomena and issues of the 17th to 19th century. These include (1) European environmentalism in the tropics, (2) the Renaissance Europe's search for the Christian 'Eden'[107], and (3) the emergence of the colonial botanical garden system[108]. European environmentalism in the tropical region, in the West Indies, Africa, and the Indian Ocean, is characterized as a two-way civilizational process - a historical reality where interactions, exploitations and destruction, and resistance happened. In his book *Something New Under the Sun: An Environmental History of the Twentieth-Century World* (2000), John Robert McNeill assesses the state of the environment through discussing the technological and economic advancements in highly industrialized countries, specifically in the United States, and its concurrent impacts in the global field.[109] In a separate article, he modified historian David Abernethy's concept of *"*Triple Assault*"*[110], where he added a fourth one – environmental science. The concept includes disciplines such as botany, scientific forestry, meteorology, and sanitation; sciences that were used in the service of the American empire in the Philippines.[111] At the advent of American empire building in the Pacific, the world has entered into a new era of environmental exploitation, primarily to cater to the interest of Western powers. In an attempt to further expand environmental, historical thought, William Beinart's and Lotte Hughes' edited book on the history of the British Empire, titled *Environment and Empire* (2007)[112] presents a historical narrative of

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[107] Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1800* (USA: Cambridge University Press, 1995), p. 4.
[108] Ibid., p. 13.
[109] J. R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World* (New York: W.W. Norton and Company, Inc., 2000).
[110] Consists of European empires' simultaneous military/political, commercial and cultural assaults on the states, economies, and societies in the Americas, Africa, and Asia.
[111] J. R. McNeill, "Introduction: Environmental and Economic Management" in Alfred McCoy and Francisco Scarano (eds.), *Colonial Crucible: Empire in the making of modern American state* (Quezon City: Ateneo de Manila University Press, 2010), p. 475.
[112] William Berinart and Lotte Hughes, *Environment and Empire*, Oxford History of the British Empire (New York: Oxford University Press, 2007).

the environment from the perspective of the environmental. The book attempts to illustrate “super-natural” role of humans in environmental history[113]; how the people of the British Empire changed and rearranged ecological landscapes through their assessment and projects based on the material condition of territories, for industrial production, capitalist growth, and profit-making ventures. Using the British Empire as their unit of study, they discuss some environmental themes in empire history, names environmental causation, environmental impact, conservationism, and indigenous cultures and local knowledge.[114] J.R McNeill and Alan Roe’s reader on environmental history, *Global Environmental History: An Introductory Reader* (2013)[115], offers global and regional perspectives in environmental thought, as well as case studies of environmentalism as an ideological movement. Validating the dictum "everything is connected to everyone else", McNeill and Roe present a "daunting and logical" studies about the global environment, dissecting environmental history and its global scale comprehensively using specific geographic experiences of natural environmental change, human and animal relationship, and man-made hazards and disasters.[116] Follows the same thought-approach, *The Oxford Handbook on Environmental History* (2013)[117], edited by Andrew Isenberg, offers and comprehensive, up-to-date studies on thematic, sectoral, and periodical environmental history of the world. The essays in this compilation cover topics from environmental landscapes, discursive critique of environmental history subfields such as science and technology, pollution and conservation, and environmentalism, the human aspects of the environment – from owning to the creation of laws, and other relevant discourses such as gender, nationalism, borders, and diplomacy.[118] The overall theme of the book is to offer a new meaning to environmental history – a “new environmental history”, through inter- and trans-disciplinary approaches, and the integration of environmental history with established fields in the natural and social sciences.[119]

There is an apparent synergy in the writing of the history of disasters and the framing of risk reduction and management policies along the way. Since the second half of the 20th century, as Hewitt (1983) has pointed out, there’s a linear and coinciding thrust between the dominant view (natural sciences and engineering) and the alternative view (social sciences). From this standpoint, one can observe the emergence of varying collaboration, direct and indirect, of research works – manifesting inter- and trans-disciplinary studies on natural hazards and disasters. In this endeavor geography and history are the most frequently paired fields. Both claiming as the mother of all disciplines in the social sciences, Alan R.H. Baker (2003) suggests bridging what separates the two. In his book *Geography and History: Bridging the Divide* (2003)[120], he proposes how to navigate with the disciplines and use the ideas and parameters of the two to narrate the history of the environment. The book offers definitions and invites discussions on seemingly repetitive and interchangeable subfields – historical

[113] Ibid., pp. 1-2.
[114] Ibid., pp.3-21.
[115] J. R. McNeill and Alan Roe (eds.), *Global Environmental History: An Introductory Reader* (Oxon: Routledge, 2013).
[116] Ibid., xiii-xxvi.
[117] Andrew Isenberg (ed.), *The Oxford Handbook on Environmental History* (New York: Oxford University Press, 2014).
[118] Ibid., v-vii.
[119] Ibid., pp. 1-14.
[120] Alan R.H Baker, “Geography and History: Bridging the Divide”, *Cambridge Studies on Historical Geography* 36 (Cambridge: Cambridge University Press, 2003).

geography, geographical history, and the discursive pluralities of "geographies and histories" – environmental, landscape and regional.[121]Baker puts premium to the place, placemaking and meaning creation, as well as a retrospective appreciation of the environment – how does it change, who initiates changes, and how these changes the totality of one area in particular periods.

Decades of research in environmental history as produced several discourses and frameworks of understanding the environmental, its relationship with human and non-human entities, and the changes it faces across time. Frank Uekoetter compiled these studies in *The Turning Points of Environmental History* (2010), where he describes the evolution of environmental history as a field, from being a marginalized field brought up by professionals and activists, to a "burgeoning" discipline of research.[122]It offers a look at how one can make sense of the history of the environment, through "turning points" such as "decline", "renewal", " watershed", "destruction", and linear modes such as "before and after"[123] – a survey of which is present and discussed amongst the case studies in the compilation reader. As a final aim, it pursues a comprehensive chronology of environmental history, encompassing important subfields such as agriculture and forestry, empire and nation-states, and environmentalism and sustainability.

To further the understanding of hazards and disasters from other fields of study, anthropologists offer critical views to expand the horizon in disaster research. Susanna Hoffman and Anthony Oliver-Smith, in their book *The Angry Earth: Disasters in Anthropological Perspective* (1999)[124] argues the existence of the so-called "anthropology of disasters", and thus hazards and disasters should be viewed from anthropological, as well as historical perspective. As conventional anthropology does not consider natural hazards, and natural hazard-induced disasters as "anthropological", given that it does not satisfy the basic dictum of "everyday" habitual human experience, they argue that these are processes and not isolated events temporarily attached over time; thus making the part of the normal, "everyday" lives of people. The idea of resilience as a by-product of people's social construction of environmental conditions, is based on their experiences of hazards and disasters. The essays in this book compilation present case studies, which are aimed at determining the "cultures of adaptation" by different societies across the globe. Another book that presents case studies on the anthropological nature of hazards and disasters is *Interpretation of Calamity: From the viewpoint of human ecology* (1983), edited by Kenneth Hewitt.[125] In this book, they focus on analyzing the "risks to human communities", they offer empirical and thematic narratives, ranging from studies that focus on interpretations of majors disasters, risks to agricultural and food production, and a re-articulation of the conception of natural hazards and disasters.[126] From herein, Hewitt asserts the importance of looking at the "alternative view" aside from the "dominant view". He argues that the geophysical events, or different gravities and impacts to human communities, should not only be a realm of the natural sciences but rather of social

[121] Ibid., vii-viii.
[122] Frank Uekoetter, *The Turning Points of Environmental History* (Pittsburgh: University of Pittsburgh Press, 2010), p. 1.
[123] Ibid., pp. 2-3.
[124] Hoffman and Oliver-Smith, *The Angry Earth: Disasters in Anthropological Perspective*.
[125] Hewitt, *Interpretations of Calamity: From the viewpoint of human ecology.*
[126] Ibid., pp. vi to ix.

scientists, to craft policies and mitigation procedures suitable to a sustained societal resilience.

c.3.2 On Historical Seismology

The field of historical seismology has been present in natural and social science research endeavors for quite a time. Although it was not labeled as is, pioneer scientists and engineers who advanced this field as a proactive branch of seismology and engineering factored in the importance of relating the earthquake as a geological phenomenon to the broader societal dynamics, i.e. its relationship to people and communities, and how the latter in return understand and appreciate earthquake as an environmental phenomenon. The studies that follow are published history books and scientific manuscripts in natural sciences and social sciences journals.

John Milne's pioneering work in 1886 on earthquakes and its effects in public construction, *Earthquake and other Earth Movements* (1886)[127] tackles the origin, nature, and science of earthquake, and its effects on land and public edifices. Milne was one of the pillars of the Imperial College of Engineering in Japan (now the University of Tokyo), and the Seismological Society of Japan. Institutionalizing the science of seismology in Japan, Milne, together with other foreign technical experts, served as foreign advisors to the Meiji Emperor[128], and launched international research engaging initiatives, leading to the publication of the society's journal, the *Transactions of the Seismological Society of Japan*. His work is considered to be one of the firsts to comprehensively discuss not only the instrumental nature of earthquakes, but also to relate and identify the relationship of the earthquake as a geological phenomenon, with other disciplines, such as in the arts, philosophy, and humanities.

The last two decades saw the surge of considerable researches on historical seismology and history of earthquakes. Many of the scientific studies made were event and location-specific, thus creating somehow case study-based and localized understanding of historical seismology as a field of research. But thanks to specific academics, there are now available compilations of these works.

In his career that spanned for more than five decades, Jean Vogt a treasure of historical works on historical seismology. In a short appraisal, Fréchet and Albini (2008) list down 22 published works of Voght, dealing with the theoretical, quantitative, and qualitative aspects of historical earthquakes, and historical seismology.[129] To mention a few of these: "Révision de deux séismes majeurs de la région d'Aix-la-Chapelle - Verviers - Liège ressentis en France 1504, 1692" (1984)[130], "Probl`emes m´ethodologiques de la

[127] John Milne, *Earthquake and Other Earth Movements* (New York: D. Appleton and Company, 1886).
[128] Gregory Clancey, *Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930* (University of California Press, 2006), p. 63.
[129] J. Fréchet and P. Albini, "Jean Vogt, 1929-2005: His Life as a Seismologist, Geologist, Geographer, and Historian", Julien Fréchet, Mustapha Meghraoui, and Massimiliano Stucchi, *Historical Seismology: Interdisciplinary Studies of Past and Recent Earthquakes* (Springer, 2008), pp. 3-16.
[130] Jean Vogt, "Révision de deux séismes majeurs de la région d'Aix-la-Chapelle - Verviers - Liège ressentis en France 1504, 1692", Tremblements de Terre: Histoire et archéologie, Actes du Colloque d'Antibes 2-4/11/1983. Valbonne, 9-21, 1984.

sismicit´e historique, base des discussions de risque sismique. In: Tremblements de terre" (1987)[131], "L'imbroglio des catalogues de sismicit´e historique. A propos d'une crise sismique ressentie `a la fin du XVIIIe si`ecle dans la plaine rh´enane et en Souabe" (1994)[132], and "Bref historique des enquˆetes macrosismiques en France, dans leur contexte, avec quelques exemples de pays voisins" (2003).[133] Colleagues and students of Vogt praise him for his advocacy to advance critical reading and interpretation of earthquake records to avoid the problematic input in catalogs, faulty understanding of earthquakes and their records, and the identification of "fake quakes", and the prevention of its proliferation in the field.[134]

The works of Pierre Alexander of the Observatoire Royal de Belgique are valuable historical catalogs/studies about earthquakes in Belgium during the ancient and modern ages. Banking on the importance of critical appraisal of seismological data to establish the historical value of earthquake events and experiences, Alexandre worked on developing the field of historical seismology focusing on the events in Belgium and Western Europe. Some of his pioneering studies are as follow: "Catalogue des séismes survenus au Moyen Age en Belgique et dans les régions voisines" (1985)[135], "La séismicité historique du Hainaut, de la Flandre et de l'Artois de 700 à 1800" (1990)[136], "Les Séismes en Europe occidentale de 394 à 1259. Nouveau catalogue critique" (1990)[137], and "The seismic cataclysm of 29 March 1000: genesis of a mistake" (1991)[138].

We can point out that the methodology employed by Vogt and Alexandre lie on two things: (1) critiquing of sources, to determine the value of seismological information, both numerical and non-numerical, and (2) creation of catalog with a critical historical presentation, wherein chronology is indispensable. Several compilations will be discussed below.

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[131]Jean Vogt, "Probl`emes m´ethodologiques de la sismicit´e historique, base des discussions de risque sismique. In: Tremblements de terre." Evaluation du risque, mesures de pr´evention et aide/Erdbeben. Risikoerfassung, Schadenminderung, Hilfe. Nationale Schweizerische Unesco-Kommission, Schweizerische Geophysikalische Kommission, Brigue, 7–10 April 1986, Z¨urich, 1987, pp. 58–63

[132] Jean Vogt, "L'imbroglio des catalogues de sismicit´e historique. A propos d'une crise sismique ressentie `a la fin du XVIIIe si`ecle dans la plaine rh´enane et en Souabe", P. Albini and A. Moroni (eds.), *Historical Investigation of European Earthquakes – Materials of the CEC Project "Review of Historical Seismicity in Europe*, CNR, Milano, 2:163–168, 1994.

[133] Jean Vogt, "Bref historique des enquˆetes macrosismiques en France, dans leur contexte, avec quelques exemples de pays voisins". Travaux du Comit´e Franc¸ais d'Histoire de la G´eologie 17:175–192, 2003.

[134] Fréchet and Albini, "Jean Vogt, 1929-2005", p. 13.

[135] Pierre Alexandre, "Catalogue des séismes survenus au Moyen Age en Belgique et dans les régions voisines". In Seismic activity in Western Europe, P. Melchior editor (Reidel Publishing Company, 1985): 189-203.

[136] Pierre Alexandre, "La séismicité historique du Hainaut, de la Flandre et de l'Artois de 700 à 1800" *In Tectonique actuelle et récente en Belgique, Annales de la Société Géologique de Belgique* (112): 329-344 (1990).

[137] Pierre Alexandre, "Les Séismes en Europe occidentale de 394 à 1259. Nouveau catalogue critique", Observatoire Royal de Belgique, Série Géophysique, Hors- série, Bruxelles (1990).

[138] Pierre Alexandre, "The seismic cataclysm of 29 March 1000: genesis of a mistake", M. Stucchi, D. Postpischl and D. Slejko (eds.), *Investigation on Historical Earthquakes in Europe*, *Tectonophysics* (193): 45-52 (1991).

One of the first compilations of studies on historical seismology from different countries around the world is *Historical Seismograms and the Earthquakes of the World* (1988), edited by W.H.K. Lee, H. Meyers, and K. Shimazaki.[139] This compilation sums up the studies presented in several geophysical and seismological conferences that enhanced the subfield of historical seismograms as a basis of research of past earthquakes. It contains not only studies specific on seismograms, but also some new methodologies and techniques in data rescue and data preservation, as well as case studies on historical seismicity from different countries, from state and private observatories, to highlight the best practices and potential collaboration.

The book *Historical Seismology: Interdisciplinary Studies of Past and Recent Earthquakes*, edited by Julien Fréchet, Mustapha Meghraoui, and Massimiliano Stucchi, published in 2008.[140] The book is "based on different scientific contributions that document the state-of-the-art and new methodological approaches – namely from early historical accounts to the quantification of early seismograms – in the historical earthquake investigation."[141] This compilation contains almost two dozens of qualitative and quantitative scientific contributions assessing the earthquake experiences in Europe, North America, and Northern Africa. The book, as a posthumous dedication to Jean Vogt (1929-2005), a French seismologist, geologist, and historian, who advanced the use of historical archival materials in seismological research, includes some of his works, which cover "all fields related to historical seismology that may help students and young researchers and individual scientists from different disciplines – such as history, seismology, engineering, geology and geophysics – to understand the potential of historical earthquake data."[142]

Another work that is valuable in the field of historical seismology is *Earthquakes and Tsunamis in the Past: A Guide to Techniques in Historical Seismology*, co-edited by Emanuela Guidobini and John Ebel, published in 2009.[143] This book is a product of recognition and the initiative of the authors to create a handbook designed explicitly for historical seismology, tackling its definition, essence, methodological parameters, limitations, nuances, and importance as a growing research field. This book provides a comprehensive orientation to historical seismology as a discipline and offers a theoretical and empirical introduction to this subfield of historical research. Particularly commendable with this book is its diligence to tackle how to bridge seismology, as an effective and technical discipline, and history, through its critical suggestions on how to approach historical records, earthquake and seismic data, and how to reconcile differences and nuances.[144]

For geographic location/centered historical and discursive studies, Deborah Coen's book, *The Earthquake Observers: Disaster Science from Lisbon to Richter* (2013)[145] and Gregory Clancey's *Earthquake Nation: The Cultural Politics of Japanese Seismicity,*

[139] W.H.K. Lee, H. Meyers, and K. Shimazaki, *Historical Seismograms and the Earthquakes of the World* (California: Academic Press, Inc., 1988).
[140] Julien Fréchet, Mustapha Meghraoui, and Massimiliano Stucchi, *Historical Seismology: Interdisciplinary Studies of Past and Recent Earthquakes* (Springer, 2008).
[141] Ibid., vii.
[142] Ibid.
[143] Guidobini and Ebel, *Earthquakes and Tsunamis in the Past.*
[144] Ibid., Parts II (Chapters 3-7) and III (Chapters 8-10).
[145] Deborah Coen, *The Earthquake Observers: Disaster Science from Lisbon to Richter* (University of Chicago Press, 2013).

1868-1930 (2006)[146] are works worth including to the primary texts in the historico-cultural understanding of tectonic movements. They looked at the development of seismology, earthquake architecture, and engineering, not only from science but also from the lens of culture and social mentalities. On the one hand, Coen's wrote on seismology and made it more human, by focusing on what she calls as "earthquake observers". She argues: "…nineteenth-century seismology looks unabashedly anthropocentric: it studied earthquakes utilizing their human impacts and with human interests at heart. Its primary variable, seismic intensity could not be determined at all in uninhabited areas. Intensity is a measure of shaking regarding its effects on buildings and people. Seismology did not stop at the human perspective. Instead, it was a project of translation: among scientists, citizens, and instruments. It successfully mediated between the technicalities of physical science and the everyday experiences of people living with environmental risk."[147] On the other hand, Clancey elaborated the "cultural politics" of earthquakes in Japan, focusing on how the Nōbi earthquake set the tone for an evolution of seismology and architecture, particularly the roles played by the political actors in the field, which included scientists, architects, and other state-credentialed professionals, in Meiji Japan.[148] He furthered his interpretation of the Nōbi earthquake as a historical event in "The Meiji Earthquake: Nature, nation, and the Ambiguities of Catastrophe."[149]

In many countries, the tradition of historical seismology has been grounded on their own social experience and the need to further understand earthquakes and their effects in their respective societies, geared with the need to distinguish it from the rigors of historical mentality. In Japan, as Clancey (2006, 2013) have mentioned, started during the Meiji and post/Meiji era The experience of Japan to everyday earthquakes, as well in large, disastrous earthquakes, from the Nōbi earthquake in 1891, the Kanto earthquake in 1923, 1964 Niigata earthquake, the Hanshin/Awaji earthquake of 1995, up to the infamous 2011 Sendai earthquake-tsunami,[150] manifest their strong commitment to earthquake studies, seismological data recovery, and innovative use, and translating scientific studies to actual disaster management policies. The studies of Katsuhiko Ishibashi, to name a few, "Great Tokai and Nankai, Japan, Earthquakes as revealed by Historical Seismology: Review of the events until the mid/1th century" (1999)[151] and "Status of Historical Seismology in Japan" (2004)[152] provide us with a glimpse into the well-established field of historical seismology and seismological data recovery for historical studies in Japan. Besides, historical seismology has gained momentum as a field of study in Colombia since the 1980s. Baquero, Gomez Capera, and Salcedo Hurtado (2004) present us the development and trajectories of historical seismology in

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[146] Clancey, *Earthquake Nation.*
[147] Coen, *The Earthquake Observers*, p. 11.
[148] Clancey, *Earthquake Nation*, p. 4.
[149] Greg Clancey, "The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe", *Modern Asian Studies* 40(4): 909-951, 2013.
[150] Ritsuko S. Matsu'ura, "A Short History of Japanese historical seismology: Past and the Present", *Geosciences Letters* 4(3), 2017; Katsuhiko Ishibashi, "Status of Historical Seismology in Japan", *Annals of Geophysics* 47(2/3): 339-368.
[151] Katsuhiko Ishibashi, "Great Tokai and Nankai, Japan, Earthquakes as revealed by Historical Seismology: Review of the events until the mid/1th century", Journal of Geography 108(4): 399-423.
[152] Katsuhiko Ishibashi, "Status of Historical Seismology in Japan", *Annals of Geophysics* 47(2/3): 339-368.

Colombia, from the earliest recorded accounts in the early 201st century, up to the first wave of scientific studies made in the 1960s.[153]

Through an academic appraisal fashion, Aitor Anduaga's *Cyclones and Earthquakes: the Jesuits, Prediction, Trade, & Spanish Dominion in Cuba & the Philippines, 1850-1898* (2017) highlights the underprivileged contribution of seismology in Philippine and Cuban history, particularly in the 19th century.[154] Anduaga studied the institutional development of Observatorio Meteorológico de Manila (OMM) in the Philippines, the Observatorio Fisico-Meteorológico de Havana (OFMH) and the Observatorio del Colegio de Belén (OCB), and their respective scientific production, particularly on seismology and meteorology. Several groups of professionals made most of these scientific accounts and studies: first were the Jesuits, and the second was the Spanish colonial engineers – both from the military (*ingenieros militares*), civil (*ingenieros coloniales*) and of the mines *(ingenieros de minas).* These professionals played active roles in the development of the pillars of the colonial economy. These scientists and engineers mastered the craft of calculating the weather and putting numerical values on the behavior of the sky, and in the tremors on the earth's surface, institutionalization and propagation of scientific ideas for the betterment of colonies. Anduaga's work is a classic discourse analysis of scientists and scientific institution's role in knowledge production, and how their beliefs shape an era's understanding of environmental phenomena such as earthquakes. The author also credits Milne's influence in the two institutions in Cuba and the Philippines, as the former indirectly provided direction to the theoretical trajectory of their research endeavors on earthquakes. In a more specific period and geographic location, he discusses the role played by the military engineers in building seismic-resisting structures in the Philippines during the 19th century. In his "Earthquake Building Overseas: Military Engineers, Cyclonic-Seismic Affinity and the Spanish Dominion in the Philippines, 1860-1898" (2013)*[155]*, he argues that the Spanish colonial government was able to utilize modern earthquake engineering techniques for the benefit of the Pacific colony, both offering scientific and military solutions to the natural hazards that hamper the islands and the 'piratic' problem in the southern part of the archipelago, respectively. Anduaga's works rely on archival materials from Spain and the Philippines.

The works of Coen, Clancey, and Anduaga have a common theme – they center on and highlight the role of human on the development of seismology, through the recovery of scientific data, promulgation of theoretical foundation to understanding earthquakes, and production of specific studies based on particular earthquake experiences the subject areas they studied. They highlighted the roles of seismologists, engineers, and architects on professionalizing the field of earthquake studies, and making viable policy contributions, for the betterment of different sectors of the society often affected by the destruction caused by earthquakes. It must be emphasized that in the late 19th century, most of the scientific advancements and accounts and studies about earthquakes were

[153] Armando Espinosa Baquero, Augusto Antonio Gomez Capera, and Elkin de Jesus Salcedo Hurtado, "State-of-the-art of Historical Seismology in Colombia", Annals of Geophysics 47(2/3): 437/449.

[154] Aitor Anduaga, *Cyclones and Earthquakes: The Jesuits, Prediction, Trade, & Spanish Dominion in Cuba & the Philippines, 1850-1898* (Quezon City: Ateneo de Manila University, 2017).

[155] Aitor Anduaga, "Earthquake Building Overseas: Military Engineers, Cyclonic-Seismic Affinity and the Spanish Dominion in the Philippines, 1860-1898", *Engineering Studies* 6(1), 2013: 1-22.

made by two groups of educated and professionals: first was the Jesuits of the *Observatorio de Manila*, and the second was the Spanish colonial engineers – both from the military and of the mines *(ingenieros de minas).* During the early American period in the Philippines in the 20th century, American Jesuits who were also making pioneering endeavors on seismology in the United States also influenced the level of scientific thinking and understanding about earthquakes.

In the recent earthquakes, one short work on historical seismology in the context of the Philippines that summarizes the almost 400 years of Philippine seismological history is R.G. Valenzuela and L.C. Garcia's "Studies on Philippine Earthquakes" (1988), which contains quantitative analyses of historical earthquakes in the archipelago, primarily based on William Repetti's *Catalogue of Philippine earthquakes, 1589-1899.*[156] It is also worth mentioning the study titled *Moro Gulf Tsunami of 17 August 1976* (1978)[157] by Victor Badillo, S.J. and Zinnia Astilla. This study presents us a narrative of their findings about the tsunami that hit the Moro Gulf in Mindanao in the year 1976; it provided technical descriptions of earthquakes, seaquakes, lake seiches, and the waves were made to characterize the tsunami as a natural phenomenon, and an assessment of the damages and impacts of the event in the towns and cities hit by the quake and sea waves.[158]

c.3.3 On Historical Earthquakes in the Philippines

Another layer of a narrative of late 19th century hazards are the impacts or effects on social structures of society.[159] What emanates clearly from the studies was the need for immediate and sustainable earthquake resistant public edifices. The persistence and active engagement of the government in this endeavor was highly seen.[160] Military engineers applied principles to establish components that will serve as guides in designing buildings; they have exhausted their knowledge in constructing forts and defense structures in urban facilities and edifices.[161] A significant take away of these works is that they solidified the treatment of earthquakes and volcanic eruptions as scientific phenomena and phenomena that can and should be explained by modern science. In a general sense, they may have different or unique approaches to specific topics, but they share similar patterns of documenting and analyzing hazards. As subtly indicated in some works, the reality of having limited accounts of hazards during the centuries prior to the 19th, are the following scenarios: (1) that if churches, tribunales, conventos, and monasteries were not damaged, it does not bother to be recorded – thus nothing "historical" or worth remembering to people, especially to those who write about it, and (2) if there are fewer people killed or who died. The relative intensity of earthquakes and volcanic eruptions that happened in the 19th century proved to be a turning point in the history of hazard documentation. One can attribute this to either modern technologies of recording or to the rise of scientific mentality itself.

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[156] William Repetti, *Catalogue of Philippine earthquakes, 1589-1899* (Berkeley, California: University of California Press, 1946).
[157] Victor L. Badillo, and Zinnia C. Astilla, *Moro Gulf Tsunami of 17 August 1976* (Quezon City: Manila Observatory, 1978).
[158] Ibid., pp. 1. 14-16.
[159] Gealogo, p. 370.
[160] Ibid., p. 374.
[161] Anduaga, "Earthquake Building Overseas", p. 16.

But nevertheless, the production of literature founded on rigorous scientific research is a significant leap to the progress of science in the archipelago. In technical terms, the works provided mathematical explanations, with corresponding clarifications in layman's terms. Almost all the cited materials have a usual pattern of explaining and elaborating information and analyses. They recognized the historical notion of hazards that the present or the events they are focusing on are products of previous environmental processes. Since most of the authors are products of scientific schools and have been practicing as professionals in their fields, they gave particular value to scientific reasoning, despite the surfacing of some quasi-religious interpretations when it comes to the tremendous effects of the hazards to people.

Greg Bankoff's works on the history of natural hazards, epidemics, and human disasters in the Philippines reveal his views on Philippine environmental history such as "cultures of disaster", "frequent life experiences", and "cultures of coping". In his book *Cultures of Disasters: Society and natural hazard in the Philippines*[162], he argues that "Filipinos are Filipinos because the environment they inhabit has played a role in shaping their cultures; that environment is itself the product of both physical and human forces. It is this interrelatedness, the social and cultural construction of nature, and the physical and natural construction of culture that lies at the root of this study of society and environment in the Philippines…"[163] Moreover, he states that natural hazards such as typhoons, earthquakes, volcanic eruptions, and epiphenomenal hazards like tsunamis, floods, and droughts are "are agents of cultural formation as much as they are physical events."[164] By presenting different data, studies, and analysis from the natural and social sciences, he offers in his a history of natural hazards in the archipelago, as well as historical roots, evolution, and understanding of Filipino's apparent vulnerability and adaptability to hazards and disasters. His following works emanating and related to the topic of the book reveal his expanded thoughts and arguments on the "cultures of disaster" in the country. His much recent work, he contemplated the idea of new historical turning points, an alternative historical approach in the Philippines. In his article "Hazardousness of Place: A New Comparative Approach to the Filipino Past" (2016)[165], he advances the need for a "geographically oriented past"; an understanding of the "…Filipino past not so much concerning human actions and reactions to one another, whether neighbor or stranger, but by reverting to an older form of narrative that provides a detailed geographical description of a region or regions, a chorography."[166] Implying the need for a transnational environmental history, he presents his template of the "hazardousness of the place", and furthers the appropriate understanding that "…begins with shared risks and fully considers meteorological and geophysical hazards offer a wider perspective and a new lens for understanding patterns of historical development."[167] Moreover, he argues that a place experience of being hazardous "…not only informs the Filipino past but also links the peoples of the archipelago through the shared experience of disasters to a wider region that calls for new comparative

[162] Greg Bankoff, *Cultures of Disasters: Society and natural hazard in the Philippines* (London: Routledge, 2003).
[163] Ibid., p. 3.
[164] Ibid.
[165] Greg Bankoff. "Hazardousness of Place: A New Comparative Approach to the Filipino Past", *Philippine Studies: Historical and Ethnographic Viewpoints* 64(3-4): 335-357.
[166] Ibid., p. 337.
[167] Ibid., p. 351.

histories."[168] He explains that turning points such as changing migration patterns, agriculture and land use, housing and architectural traditions, even slavery and wars are an episodic period that can be understood through their attribution to environmental threats and natural hazards.[169]

Moreover, agreeing with Bankoff's idea of shared cultural experience in times of hazards and disasters, in the book *Natural Disasters, Cultural Responses: Case Studies towards a Global Environmental History* (2009)[170], furthers the idea of universality of human experience in times of human-induced local and regional disasters.[171] The emergence of a new wave of a historical subfield, in the United States and Europe in the 1980s for example, made historians ask new sets of pertinent questions in human-environment relations across time.[172] The studies included in this book compilation argued the evolutionary nature of cultural responses of people and societies from the relatively same but different intensity disasters. Mauch and Pfister (2009) claims, "…while natural disasters may be similar to those in the past, the manner in which they are anticipated and endured has evolved, in no small part because professionalized cultures of disaster management have emerged."[173] Amongst the collection of studies they presented in the book, highlighted is the strength of the historical approach in disaster research. One can identify in the changes in the manifested responses of people to hazards over time, dependent of the social and cultural patterns, values, religious belief systems, political institutions and economic structures where they belong, stand and play, but also the differences and changes in responses from one cultural, social, and political space to the next.[174] Aside from the historical approach as a tool for understanding natural hazards and disasters, the book also banked on the paradigm of vulnerability as a framework in disaster studies. And from they elaborated the importance of identifying classifications of vulnerabilities, whether those are social or biological.[175]

In the article *Fire and Quake in the Construction of Old Manila* (2007)[176], Bankoff wrote a history of the Spanish capital in the Pacific, from its founding in the last decades of the 16th century until the end of the succeeding year, by historicizing the cases of earthquakes and fire that hampered the city. Susana María Ramírez Martín's *El Terremoto de Manila de 1863: Medidas políticas y económicas* (2006)[177] is a study of the 1863 Manila earthquake post-disaster response of the Spanish colonial government in the Philippines. She critically studied archival materials from the Philippines and narrated the political and economic measures the government implemented to rehabilitate and reconstruct the city after the disastrous tremor. Francis Gealogo's work on 19th-century earthquakes titled "Historical Seismology and the Documentation of Postdisaster Conditions: The 1863-1880 Luzon Earthquakes" (2016) points out one important component of historical seismology as proposed by Guidobani and Ebel

[168] Ibid., p. 352.
[169] Ibid., p. 351.
[170] Mauch and Pfister, *Natural Disasters, Cultural Responses.*
[171] Ibid., p. 335.
[172] Ibid., pp. 5-6.
[173] Ibid., p. 13.
[174] Ibid., pp. 6 and 9.
[175] Ibid., p. 20.
[176] Greg Bankoff, "Fire and Quake in the Construction of Old Manila", *The Medieval History Journal* 10(1&2) (2007): 411–427, 2014.
[177]Susana María Ramírez Martín, *El Terremoto de Manila de 1863: Medidas políticas y económicas. (*Madrid: Consejo Superior de Investigaciones Científicas, 2006).

(2009).[178] Documentation and narratives about the said hazards was a common scientific activity by government offices and educational institutions. Aside from the scientific components, narratives also contain stories about the impact and effects of the disaster on social structures and the physical infrastructures of the affected communities.[179] The works of these three authors were cited in the dissertation, as their arguments support and strengthen the authors' perspective on historical earthquakes.

Historical studies on vulnerability present us a wide array of perspectives on the issue at hand. Bankoff (2004) argues that "…history reveals that vulnerability may be centuries in the making: societies and destructive agents are mutually constituted and embedded in natural and social systems as unfolding processes over time."[180] Given this, we can connect it with the tool as mentioned earlier that is indigenous knowledge. He adds, "vulnerability and local knowledge as concepts have proven useful as a means of assessing disasters within their socio-economic, political and environmental context that was previously sorely lacking. These concepts have also certainly provided a helpful guide in formulating approaches and policies in hazard preparedness and relief provision."[181] This is where Bankoff (2009) adds his idea of "cultures of coping." He argues that browsing through the historical records, archival and local history records, one may see a pattern of evolving cultural responses from the local population. He laments that "…the hazards that beset the Philippines engender both cultures of disaster and cultures of coping: societies that are shaped by the interrelation of the environment and extreme natural phenomena, and communities whose vulnerability fosters particular forms of resilience in the face of adversity and misfortune. It is this two-way process at the level of the macro and the micro that lends such distinctiveness to the peoples of the archipelago and has proven so integral to the formation of their character as individuals and as collectives."[182] These "cultures" are manifested both individually, and collectively. In the manuscripts "Dangers to going it alone: Social capital and the origins of community resilience in the Philippines" (2007)[183] and "Storm over San Isidro: "Civic Community and Disaster Risk Reduction in the Philippines" (2012)[184], Bankoff stresses the role of collective groups, associations, collective values and practices, religious groups, farmer associations, civil society organization, people's organizations (POs), and non-government organizations (NGOs) as sources of "community resilience". He highlights the role of indigenous knowledge, local culture, and the civil society in considering the roots of present-day resilience, as well as the causes of its vulnerabilities in a community's past.[185]

[178] Francis Gealogo, "Historical Seismology and the Documentation of Postdisaster Conditions: The 1863-1880 Luzon Earthquakes". *Philippine Studies: Historical and Ethnographic Viewpoints* 64(3-4), 2016, p. 371.
[179] Ibid., p. 370.
[180] Greg Bankoff (ed.), *Mapping Vulnerability: Disasters, Development and People* (London, 2004), p. 4.
[181] Ibid., p. 36.
[182] Greg Bankoff, "Cultures of Disaster, Culture of Coping", p. 177.
[183] Greg Bankoff, "Dangers to going it alone: Social capital and the origins of community resilience in the Philippines", *Continuity and Change* 22(2) (2007).
[184] Greg Bankoff, "Storm over San Isidro: 'Civic Community' and Disaster Risk Reduction in the Philippines", Journal of Historical Sociology 25(3): 331-351, (2012).
[185] Ibid., p. 331.

Raymond Abejo's work, *"*Mga Kalamidad at ang Rebelyong Dios-Dios sa Samar noong Dantaon 19*"* (2015)[186] and Alvin Camba's study "Religion, Disaster and Colonial Power in the Spanish Philippines in the Sixteenth and Seventeenth Centuries" (2012)[187] are studies on hazards as historical events. On the one hand, Abejo's work, which deals on the correlation of disasters, social change, and social movements in the island of Samar during the 19th century, shows varying and evolving understanding on the meaning and implications of, hazards such as typhoons, earthquakes, to the dynamics of a colonial society. The religious view of the weather turned out to be one major catalyst for a messianic-politico-religious, anti-colonial movement, the "*Dios-Dios*".

On the other hand, Camba's work cites cases of how the Spanish colonial state, in the 18th century, interpreted hazards socially and politically and exercised the powers of the government to respond to threats and problems posed by natural events, which were deemed to be religious. This work also falls into the parameters of historical seismology as it depicts the dynamics of society during and after specific environmental events. These two works, though not extensively cited in the dissertation, provides perspectives on how people view disasters, i.e., earthquakes, given the political context of their time, and the available knowledge about them.

Furthermore, Bankoff's comprehensive study titled "In the Eye of Storm: The Social Construction of the Forces of Nature and the Climatic and Seismic Construction of God in the Philippines" (2004)[188], deals with the social construction of nature, and the natural creation of God, the role of religion as a potent force to consider in explaining popular explanations of hazards and disasters, and its implications in the political life of people.[189] He framed his history of typhoons and earthquakes in the Philippines using the idea that people to God's wrath and punishment are attributing hazards. These examples indeed prove that religious view is a valid point of analysis in understanding people's responses to risks. This work of Bankoff focused on the disasters that hit the Philippines in the 1980s and 1990s. He surveyed the typhoons, earthquakes, and volcanic eruptions that happened in the said period, and looked at how Filipinos created an image of a punishing God, due to the sufferings caused by the mentioned natural hazards.

The survey and classification presented above provide an overview of the historical work on the history of natural hazards and disasters. At this point, how can we have a bird's eye view of the trajectory of Philippine environmental history writing, particularly on the history of hazards and disasters? Based on the survey of literature presented, what gaps can we identify? And where is it located? As implied in the previous parts, I believe, most, if not all, of the works on this field encompass ideas of historical particularism and cultural ecology. As presented, we can see that the various scholarly materials produced resonate the ideas mentioned and emanating in/from some of the theoretical frameworks – both historical and anthropological. Aside from the "dominant" view – the scientific

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[186] Raymund Arthur Abejo, "Mga Kalamidad at ang Rebelyong Dios-Dios sa Samar noong Dantaon 19" *Philippine Social Sciences Review* 57 (1-4): 115-142, 2015.
[187] Camba, "Religion, Disaster and Colonial Power in the Spanish Philippines in the Sixteenth and Seventeenth Centuries".
[188] Greg Bankoff, "In the Eye of Storm: The Social Construction of the Forces of Nature and the Climatic and Seismic Construction of God in the Philippines". *Journal of Southeast Asian Studies* 35 (1): 91-111, 2004.
[189] Ibid., p.106.

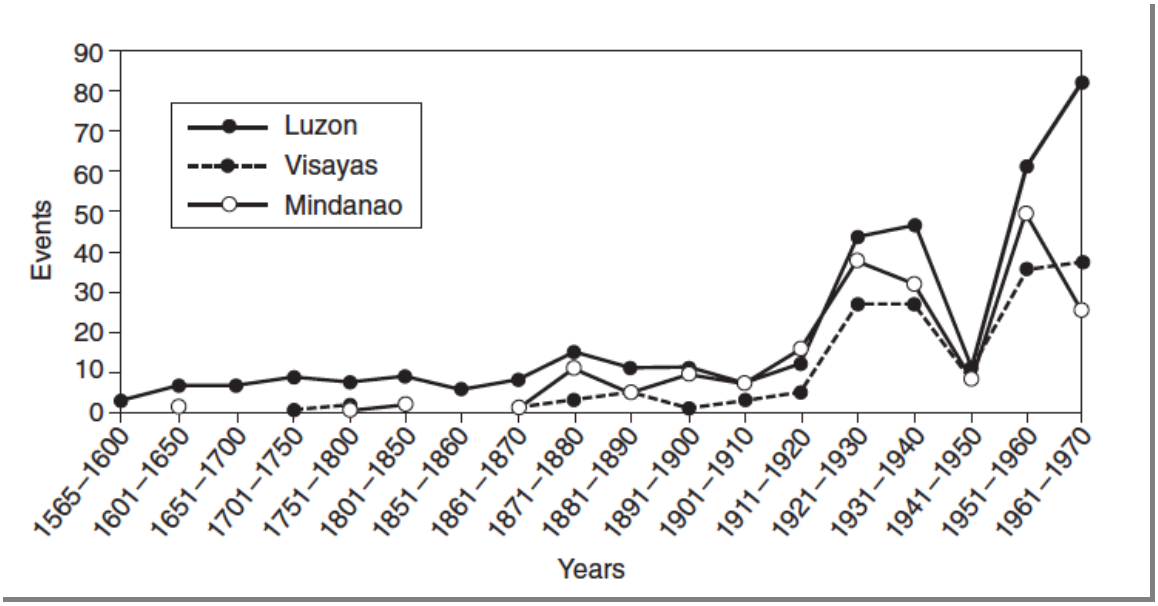
opinion from the natural science, it is an imperative amongst researchers to extract and (re)surface the cultural-historical and anthropological views to balance out the perspectives and to make hazards as anthropomorphic and disasters as anthropogenic. Analysis of these environmental threats as cultural experiences of people will provide a more encompassing history not only of the physical environment but of the human environment; disasters are viewed as human experiences rather than merely physical and biological processes of nature. This dissertation is a historical narrative earthquake and volcanic eruption experiences of people, not only as mere physical phenomena that the environment undergoes, but also as a historical event, which shaped their everyday life, their mentalities on nature, and their ideas and meanings of place-making across time. It narrates the cultures and cultures if responses manifested, highlighting the local perspectives and understandings of the environments, the hazards related to it, the disasters people eventually or habitually face, and the coping or adaptation mechanisms they created and learned as time pass by.

d. Scope and Limitation

The scope of this dissertation covers the earthquakes that hit the island of Luzon from the second half of the 19th century until the last decade of the 20st century. The study does not discuss all the earthquakes that happened during this period. It focuses on the six earthquakes mentioned earlier: the June 1863, July 1880, August 1937, August 1968, August 1983, and July 1990. These earthquakes were chosen based on the extent of their damage, geographical consideration, for which all of them happened in Luzon, and documentary sources and recorded accounts about them are available and accessible. It will limit the study in the island of Luzon but does not argue that the experiences in this island would be detached or entirely different from the earthquake experiences in other islands of the country. Luzon Island is defined as the geographic Luzon in the 19th and 20th century. The geographic Luzon refers to the largest island in the Philippine archipelago, where the most extensive and most extended fault lines where tectonic movements frequently happen. A figure in Bankoff's (2003) study illustrate that Luzon has the most recorded earthquakes since the 16th century, based on the complied data by the Philippine Instutte of Volcanology and Seismology (PHIVOLCS).[190] At the same time, the period chosen will not be treated as a detached period in history, as if it is not influenced by prior epochs, or did not shape the era that followed it. The decision to focus on this period is based on source availability, as well as the resources of the author in research. Moving more backward in time, the 17th and 18th centuries can be studied using other historical materials that can be accessed in other archives, for example in Sevilla and Valladolid in Spain, and in Mexico. Moreover, the author chose this period because of his interest in the 19th and 20th centuries. The dissertation, aside from attempting to be a pioneer work on the social history of earthquakes, also aims to give an additional valuable perspective of the period stated, as this period is considered the birth and development of the Filipino nation – a topic still being problematized and challenged until today.

[190] Bankoff, *Cultures of Disaster*: *Society and natural hazard in the Philippines,* p. 39.

Photo No. 1
Recorded earthquakes in the Philippines per region, 1565-1970[191]



This dissertation has four chapters following the introductory part. The second chapter is a short discussion of an approach to historical seismology, contextualizing earthquake as a subject matter of historical inquiry. Using the discourse on historical seismology, this chapter discusses how earthquakes are historicized as a geological phenomenon, as a phenomenon amongst early Filipinos based on select documented oral historical sources, and as a historical event in the modern age (in Western history), or during the 16 to the 18th century, based on select historical materials.

The third chapter discusses the two major earthquakes in the second half of the 19th century, the June 1863 and July 1880 Luzon earthquakes. It describes the extent of the two earthquakes, and how the Spanish government in Manila and Madrid responded to the needs of the affected provinces, especially Manila, and as well as how the two earthquakes paved the way for the gradual realization and institutionalization of seismology as a field of science for government work.

The fourth chapter deals with four major earthquakes in Luzon in the 20th century: the August 1937 Luzon earthquake, the August 1968 Manila earthquake, the August 1983 Ilocos Luzon earthquake, and the July 1990 north-central Luzon earthquake. It describes the way the government and the people considered these earthquake incidents as turning points in the development of different disaster response and risk mitigating mechanisms. These earthquakes also had various social and cultural meanings in the context of the decade they when they happened.

The fifth and final chapter is a summary-conclusion of the dissertation. This chapter discusses the attempt of this dissertation to provide an understanding, theoretical and empirical groundwork, and an alternative approach view of Philippine history from hazards and disasters.

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[191] Borrowed from Bankoff, *Cultures of Disaster*: *Society and natural hazard in the Philippines,* p. 39.

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Sum Up

As a review, one of the aims of this study is to make a comparison of earthquake experiences covering a more extended period, to determine changes and evolutions in responses of various sectors of society in times of calamities. One universal generalization when it comes to disaster responses is that authorities, as well as people, "do not learn" from the mistakes of previous disasters, especially in the implementation of disaster risk reduction and management programs. The analyses made about the select earthquakes attempt to provide a historical example for this generalization and make it more comprehensive and experience-based. Going back to the issue of resilience, this is where it can be placed, and properly contextualized. Mentalities are not born out of single events – it is a by-product of a long period of experiences and interaction with a relatively consistent naturally hazardous environment. This is one of the aims of the research project; this dissertation is currently part of a project titled "Local Adaptation, Resilience, and Interpretation of Socio-Natural Hazards and Environmental Management in the Philippines" aims to comprehensively assess how Filipinos of today use the existing local knowledge systems, how they manifest their resilience to calamities, and how they interpret such hazards and disasters give specific political, social, economic, and cultural backgrounds and contexts. This work contributes to the anthropological and geographical case studies the project has made in the past five years and aims to enrich the expanding literature of historical, cultural studies on hazards and disasters.

Lastly, this work dreams of engaging other professional historians, history researchers, and history enthusiast to consider environmental history and history of disasters as fields of their research endeavors. There are still a lot of documents to be looked into and salvaged, topics to be research on, and historical issues to be problematized. Looking at history from the environment contributes to the holistic understanding of the development of Filipino society; especially on our knowledge and appreciation of hazards, disasters, and the cultures we have with regards to coping with environmental threats. Generally, Filipino environmental historians are trying to establish notions and ideas regarding the effects of natural calamities to Filipinos' lives in different periods. Surveying the studies made on the history of natural hazards, catastrophes, and disasters, except for those in the last four decades, most of the published works are chronological and descriptive. This ongoing generation is an excellent period to work on the history of the environment, in time of major societal and global issues on climate change, disaster risk reduction and management, and disaster resiliency.

CHAPTER 2

Locating the roots of "Historical Seismology": Philippine geography, oral traditions, and early-recorded earthquakes

"In bygone superstitious times lightning and thunder were regarded as supernatural visitations. But as these phenomena became better understood, and med learned how to avoid their destructive power, the superstition was gradually dispelled. Thus it is with Earthquakes: the more clearly they are understood, the more confident in the universality of law will man become, and the more his mental condition be advanced."

- Arthur Milne, *Earthquake and Other Earth Movements* (1886)[192]

It is a necessity to provide perspectives and approaches on how earthquakes can be studied as a subject matter of historical inquiry. By means of identifying and its location and role as indispensable events, and by contextualizing its scientific, and cultural meanings, earthquakes can be problematized as a historical issue grounded on Philippine situation. Using the discourses on historical seismology, this chapter discusses how earthquakes are historicized as (1) a product of geographic-geological processes, (2) as a phenomenon amongst early Filipinos based on select documented oral historical sources, and (3) as a historical event in the modern age (in Western history), or during the 16 to the 18th century, based on select archival materials.

a. Geology and Geography of Luzon Island

In historical seismology, a prerequisite in numerical data analysis is the contextualization of an earthquake's geographical and geological background. In the case of the Philippine, one approach in understanding earthquakes as historical events and seismological phenomena is to look at the nature of the archipelago's physical landscape.

a.1 A Geological Overview

Different environmental processes shape the world. These change physical landscapes, influence the biological profile of continents, and affect the patterns of human settlements across various topographic milieus. The scientific community has produced a vast scientific literature about processes of the natural world.

Earthquakes and volcanic eruptions, together with other significant and epiphenomenal hazards, have caused, and are producing, changes, improvements, and havoc to the

[192] John Milne, *Earthquakes and other Earth movements* (New York: D. Appleton and Company, 1886), p. 10.

natural environment and human societies. These hazards are mainly terrestrial; as they are practically caused by specific geomorphological events, such as tectonic movements and changes inside the earth's core.

The occurrence of an earthquake is due to the sudden release of energy within the earth, which generated seismic waves that move several miles from its source.[193] Conventionally, earthquakes are attributed to the abrupt movements of faults, which tensions between tectonic plates happen, but scientists also include in volcanic eruptions due to the release of magma from underneath the earth's crust, and even aboveground movements such as landslides, as causes of it. [194] The severity of an earthquake lies of several aspects: (1) extent of the break in a area due to a movement, (2) how far movements are, (3) how deep is the break inside underneath the surface of the earth, and (3) the duration of changes of the broken area, usually within the fault.[195] These movements or movements in the tectonic plates are also associated with the secondary hazard, which pose a separate set of challenge or danger to the humans and the environment. These include risks both in land and water bodies, natural landscapes and urban settlements: ground motion, ground breaks or faulting, mass wasting, and liquefaction; tsunamis, seiche waves formed by the movement of lakes and enclosed bodies of water; fires and explosions caused by disruption of structures and utilities, changes in ground level causing disruption of habitats changes in groundwater level, displacement of coastlines, and displacement of populations.[196] In seismology, one scientific field where earth movements are being studied, seismologists, even geologists and physicists, first identify the classes of movements, whether those are earthquakes, earth tremors, earth pulsations, and oscillations.[197]

Scientists measure earthquakes by focusing on how the waves produced by the movements behaved. Commonly classified as primary and secondary or shear[198], these waves provide seismologists of the numeric information in making sense of the tectonic movements. Two measurement schemes are used to describe the magnitude and intensity of the earth. On the one hand, magnitude refers to the amount of energy release, as seen in the seismic waves amplified by the movement. On the other hand, intensity pertains to the extent of destruction caused by the earthquake; usually with metrics identifying destroyed human infrastructures and loss of lives. In measuring the magnitude, seismologists use the Ritcher Scale, while on the intensity, two systems are being used, the Mercalli Scale and the Rossi-Forel Scale.

The earth's core is composed of a lot of molten chemicals circulating an enclosed cover known as the earth crush. Even though regarding size the crust is relatively thinner compared to the core of the earth, it can cover and hold the materials inside the planet; elements that are of extremely high temperature. But, as per the nature of the earth as a structure, some materials need to be released from the core to the surface. The release can be through a structure along tectonic fault lines, or in structures where the core

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[193] Timothy Kusky, *Earthquakes: Plate Tectonics and Earthquake Hazards* (New York: Infobase Publishing, 2008), p. 67.
[194] Ibid., p. 82.
[195] Ibid., p. 68-69.
[196] Ibid., p. 84.
[197] John Milne, *Earthquakes and other Earth movements* (New York: D. Appleton and Company, 1886), pp. 3-4.
[198] Ibid., pp. 76-77.

chemicals can pass through, though to the crust natural cracks or thin layered parts. Volcanoes are mountain-like structures with the particular trait of being an open vent for the release of materials within the earth to the crust's surface. Commonly known as magma, chemicals move from one region of the core to the surface, through an opening in the crust.

A survey of the earthquakes across the globe will reveal that a vast majority of these hazards happen in the Pacific region, encompassing different continents and geopolitical spheres. Zooming in to the subject matter of this study, the Philippines has a long history, and continuously experiences, earthquakes and volcanic eruptions due to its geographical location, and topographic and physiological characteristics.

a.2 Geography of Luzon: Fault Lines and Volcanic Arcs

a.2.1 Origin of the Philippine Archipelago

The Philippines, a relatively sizeable archipelagic country in the western side of the Pacific and the middle of major Southeast Asian seas, contains thousands of islands and islets produced by long duration and repetitive geomorphological processes. One description is that it's a "confused picture of island arcs in the Western Pacific and circum-Pacific orogenies."[199] Islands, large and small, contain varying plains and high-altitude landforms, mountain ranges and rolling hills, and volcanoes and volcanic mountains. Disproportionate in size and form, these islands have similarities with the rest of the archipelago – they have plain land, coastal and hilly regions. Islands coincide with the principal geographic context and limitations of the whole archipelago lying between vast oceans and seas and standing along frequently moving tectonic plates.

The location of the archipelago in the Pacific Ocean's western brim, which is an unstable segment of the crust of the earth compared to other regions, illustrates the pattern of landform development.[200] The origin of the islands is quickly attributed to small tectonic movements. But available scientific explanations lead us to several geological theories, which simplify the understanding of these complex geomorphological events that happened thousands of years ago. Landforms were a product of complex processes of diastrophism, vulcanism, and gradation.[201] The existence of the western Pacific arc system, wherein the Philippines is a part, is characterized by Active vulcanism, intense seismic activity, and considerable isostatic imbalance.[202] In particular, tectonic movements, volcanic eruptions, and subsequent lava flow, and climatic changes framed the archipelago into its current form – having a strong influence over the islands geological and physiographic features. Expanding Wegener's continental drift and tectonic movements theory, Willis on the one hand, concludes that the Philippines was forced through the marginal and peripheral eruption of the Pacific basin; on the other hand, Faustino argues that the archipelago was once part of a continental shelf that is

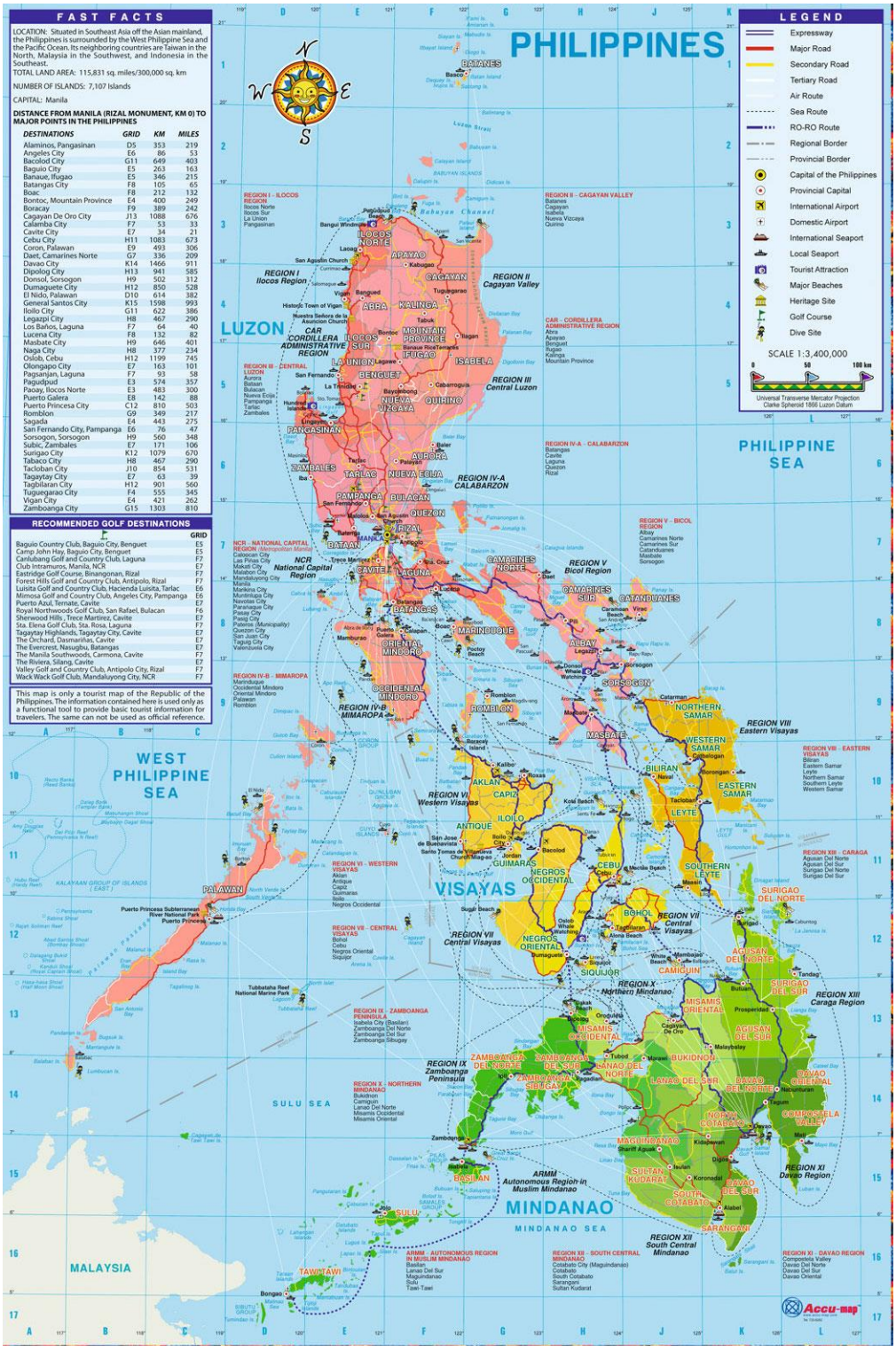
[199] Frederick L. Wernsted and J. E. Spencer, *The Philippine Island World: A Physical, Cultural, and Regional Geography* (University of California Press, 1967), p. 9.
[200] Domingo C. Salita, *Geography and Natural Resources of the Philippines* (Quezon City: College of Arts and Sciences, 1974), p. 40.
[201] Salita, pp. 39-40.
[202] Werntedt and Spencer, *The Philippine Island World*, p. 9.

probably, parts of mainland Asia.[203] Following these overlapping theories, one can identify the Philippine archipelago's global tectonic involvement. The Philippine moves and continuously moved based on the geological activities, namely collisions and separations of three tectonic plate: the Eurasian plate in the western border of the archipelago, the Pacific Plate on the eastern boundary, and the relatively small Philippine Plate in between the two. In this geological context that the archipelago's physiography, fault lines, volcano chains, trenches, and more specifically, mineral resources, biological life, and tropical climate variations evolved through time. Geologists identify colliding and consistently in traffic the continental movement trends, such as the Philippine Mobile Belt – a description of the constant drive of the tectonic plates, and some islands which are parts of larger plates, such as the Palawan and Zamboanga Microcontinental Belts.[204]

Diverse is the physiography of the Philippine Islands, owing in part to variations in geographic nature per region of structural forces, rock materials, and tectonic histories.[205] Geologists and geographers have a shared view regarding the cause of the archipelago's physiography: various ground movements and widespread vulcanism. Some point out the Tertiary-Quaternary periods as the time frame of these geological activities, which resulted in the emergence of volcanic cones, often time in series or clusters.[206] Another proof is that mountain masses in the archipelago follow the major fault lines, which are zones of structural weakness and land movements.[207]

[203] Salita, *Geography and Natural Resources of the Philippines*, pp. 40-41.
[204] Raymundo Punongbayan and Perry Ong, *Kasaysayan: The Story of the Filipino People* Volume 1: The Philippine Archipelago (Mandaluyong City: Asia Publishing, Inc., 1998), p. 41.
[205] Werntedt and Spencer, *The Philippine Island World*, p. 14.
[206] Ibid., p. 13.
[207] Salita, *Geography and Natural Resources of the Philippines,* p. 43.

Map No. 1
Philippine Map, Luzon colored in Red[208] ()



[208] Philippine Map <https://bit.ly/2T9Rhef>

a.2.2 Fault Lines and Volcanic Zones

The system comprising the Philippine fault lines and volcanoes can be considered as a zone. It is a region of interlacing and branching fractures, the primary alignment being the series of mountains, volcanoes, ridges, and small faults from east of northern Luzon up to the central-eastern Mindanao. This zone is also known as the Philippine Mountain Belt, the main line of which is the "Philippine Fault". This fault, alongside other faults, is an active earthquake generator and produce large-magnitude earthquakes.[209] The presence of this fault zone, which extends 700 miles encompassing Caraballo Mountains, northwest Dingalan Bay, Polilio Strait, Ragay Gulf, Central Leyte, up to Agusan Valley, has had a significant impact on the forms and topography and structural alignment of the individual islands of the archipelago.[210] The movements in the fault zone are fundamentally governed by regional tectonic tremors produced by the Philippine fault zone and several subduction zones.[211] There are at least five (5) active faults in the archipelago, some traversing into numerous provinces, and in between islands and sea; three of these are in Luzon – Casiguran, Lubang, and the Marikina Valley faults.[212] Convergences between plates where the archipelago is located occur in three main areas: (1) west-dipping Philippine Trench and the East Luzon Trench to the east, (2) the Manila-Negros-Cotabato Trench System, and (3) the southeast-facing Sulu Trench and the left-lateral Philippine Fault Zone.[213]

A product of the normal geomorphic movements – sliding, subduction, and clashing of tectonic plates are volcanoes. Located along what is known as volcanic arcs – extents most probably parallel with tectonic zones, and there the magma finds its way to become lava at the surface of the earth. The archipelago is a host to almost 200 volcanoes, 22 of which are considered active, given the frequency of its eruptions and small volcanic activities.[214] The distribution of these geological structures follows a pattern wherein these series of magma-excreting open vent-mountains is parallel to an oceanic trench, 100 kilometers away east of the archipelago.[215] Philippine volcanoes belong to a zone, what is known in the geological world as the Philippine Island Arc System, one of the four around the globe, together with the Kuril Volcanic Arc (northwest Pacific), the Northeast Japan Arc, and the Indonesian Islands.[216] The Philippine arc includes the volcanoes and volcanic mountains in west Luzon, Bicol-Leyte region, Panay-Negros area, and western Mindanao.[217] Geographically, these faults and volcanoes can be astonishing and panoramic, especially the latter. But scientific and historical events and experience proved those to be more destructive than a scenic view. Tremors caused by tectonic movements and eruptions of volcanoes destroy communities, take lives, and change landscapes. But scientists view these events not only destructive events, but also as a way in which nature offers balance, by providing fertile lands and slopes of volcanic debris, volcanic stones for house and public work constructions, naturally

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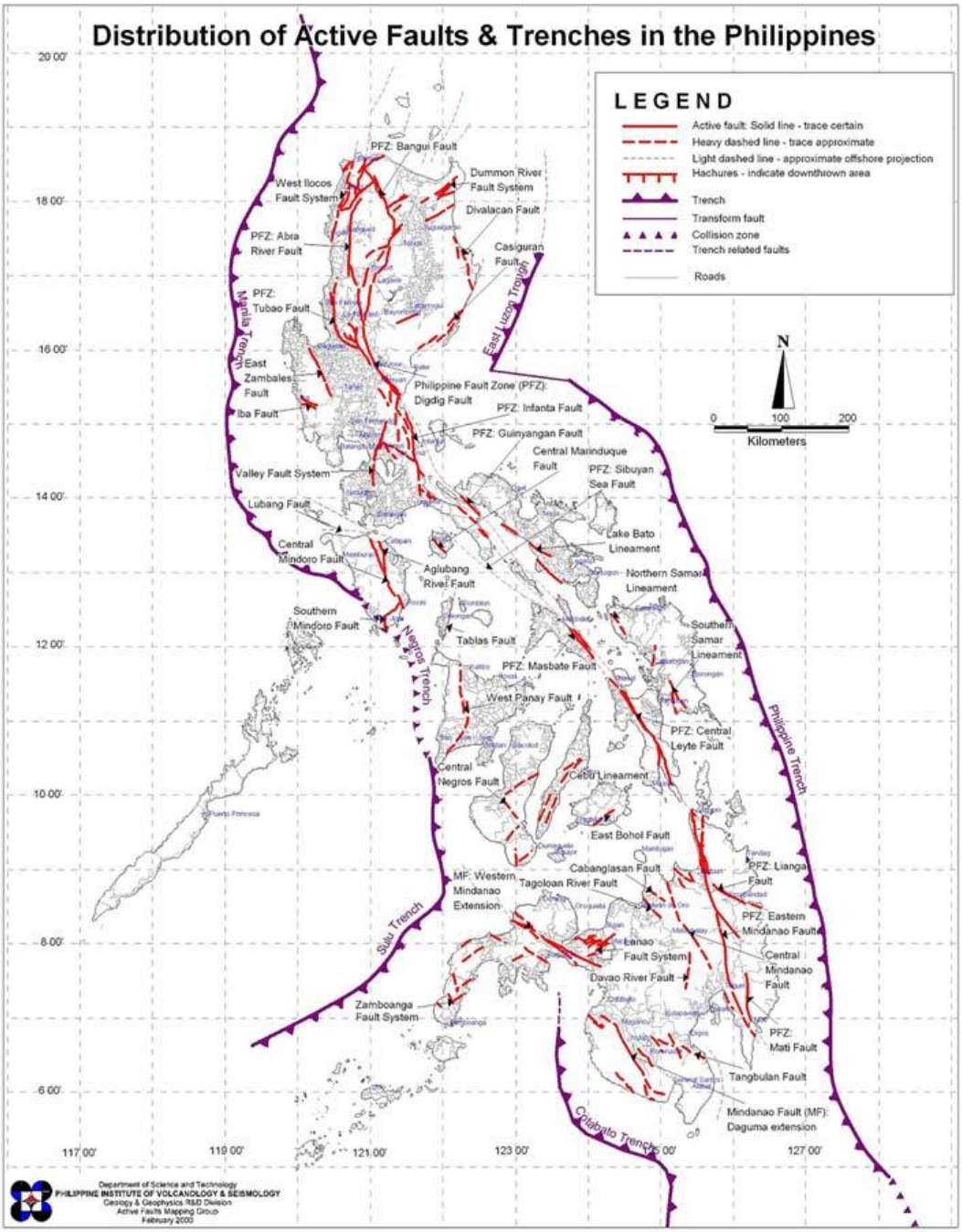
[209] Punongbayan and Ong, *Kasaysayan: The Story of the Filipino People* Volume 1: The Philippine Archipelago, pp. 51-52.
[210] Werntedt and Spencer, *The Philippine Island World*, p. 12.
[211] Punongbayan and Ong, *Kasaysayan: The Story of the Filipino People* Volume 1: The Philippine Archipelago, pp. 51-52.
[212] Ibid.
[213] Ibid., p. 42.
[214] Ibid., pp. 52-53.
[215] Ibid., p. 73.
[216] Ibid., pp. 95-96.
[217] Ibid.

processed water, and minerals such as gold, silver, and sulfur from volcanic fluids and gases.[218]

Map No. 2
Distribution of Active Faults and Trenches in the Philippines[219]



[218] Ibid., p. 91.
[219] Department of Science and Technology <dost.gov.ph>

b. Philippine oral and popular traditions

Societies and cultural communities, through their individuals and collective stories, make spaces relatable to their existence. They make the past knowledgeable through narratives they believe tell about their origin, and these are being passed on to succeeding members of their group and serve as the community's history. Geographic spaces become symbolic environmental places, and ans they eventually are attributed to the writing of historical accounts, as natural processes contribute to the content of such stories. Epics, myths, legends, and folklore comprise the enormous array of stories kept and passed from one generation to another in traditional Philippine cultural communities and ethnolinguistic groups. Surveying these rich indigenous literary traditions, one may find how indigenous societies view their environment, and how they make sense of the processes their natural spaces underwent.

Another approach in viewing the historicized understanding of the seismological experience of Filipinos is by reading and deconstructing the stories indicated in available documented oral literature of Filipinos, particularly from ethnolinguistic groups whose cultures have persisted until the present time. A survey of the environmental worldview, stories from select epics, and the folklore and beliefs, we can picture out how earthquakes and other hazards as part of the latent cultural experience of these cultural communities. How do these oral stories and histories connect to scientific findings and researches on the geographic and geologic origin and formations in the Philippine archipelago? Scientists often read Creation stories as a way in which groups put the cultural interpretation of the origin of places, or why and how environmental processes happen. Geology, as a field, which studies how the earth works, also dwells into some cultural and philosophical question of how the landscapes are formed.[220] An agreement between oral literature and geology can be seen in the similarities on how mountains, volcanoes, the plains emerged, and how human settlements were established.[221] For example, stories such as the Manobo creation myths resembles with how geologists describe the formation of the Philippine archipelago.[222] But it is important to point out that there is a stark contrast regarding valuing time and methods of understanding processing, the natural sciences appreciate these stories as these put a social dimension to the continuously evolving natural world.

b.1 Culture and Environment: Boas' "Anthropogeography"

Franz Boas (1852-1948) influenced 20th-century anthropology through his ideas on the relationship between environment and culture. His critique focused on his idea of "historical particularism", the pluralistic concept of culture, and the value of indigenous historicism of culture, in contrast to European positivist tradition. The Boasian idea of the environment "embodies the views of history and human motivation; the plurality of voices is important, and for a society to be understood, one should present an elaborate account of the environment one is included, and how the forces and power relations

[220] Punongbayan and Ong, *Kasaysayan: The Story of the Filipino People* Volume 1: The Philippine Archipelago, p. 13.
[221] Ibid., p. 11.
[222] Ibid. p. 13.

dictate the growth of cultures.[223] Boas argues, "as soon as the cultural basis is distinct, even the most absolute identity of environment cannot be assumed to lead to the same result."[224] Speth (1978) describes this idea in Boas' particularism as "anthropogeographic"[225], an application of specificity as cultures grown in particular environments and period. He furthers that *"*environmental conditions which have created or modified cultural elements", as well as 'psychological factors' or 'historical connections' that have shaped a culture…Environment modifies culture, and culture alters certain aspects of the environment. The limiting effects of the environment are evide*nt."*[226] Boas argues that culture is the creative locus of human conduct and is historically derived.[227] As per the environment, he has four propositions: (1) environment alone cannot explain culture because identical environment is consistent with distinct cultures; (2) geographical determinants limit (or favor) and modify existing cultures; (3) the direction that an environmental stimulus takes and the meaning that the environment has depends upon culture type; and (4) the relations between natural environment and culture are mediated generally by economic conditions. Boas gave the most comprehensive meaning to the term environment, recognizing the natural and cultural components.[228] Although he emphasizes the role of environment in shaping human cultures and societies, he argues that it has to limit and to favor power on culture; this influence in contingent, and serves as a stimulus and source of creative forces for which geographical locations and forces influence the growth and development of communities.[229]

If Boas promotes the understanding that cultures exist in specific environments, and thus environments in a given period dictate the flow of cultural genesis and development, Julian Steward emphasizes the value of cultural adaptation.[230] Cultural ecology he explains *"*is the study of the processes by which society adapts to its environment. Its principal problem is to determine whether these adaptations initiate internal social transformations of evolutionary change.*"*[231] One valuable postulate of Steward is the value of human adaptation to the environment, giving a premium on the physical nature of the natural environment, the structure of a society, and the available technologies humans use.[232]Having close bound on multi-linear evolutionism, cultural ecology shares ideas that are essential in looking at the grander scheme on how cultures develop, pointing out the broader role of environment and the adaptive strategies humans learn and manifest.[233]

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[223] Janine Hitchens, "Critical Implications of Franz Boas' Theory and Methodology", *Dialectical Anthropology* Volume 19, Number 2/3, 1994 (Netherlands: Kluwer Academic Publishers), p. 245 and 250.
[224] Boas (1911 and 1940), as cited by William Speth, "The Anthropogeographic Theory of Franz Boas", *Anthropos* Volume 73 Number 1/2 (1978), p. 7.
[225] Ibid.
[226] Ibid., p. 13.
[227] Ibid., p. 25.
[228] Ibid.
[229] Ibid., pp. 16-17.
[230] Jerry Moore, *Vision of Culture: An Introduction to Anthropological Theories and Theorists*, 3rd Edition (Plymouth: Altamira Press, 2009), p. 197.
[231] Steward (1968) as cited by Moore, p. 198.
[232] Ibid., pp. 198-199.
[233] Alan Barnad, *History and Theory in Anthropology* (UK: Cambridge University Press, 2004), p. 40.

Banking on these morsels of ideas, how can we assess the "Philippine environment"? What do works on environmental history view the environment in Philippine context? In my view, we can see these by considering the hazards and ecological processes. By looking at how these hazards shaped the physical landscape and landscapes of the mentality of a community and society, we can further our understanding on how human viewed the environment in a particular period and place. Applying these Boasian arguments, natural hazards such as earthquakes are both a cultural trait and a source of cultural characteristics. Filipinos view dangers as part of their everyday life, this part of the grand scheme of cultural landscape; but at the same time, these hazards influence people how to interpret the processes of the environment, leading to a variety of views about the environment, particularly to events that cause disorder or chaos.

b.2 Oral literature and environmental hazards

The most extensively studied amongst these oral literary forms are the legends and epics. On the one hand, legends are commonly described as stories that tell the origin of places and people; how particular landscapes appeared or formed, and how people relate it with their lives, through valuable morals implied in the story. Legends are sometimes interchanged with myths; but the former is considered to have some historical basis, unlike the latter that is relegated by pure cultural fiction. On the other hand, epics are conventionally defined as stories of heroism, with the hero as the central figure, wild creatures coexist with humans, and supernatural events comprise the plot of these stories composed of long narratives and repetitive storyline.[234] Both legends and epics also describe the natural environment where its owner ethnolinguistic group resides. Aside from detailing the physical landscapes, it represents the everyday life of people – life processes, material, and intangible cultures, and events and conditions that pose a threat to their community – whether caused by humans such as piracy, battles, and wars, or induced by the natural environment like storms, flooding, earthquakes, and volcanic eruptions.

Scholars have studied a variety of oral literature, and this reveals a compendium of cultural knowledge or information about how traditional societies view the world. One of the earliest studies of Philippine oral literature is E. Arsenio Manuel's "A Survey of Philippine Folk Epic" (1963).[235]This is a lengthy work that compiled available materials about Philippine epic, "based primarily on "printed sources, unpublished records, taped materials which have not as yet been transcribed, and such raw notes which have been gathered in the field but of which there is no textual record", and is aimed "to survey the scattered materials, references and information on long heroic narratives found in the Philippines and to determine their folk provenience and epic character,"[236]The

[234] E. Arsenio Manuel describe epics as follows: (a) narratives of sustained length, (b) based on oral tradition, (c) revolving around supernatural events or heroic deeds, (d) in the form of verse, (e) which is either chanted or sung, (f) with a certain seriousness of purpose, embodying or validating the beliefs, customs, ideals, or life-values of the people.[234] He adds, supernaturalism and heroism are indispensable themes, and different personages manifest these, and in varying degrees and intensities. E. Arsenio Manuel, "A Survey of Philippine Folk Epics" *Asian Folklore Studies* 22 (1963), p. 3.
[235] E. Arsenio Manuel, “A Survey of Philippine Folk Epics” *Asian Folklore Studies* 22 (1963): 1-76.
[236] Ibid., p. 1.

multivolume work edited by Damiana Eugenio, titled *Philippine Folk Literature*[237], is a comprehensive collection and study of selected documented Philippine oral literature. Composed of eight books, this work is an anthology of indigenous short stories (Book 1), myths (Book 2), legends (Book 3), folktales (Book 4), riddles (Book 5), proverbs, (Book 6), folk songs (Book 7), and epics (Book 8). This work by Eugenio is hailed as the academic scripture when it comes to Philippine oral literature. Brandon Joseph Reilly's doctoral dissertation titled *Collecting the People: Textualizing Epics in Philippine History from the Sixteenth Century to the Twenty First* (2013) charts the history of epics as a subject matter of academic endeavor in the Philippines, and a work on "history of changing epistemologies, institutions, disciplines, and technologies engaged in the interpretation of culture".[238]The work examines writing about, describing, summarizing, transcribing, and translation of documented epics, by paying "…particular attention to how the instruments of pen, printing press, tape recorder, and video recorder and media of preservation such as government report, published or unpublished colonial chronicle, scholarly textualization, coffee table book, or television show, have shaped the epics." [239]

To add, Dante Ambrosio's pioneering work on indigenous Philippine stars and constellations titled *Balatik: Etnoastronomiya: Kalangitan sa Kabihasnang Pilipino*[240] (2010), presents us an extensive reading of how indigenous Filipinos view the environment by looking at the heavenly bodies, and how the celestial phenomena related to these bodies were read and influence the way of life of early Philippine societies. Ambrosio argues that the life cycle of societies highly depends on the appearance of celestial bodies, particularly on some indigenous stars/constellations such as *balatik* (Orion) and *moroporo* (Pleiades), and this intricate way of human-environment relationship is a "civilization in the sky".[241]

In general, indigenous Filipinos view the world as a universe (commonly referred to as *sandaigdigan*, *santinakpan*, *sansinukob*) with different regions.[242] In these regions lie different entities, such as godly beings, spirits, wild animals, and humans. Different cultural communities have a wide array of depictions of their world, but the prevalence of bordered regions where entities live and interact with their fellow creatures, particularly human, is a standard feature. One the one hand, the lower region is conventionally associated with the idea of suffering, the dead, and haven for certain mythological creatures. Traditionally, for example, people from the Bicol region have three regions: the *kamurayawan* (heavenly region), the earth for humans, and *gagamban* (lower region) where the *aswang* live and thrive. [243] The Tagbanua people believe in the

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[237] Damiana L. Eugenio, *Philippine Folk Literature, Books 1-8* (Quezon City: University of the Philippine Press, 1989-2001).

[238] Brandon Joseph Reilly, "Collecting the People: Textualizing Epics in Philippine History from the Sixteenth Century to the Twenty First", Doctoral Dissertation, University of California, Los Angeles (2013), iii.

[239] Ibid., ii.

[240] Dante Ambrosio, *Balatik: Etnoastronomiya: Kalangitan sa Kabihasnang Pilipino* (Quezon City: University of the Philippines Press, 2010).

[241] Dante L. Ambrosio, "Balatik: Katutubong Bituin ng mga Pilipino", *Philippine Social Sciences Review* 57(1-4): 1-28.

[242] Ferdinand C. Llanes (ed.), *Kasaysayang Bayan: Sampung Aralin sa Kasaysayang Pilipino* (Quezon City: ADHIKA ng Pilipinas, Inc, 2001), p. 53.

[243] Ibid., p. 55; cited from Jose Castaño, *Breve acerca del origen, religion, creencias y supersticiones de los antiguo Indio de Bikol*, which can be found in Wencelas Retana's collection

existence of a lower region called *a basad*, and this is where the souls of the departed go, especially those who died of natural causes; for the Manobo people of Davao in Mindanao, the *maybollan* or *Ilongsud* is the region where the souls of the dead go.[244] For the Pintados of the island of Panay, the lower region is called the *casaan*, which is considered a place of suffering.[245]

On the other hand, some ethnolinguistic groups consider the lower regions of the universe, as well as regions not inhabited by benevolent beings and humans, as place where gigantic and powerful creatures live, and they cause different environmental processes in the human region, like earthquakes and volcanic eruptions. Creationist stories and legends reveal the presence of earthquakes as part of human societies, as shown in varying descriptions of how it happens, and what or who causes it. For the Illongos of Panay, the *idadalmon* live under the earth, and they cause earthquakes and floods.[246] The Bagobo people believe that in the lower region their lie four or five posts that support the earth or human region; and there exist colossal snakes, eels, and crabs that usually fight each other.[247] Earthquakes happen when the *kasili* (eel), which surrounds the earth, moves; its movement is usually caused by the *kayumang* (crab) agitating it.[248] Similar to this characteristic of the presence of wild creatures causing earth tremors is that of the Mandaya people; there is a giant wild boar called the *babybulan*, which moves the tree that supports the human region.[249] For the Maranao people, the world is carried on the back of a huge animal called *lumbong*; accompanying it is a shrimp, and they frequently quarrel with each other.[250] The latter claws the lumbong, and thus moves and causes the shaking of the world, which results to earthquake in the human region.[251] The Bicolanos of Albay believes in the traditional thought that a huge giant supports the earth, and whenever he moves his fingers because of anger, earthquakes occur.[252] A little earthquake is due to the movement of the giant's index finger (guisguis), while a stronger one is caused by the third finger (manlabao); people fear that when the giant gets tired of holding the earth, the world will be annihilated and it will be the end of mankind.[253]

Stories about the peopling of the earth and how populations flourished also reveal vignettes about earthquakes. The Bontoc people of Cordillera, who have one of the stories of the origin of the "first" man and woman, depicts earthquakes as the act wherein the angry earth throws big rocks and stones to the water, to show its discontent

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titled *Archivo Bibliofilo Filipino: Recopilacion de Documentos histroicos. Cientificos, literarios y politicos y estudios bibliograficos* (Alicante: Biblioteca Virtual de Miguel de Cervantes, 2017),

[244] Ibid.

[245] Ibid., p. 54; cited from Miguel de Loarca, "Relaciónes de Islas Filipinas" in Mauro Garcia, *Readings in Philippine Prehistory* (Manila: Filipiniana Book Guild, 1979).

[246] Ibid., p. 55; F. Landa Jocano, "The Epic of Labaw Donggon", *Philippine Social Sciences and Humanities Review* 29(1), 1964: 18.

[247] Ibid., p. 59; Damiana L. Eugenio, *Philippine Folk Literature: The Myths* (Quezon City: University of the Philippine Press, 1994), pp. 105, 108-113, 119, 125.

[248] Ibid.

[249] Ibid.; Jose I. Llanes, "Dictionary of Philippine Mythology", U*niversity of Manila Journal of East Asiatic Studies* 5(1), 1965: 11.

[250] T. Madale, "A Preliminary Study of Maranao Folk Literature", pp. 5-6, from Eugenio, p. 262.

[251] Ibid.

[252] H. Vibal, Bikol Paper No. 66, in H. Otley Beyer's "Ethnography of the Bicol People", from Eugenio, pp. 71-72.

[253] Ibid.

and to avenge himself from the water's first attack, which the Bontoc people believed to be the first storm then.[254] The Aklanon people of Panay have a story about how *Makakagahum* the godly being made living things form him not to be alone on earth. The story tells that living things came from seeds *Makakagahum* casted all over the ground; those that fell upon trees became monkeys and birds, those under the cracks became fairies and evil spirits, and those that rolled down on the plains and valleys received light and thus became human beings.[255] One seed fell into a very deep hole in the earth, wedged between two stones; this became a huge and hairy ape, which causes earthquakes whenever he moves.[256] The infamous Luzon legend of Bernardo Carpio, though Christianized already, also explains to us how the people make earthquakes sense in a traditional manner. The Ibanag people's version of the legend tells a story about a man known as Bernardo Carpio, who has extraordinary strength since he was a young child.[257] He attained popularity in many towns, and became proud and boastful, that he even challenged God. The God asked him to stop the quarrel of two mountains, but an unfortunate event happened - he got caught between the two mountains and was buried alive.[258] The Ibanag group of Sierra Madre region believes that earthquakes are caused by the man Bernardo trying to free himself from being buried.[259] The people of Montalban in the province of Rizal (formerly Morong) however, believe that Bernardo Carpio is chained perpetually in the Montalban gorge, and is doomed to keep the mountains from caving on each other.[260] It is said that whenever he rests, the walls of the gorge close in, and he pushes them back, making the earth around him shake.[261] In Reynaldo Ileto's book *Pasyon and Revolution: Popular Movements in the Philippines, 1840-1910* (1979)[262], he studied the legend of Bernardo Carpio not only as an oral traditional literature, but as historical text that inspired the Katipunan revolutionists in their battle for independence against Spain.

The origin of terrestrial structures is also discussed in oral literatures such as legends. As far as culture and tradition are concerned, the presence of mountains and volcanoes are not only because of physical changes in the environment, but also has cultural meaning and importance for certain groups of people, particularly those who have them as part of their everyday life. Tradition cultural communities in the Philippines consider mountains and volcanoes as haven of gods, demigods, and spirits. Browsing through epics and legends, every mountain or volcano has a story. Stories of divine acts, malevolence and punishments, and interactions of divinities and human with each other, through certain story archetypes such as adventures, festivities, and daily life cycles, portray important cultural values of certain ethnolinguistic groups.

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[254] "The Teacher of Besao", "The Literature of Besao", pp. 140-141, from Eugenio, pp. 277-278.

[255] "Beato M. de Cruz, the contributor of the "Aklan Mind to Philippine Literature", p. 27, from Eugenio, p. 295.

[256] Ibid.

[257] Ibanag Folk Literature, Paula C. Malay, WWM, 12 April 1957, pp. 32-33, from Eugenio, pp. 262-263. The whole story of Bernardo Carpio can be read in an undated compilation titled *Historia famosa ni Bernardo Carpio sa reining España na anac ni D. Sancho Diaz at ni Dona Jimena* (Manila: J. Martínez, n.d.).

[258] Ibid.

[259] Ibid.

[260] Punongbayan and Ong, *Kasaysayan: The Story of the Filipino People* Volume 1: The Philippine Archipelago, p. 11.

[261] Ibid.

[262] Reynaldo Ileto, *Pasyon and Revolution: Popular Movements in the Philippines, 1840-1910* (Quezon City: Ateneo de Manila University Press, 1979).

b.3 Local-Popular Knowledge

Theorizing the environment commences from the attempts to make a scientific description of its cultural contents and processes. Reconstructing the environment from the point of view of historically destructive forces, specifically natural hazards, requires one to look at how the "cultural eyes" of anthropology explains the genesis and progress of cultures and societies through time. At this point, useful are Franz Boas' historical particularism and Julian Steward's cultural ecology. How do these theories help us understand the history of environment perennially hampered by destructive natural forces and threats?

Different Philippine communities have developed their own notions of the environment, the celestial world, and the processes it involves. Everyday life is a clear manifestation of the thriving of a culture based on human's adaptation and perception of the natural space where they are living. Meteorological and seismological processes are part of the cultural communities, and of the civilization that was established in different parts of the archipelago.[263] Economic activities such as farming, fishing, hunting, and trade were influenced or patterned after how the environment "behaves".[264] Different ethnic groups have their own set of terminologies and deities assigned to every environmental phenomenon.[265]

Filipinos view hazards in a cultural way. Generally speaking, most Filipinos usually consider natural hazards and disasters as manifestations of God's wrath. With a form of fanaticism to Catholicism was present in people's minds leading to the Church's control over people's mentality, the wrath of God was inevitable. Thus, the only thing that can save them, based on available sources, was to pray and continue being good servants of the faith. During calamities, people run into churches to conduct *novenas* and pray until a storm passes their town. A few days after, parishioners usually hold processions of saints to ask protection and guidance, so that hazards will never happen again. The historical experiences of Filipinos about risks have a surmountable influence on the way they view and respond to the challenges of the natural environment.

It can be summed up that the Philippine communities have a wide variety of knowledge and superstitious beliefs of the natural environment. This is probably a by-product of individual and collective experiences. One of the earliest studies on local folk knowledge on the environment is Isabelo de los Reyes' *El Folklore Filipino* (1889/1994).[266] In his study about folklore, Don Belong, as he was locally known, documented, for example, the *consejas meteorologicas* of the people, specifically those on lightning and typhoon. The Ilocano fear of lightning stems from the belief that it is the *coche* of God starting its ride to make his presence felt.[267] The superstitions on lighting (*rayo* in Spanish) are very much prevalent in different towns in Ilocos Norte, as de los Reyes had documented. Precautions and defenses against lightning emanates from local plants and their uses, a

[263] Dante L. Ambrosio, *Balatik: Etnoastronomiya: Kalangitan sa Kabihasnang Pilipino* (Quezon City: University of the Philippines Press, 2010), p. 4.
[264] Ibid., p. 5.
[265] Ibid., pp. 59-60.
[266] Isabelo de los Reyes, *El Folklore Filipino*, translation by Salud C. Dizon and Maria Elinora P. Imson (Quezon City: University of the Philippines Press, 1994)
[267] Ibid., p. 97.

proof of the indigenous knowledge regarding this.[268]

Moreover, De los Reyes' 1890 work on local history and folklore in Ilocos (1890)[269] is considered a pioneer in his time, form and structure, based on the criticism it drew not only from Spanish journalists but also with his Filipino comrades in the Propaganda movement; his work is considered the pioneer in local history, that focused on oral culture and lore.[270] As a columnist and an owner of a printing press, his newspaper served as an avenue for conversation in culture, and as a way to reach the public to share and know their cultural history, particularly, the history beyond the imposed knowledge by the Spaniards.[271]

As what many contemporary literatures have proven, local indigenous knowledge plays a vital role in disaster risk reduction and mitigation mechanisms of communities, especially those that have been in the hazard belt for a long time. Local indigenous knowledge is the "cumulative and complex body of knowledge, know-how, practices, and representations that are maintained and developed by people with extended histories of interactions with the natural environment. The study of Molina (2015) shows the prevalence of local people's cultural understanding of environmental hazards as a coping strategy for mitigation and resilience.[272]Such knowledge based on the experiences and observations of peoples over generations can contribute to an increased understanding of climate change and help develop community-level adaptation strategies."[273] The anthology by Malay and Malay (1955) offers us an anecdotal collection of folklore on weather and environmental phenomena.[274]By looking at the behaviors of animals, plants, wind direction, the land, and the bodies of water, people can estimate and point out weather patterns and disturbances, sans the technical and mathematical predictions.[275] Zarco (1992) studied the way animals behaved during the July 1990 earthquake, by collecting accounts from local townsfolk, through field interviews, in areas where the quake was felt.[276]

Materials on popular devotion suggest people understood weather phenomena and natural hazards from a religious standpoint. Novenas and church accounts evoked the religious perspective in understanding natural hazards and disasters; prayers and rituals

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[268] Ibid., pp. 95-97.
[269] Isabelo de los Reyes, *Historia de Ilocos*, Tomo 1-2 (Manila: Est. tip. La Opinión, 1890).
[270] Lars Raymund Ubaldo, "Historia de Ilocos (1890): ni Isabel de los Reyes bilang Maagang Halimbawa ng Kasaysayang Pampook", Arthur Navarro, et al., *Kasaysayang Pampook: Pananaw, Pananaliksik, Pagtuturo* (Lungsod Quezon: U.P. Lipunang Pangkasaysayan, 2012), pp. 9-31.
[271] Mean Thomas, "Isabel de los Reyes and the Philippine Contemporaries of La Solidaridad", *Philippine Studies* 54(3): 381-411
[272] Jesusa Grace J. Molina, "People's Knowledge, People's Defense: Utilizing Local Practices for Disaster Safety Adaptation in Rapu-Rapu, Albay, Philippines", 22nd Conference of the International Association of Historians of Asia (IAHA), 2-6 July 2012.
[273] Ibid.
[274] A collection of stories about these folkways are compiled in Armando J. Malay and Paula Carolina Malay, *Our Folkways* (Manila: Bookman, Inc., 1955).
[275] Ibid.
[276] Ricardo Zarco, et. al. "Quantifying Spatial and Temporal Dimensions of Premonitory Animal Behavior of the July 16, 1990 Luzon Earthquake", *The July 16, 1990 Luzon Earthquake: A Technical Monograph. Inter-Agency Committee for* Documenting and Establishing Database on the July 1990 Earthquake, 1992.

begged the heavens for fair and good weather.[277] Browsing through old *novenas* reaffirms the observed religious mentality towards hazards. In many cultures, the offering of prayers and rituals is a prerequisite in obtaining a safe environment.[278] The reciting of the *Trisagion* or prayer to three saints was a practice whenever there are hazards, typhoons, and earthquakes for example, as mentioned in a prayer dedicated to San Ramón Nonato.[279] Patron saints or *pintakasi* of different towns, such as San Vicente Ferrer, San Agustín, San Roque, and San Isidro Labrador are offered with special prayers or *pagsisiyam*.

San Vicente, in one novena, was shown to have miraculously gave a town rain:

> "Doon sa isang villa sa Francia ay lauon nang nagcagotom, ang pagca sa touing taon ay nasisira ang canilang pag-aani dahilan sa pag-olan doon sa touing taon niyaon bagang tinitorang granizo, at sa mga lintic na madalas bumubungcal saan man doon; sinabi siya sa ating Santo ay ang ginaua niya ay pinatirican ng isang Cruz yaong lugar na madalas bucalan nang lintic at bogsoan niyaong granizo na inioolan,
> saca naman yaong Cruz ay uinisican nang benditang tubig, ay mula niyaon ay hindi na omolan doon nang granizo at nauala sampon nang lintic, at omigui na ang pag-aani roon"[280]
>
> *(In a town in France, there was hunger*
> *There is a time in a year where rains destroyed their harvest*
> *There are years that some called granzo and lintic [pests] appear more often;*
> *It was told by the saint that a Cross was put in place where the lintic were seen, and in places frequently rained upon, afterward, blessed water was showered into the Cross, and since then, it hadn't rained of granizo, the lintic were gone, and harvest went well)*

[277] Greg Bankoff, "In the Eye of the Storm: The social construction of the forces of nature and the climatic and seismic construction of God in the Philippines", *Journal of Southeast Asian Studie*s 35(1): 91–111, 2004. A recent study highlights the importance of spirituality in harnessing compassion and collaboration among dwellers of hazard-prone areas, as well as a "build back better" disaster risk reduction strategy in calamity-stricken communities. See Maria Venus B. Raj, "Spirituality as a Pillar of Disaster Resilience: Experiences and Images of Spirituality among Small Fisherfolks in Bato, Camarines Sur", Master in Community Development Thesis (2017), College of Social Work and Community Development, University of the Philippines Diliman.

[278] Ibid.

[279] Trinidad H. Pardo de Tavera, "Legacy of Obscurantism", Encarnacion Alzona (trans.) *The Character of Rizal and the Legacy of Obscurantism* (n.d.), p. 76-77.

[280] Francisco Vidal, O.P., *Pagsisiyam y Milagros sa Poon San Vicente Ferrer* (Manila: Imprenta de Sto. Tomas, 1904), p. 48-49.

San Isidro Labrador served as the patron of the town of Lucan in Quezon, as well as in many towns in Laguna and Nueva Ecija. As the patron saint of farmers, has this prayer in the people's novena for him:

Panalangin

"Oh malualhating pintacasi naming Poon San Isidro
sa mga pananim at buquid yayamang na rian cana sa
calualhatian casama ng mga angeles at santos
ipanalangin mo cami sa ating Panginoon Dios ng
camtan namin ang guinhauang ualang catapusan."

Dalit

"Cami iyong ca auaan na ihingi mo ng ulan taong
husto sa halaman na aming icabubuhay
Isidro Mababang loob
Dilang baya'y saclolohin pananim ay payabongin at dati
cang, ma auain sa tauong sino ma't alin
Isidro Mababang loob
Cami iyong idalangin pintacasi Poon namin na cami
papag anihin sa dilang aming pananim
Yayamang narian cana malualhating Gloria lingonin
nang iyong mata caming Labrador de tierra
Isidro Mababang loob"

Panalangin

"Panginoon namin Dios basbasan mo itong aming
bayan pati caming tumatahan iligtas mo sa lindol, sa
lintic, sa baguio, sa balang, sa gutom, sa salot at sa
iba pang masasama"[281]

(Prayer

Oh our blessed patron, Saint Isidore
Our harvests and lands be blessed since you have been
with angles and saints
Pray for us to God, for us to receive endless blessings.

Creed

Be pitiful to us, ask us for rain, for our crops where we
depend into, Isidore our humble patron
Not only protect our town, but to have a bounty harvest,
and be merciful to anyone, Isidore, our humble patron
Pray for us, for us to receive a good harvest,
May your presence see us, to be blessed by you, a farmer

[281]Manuel V. Palacio, *Panalangin cay Poon San Isidro Labrador, Ikalawang Pagkalimbag* (Maynila: Manuel V. Palacio, 1934), pp. 55-58.

of the earth, Isidore, our humble patron

Prayer

Our Lord God, bless our town, us who are living in it,
Save us from tremors, keep us from lintic [pests], from
typhoons, from locusts, from hunger, from tempests, and
other evils.)

c. Early "Historical" Earthquakes, 16th-18th centuries

The "early" earthquakes, or empirically those earthquakes that have appeared in old historical accounts about the Philippines, were generally described as unique, disruptive events, as far as the chroniclers and official histories are concerned. How have these hazards been described as historical phenomena?

Newson (2011) consider natural hazards as one of the reasons for population decline in the Philippines during the early years of the Spanish era.[282] Though she didn't state it as quick and disastrous as other factors such as diseases and epidemics, labor exploitation or wars, due to unavailability of sources directly reporting facts about it, she affirms the observations of Reid and Boomgaard, in which the Philippines had shared experience with Southeast Asia in the 16th and 17th century, when rapid climatic changes hit the region, manifested through frequent drought, resulting in food shortages and famines.[283] Likeminded with the latter's suggestive assumption, a variety of natural hazards, including typhoons, floods, volcanic eruptions, and earthquakes, may have contributed to mortality indirectly utilizing crop, livestock and boat destructions.[284] She further argues, "while colonial rule often amplified their effects, their role in maintaining low population densities in precolonial times has probably been underestimated".[285]

Several studies present us a variety of perspectives on how disasters were viewed and read, not only as small environmental processes, but also as political, cultural, and religious events and turning points. Published works on natural hazards, as well as on biological, environmental threats sometimes proved to be cultural phenomena; impetus to a much more significant social change, become part of a community's social memory or considered part of people's perennial life events. Given this, surfacing the indigenous and the local views and responses is imperative to fully understand the context and implications of these natural hazards to human communities. Gaiilard, et al. (2012) explored the definitions and uses "indigenous knowledge" in disaster risk reduction and management.[286] As they argue, "...'indigenous knowledge' has no universally accepted definition. Other phrases, sometimes seen as similar to and overlapping with it, are "traditional knowledge", "indigenous technical knowledge", "folk knowledge", "local knowledge", "vernacular knowledge" and "traditional environmental knowledge". These

[282] Linda A. Newson, *Conquest and Pestilence in the Early Spanish Philippines* (Quezon City: Ateneo de Manila University Press, 2011).
[283] Ibid., pp. 35-36.
[284] Ibid.
[285] Ibid., p. 253.
[286] Jean-Christophe Gaillard, Ilan Kelman, and Jessica Mercer, *Indigenous Knowledge and Disaster Risk Reduction* (Geographical Association, 2012).

terms are not necessarily accepted as synonymous but are instead sometimes differentiated on bases such as academic discipline, context, and language."[287]

Earthquakes are no doubt, inevitable forces of nature that influenced or shaped a big part of the Filipino past. Though presented briefly, we can assume that these hazards had left impacts and created mentalities, which, in the succeeding centuries, due to the increase on the number of literature and chronicles produced in and by the colonial state, had been more visible and the effects have been assessed comprehensively. Thus, knowledge of "historical" earthquakes and volcanic eruptions has been available starting in the 17th up to the late 19th century.

During the sixteenth century, themes such as damages to human properties characterize the occurrences of what we're supposed to be earth tremors. The creation of the idea of God's wrath came along as the frequency of these experiences happened. The divine nature of these hazards rose up since most of the available chronicles were regular by no other than priests, who, during those times, was the scribes and scholars of their missions or colonial settlements established. Though different terms existed and persisted based on available sources, references breeze through the idea that these were hazardous events that cause similar effects on human life and property.

Earthquake disaster experiences in the Philippines portray images of societies in entropy. These proved colonial settlements had a high vulnerability to natural hazards, in varying contexts and situations. These environmental threats affect people's lives, from property destruction to loss of life. As severe threats to the human population, earthquakes lead to disasters that transcend into the political and socio-economic spheres of society.

Considering how earthquakes were given meaning provides us epistemological contexts on how this natural hazard has developed in the mind of the people. Commonly known in the Spanish language as *terremoto*, but the word *tremblores* (instead of *temblores*) are also used, especially in Spanish South America. In general, *terremotos* refer to the destructive ground movement, while tremblores have a specific meaning and use, which are for rapidly recurring vibratory movements not sufficiently compelling to create damage.[288] Saderra Masó (1895) attempted to resolve the blurred definition of an earthquake *(terremoto* or *temblor de tierra*) as both commonly used in Spanish Philippines at that time. In his 1895 catalog, he argues that the observatory has somehow borrowed what Swiss scientists have used: that it is vital to account not only the single perceptible quakes, but the focus of the seismic analysis should be in the series – one major or minor tremor following or next to one, as well as the intensity and directionality of oscillations and trepidations.[289] Therefore, noticeable is the preference on the use of *temblor de tierra*, rather than *terremoto*, because the former encompasses a recent appreciation rather than the former. A decade earlier, renowned seismologist John Milne (1886) differentiated the two by stating that words attributed to earthquakes or any ground movements depend upon the observer's feelings, which is then depending upon one's temperament and situation.[290] He furthers that words attributed to

[287] Ibid., p. 13.
[288] Ibid.
[289] Saderra Masó, *La Seismología en Filipinas,* p. 18.
[290] John Milne, *Earthquakes and other Earth movements* (New York: D. Appleton and Company, 1886), p. 10.

earthquakes or any ground movements depend upon the observer's feelings, which is then depending upon one's temperament and situation.[291]

A lexicographical survey of the word terremoto in dictionaries made and produced in Spanish Philippines offers a range of meaning to understand the origin and use of the term better. The word *terremoto* or the phrase *temblor de tierra* are commonly referred to as the shaking or sudden movement of the ground. There are some similarities to how specific Philippine languages depict this particular physical environment activity. Languages in Luzon have different words used describing earthquakes, but languages in the Visayas and Mindanao region have almost the same. The table below shows a summary of local language counterparts of *terremoto* and *temblor de tierra*, and their meanings extracted from several colonial dictionaries produced most of during the 19th century.

Table No. 3
Earthquakes as defined in select 16th to 19th-century dictionaries

LANGUAGE	WORD	LEXICOGRAPHIC ENTRY
Spanish	Terremoto, temblor de tierra	
Tagalog	lindol, panginig	de temlor de tierra, de espanto o temor, cagilagilalas na vyca, palabra de temblor[292]
Bicol	linog	temblor de tierra. *nalinog*, vel NAG, temblar a tierra. *Linilinog*, ser hecho temblar algo con la tierra. *Nacacalinog*, lo que causa el temblor. Y por metafora dicen: *Hare pa camo garona quita yng linilinog*, cuando bullen muchos en la casa, y hacen temblar[293]
Bisaya/Cebuano	linog	temblor, terremoto, temblar de tierra. especie de arbol excelente para construccion[294]
Hiligaynon/Panayana	linog	temblor de tierra. *Nagalinog*. Temblar, o moverse la tierra[295]

[291] Milne, *Earthquakes and other Earth movements,* p. 10.
[292] Pedro de San Buenaventura, *Vocabulario de la Lengua Tagala,* el romance Castellano pvesto primero, Primera y segunda parte, Pila, Laguna (Tomas Pinpin y Domingo Loag, 1627), p. 573; Juan Jose de Noceda and Pedro Sanlucar, *Vocabulario de la lengua tagala: compuesto por varios religiosos doctos y gravados* (Manila: Imprenta Ramirez y Giraudier, 1869), pp. 620 and 622. Another Tagalog dictionary also tells the same meaning: Sofronio G. Calderon, *Diccionario Ingles-Español-Tagalog (Con Partes de la Oración y Pronunciacion Figurada.)* First Edition (Manila: Libreria y Papeleria de J. Martínez, 1915), p. 242.
[293] Marcos de Lisboa, *Vocabulario de la Lengua Bicol* (Manila: Establecimiento Tipografico del Colegio de Santo Tomas, 1865), p. 226.
[294] Juan Félix De la Encarnación, *Diccionario Bisaya-Español compuesto por el R. P. Fr. Juan Félix de la Encarnación, provincial que ha sido dos veces de Agustínos Descalzos de la Provincia de S. Nicolas de Tolentino de Filipinas.* Third Edition (Manila: Tipografia de Amigos del Pais, 1885), p. 208.
[295] Raymundo Lozano, *Gramática Hispana-Visaya-Panayana* (Valladolid: Imprenta-Libreria heligrafia y Taller de Grabados de Luis N. de Graviria, 1892), p. 189.

Iloco	guinguinéd	Terremoto, temblar la tierra[296]
Kapampangan	ayun, ayun-ayun	temblor, V.N. Temblar, *ayonayon*, temblar de flaqueza, convaleciente[297]
Maguindanao	linug	temblor, terremoto, *luminug*, tener temblor, haber terremoto[298]
Tiruray	linug	temblor, terremoto[299]

Moreover, in Kapampangan language, the derivative word *ayonayon* also refers to weak strains or weak movements (*temblar de flaqueza*). In Bicol, *linog* is also a generic term about anything that shakes, moves, or is moved. Interestingly, in Bisaya/Cebuano, linog also pertains to a type of wood or tree used in construction.

Earthquakes are typically attributed to either tectonic movements or volcanic eruption. Father Saderra Masó points out that the majority of the most destructive earthquakes in the archipelago were due to tectonic causes.[300] In his *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909*[301], almost 70 out of 203 recorded earthquakes in the archipelago occurred in mainland Luzon. In particular, areas in northern Luzon up in the Bicol region are earthquake-prone areas.[302] In the catalog he made, the Jesuit seismologist Miguel Saderra Masó detailed 19th-century earthquake experiences in a "modern" way. Veering away from the "chronicler type" of documentation, he presented information systematically, from the date of occurrence, the quantitative strength ofđ an earthquake based on the De Rossi-Forel scale, regions or areas affected, and a qualitative description of damages.[303] Examples of these are the two notable earthquakes that occurred during the second half of the 19th century. These were the earthquakes of June 1863 and July 1880 that destructed significant urban and rural areas in the island of Luzon.

An attempt to historically analyze pre-instrumental era earthquakes through available primary materials was that of Willis (1944). He noted 17 earthquakes between the 17th and 20th centuries, and there had been earthquakes that reduced entire towns, ruined or devastated significant parts of it: six in *the seventeenth century, four in the eighteenth*

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[296] Andres Carro, *Vocabulario Iloco-Español trabajo por varios religiosos del Orden de N.P.S. Agustín*, Segunda Edición (Manila: Establicimiento Tipo-Litográfico de M. Perez), p. 124

[297] Diego Bergaño, *Vocabulario de la Lengua Pampanga en Romance, compuesto por el M. R. P. Lector Fr. Diego Bergaño, del Orden de los Hermitaños de N. P. S. Agustín, Examinador Sinodal de este Arsobispado, Difinidor de esta provincial del Santisimo Nombre de Jesús, y Prior del Convento de S. Pablo de Manila* (Manila: Imprenta de Ramirez y Giraudier, 1860), p. 9.

[298] Jacinto Juanmarti, *Diccionario Moro-Maguindanao-Español compuesto por el Jacinto Juanmarti de la Compañía de Jesus* (Manila: Tipografia Amigos del Pais, 1892), p. 104

[299] Guillermo Bennásar, *Diccionario Tiruray-Español compuesto por el P. Guillermo Bennásar de la Compañía de Jesús.* First Part (Manila: Tipo Litografía de Chofrè y Comp., 1892), p. 95.

[300] Miguel Saderra Masó, *Volcanic and Seismic Centers of the Philippine Archipelago* (Manila: Bureau of Census, 1904), p. 21.

[301] Miguel Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909, with an appendix of Earthquakes in the Marianas Islands* (Manila: Bureau of Printing, 1910).

[302] Greg Bankoff, *Cultures of Disaster: Society and Natural Hazards in the Philippines* (London: RoutledgeCurzon Publishing, 2003), p. 37

[303] Saderra Masó, *Catalogue*, p. 5.

century and seven in the nineteenth century.[304] Thus, the sixteenth century was a gray area when it comes to the extensive study of earthquakes. In her book, Ramirez (2006) points out that the 16th to the 18th centuries constitute 62.8% of the recorded earthquakes in the Philippines, with 1, 15, and 16 in the number of years these centuries had experienced earthquakes, respectively.[305]In a much recent study of literary materials, Mojarro (2018) states that 18th-century Philippine newsletters, or *relaciones de sucesos*, contain vignette of accounts of natural disasters, particularly how some earthquakes in Luzon, such that of 1641, 1645, and 1743, and the great eruption of Taal volcano in 1754.[306]

Earthquake occurrences are generally attributed to either tectonic movements or volcanic eruption. He points out that the majority of the most destructive earthquakes in the archipelago were due to tectonic causes.[307] These earthquakes have available documentation, unlike some earthquakes that remained to be known only as minor earth tremor. In several catalog listings of all recorded and historical earthquakes in the archipelago, namely Miguel Saderra Masó's *La Seismología en Filipinas*[308] (1895) and *Catalogue of Violent and Destructive Earthquakes in the Philippines*[309] (1910), and William Repetti's *Catalogue of Philippine Earthquakes, 1589-1899*[310] (1946), narrative and numerical descriptions were made, and these catalogs present a relatively long history of earthquake occurrences in the archipelago. In Saderra Masó's *La Seismología*, there is a total of 1023 earthquakes recorded, divided randomly into three periods: 102 from 1599 to 1865, 457 from1866 to 1879, and 464 from 1880 to 1899. Almost 66% or 675-recorded earthquakes happened in the island of Luzon. In Saderra Masó's 1910 catalog, almost 70 out of 203 "violent and destructive" recorded earthquakes in the archipelago occurred in mainland Luzon. In particular, areas in northern Luzon up to the Bicol region are earthquake-prone areas.[311] In the updated listing of Repetti, he identified 1786 recorded earthquakes in 310 years; more than 61% or 1092 recorded earthquakes were placed in the island of Luzon, and the rest happened in other major islands such as Mindanao, Panay, Leyte, and Samar. We can derive the following from these figures: (1) earthquake occurrences are geographically distributed, though one can correlate the incidences of tremors to earthquake-prone areas such as Luzon and Mindanao to its geological position; (2) pre-18th century earthquakes were generally descriptive and based on chronicles and documentation

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[304] Bailey Willis, "Philippine Earthquakes and Structure", *Bulletin of the Seismological Society of America*, Volume 32, No. 2 (1944), pp. 79–81, cited by Greg Bankoff, "Fire and Quake in the Construction of Old Manila", *The Medieval History Journal*, Volume 10, Nos. 1 and 2, (2007), p. 419

[305] Ramírez Martín, *El Terremoto de Manila de 1863,* p. 20.

[306] Jorge Mojarro Romero, "Relaciónes de sucesos y terremotos en la Filipinas del siglo XVIII", *Titivillus* 4(2018): 93-125.

[307] Miguel Saderra Masó, *Volcanic and Seismic Centers of the Philippine Archipelago* (Manila: Bureau of Census, 1904), p. 21.

[308] Miguel Saderra Masó, *La Seismología en Filipinas: Datos para el studio de terremotos del Archipiélago Filipino* (Manila: Establicimiento Tipo-Lotográfico de Ramírez y Compañia, 1895).

[309] Miguel Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909, with an appendix of Earthquakes in the Marianas Islands* (Manila: Bureau of Printing, 1910)

[310] William Repetti, "Catalogue of Philippine Earthquakes, 1589-1899", *Bulletin of Seismological Society of America* 36(3): 133-322, July 1946.

[311] Greg Bankoff, *Cultures of Disasters: Society and natural hazard in the Philippines (*London: Routledge, 2003), p. 37

made of colonial officials and religious individuals, missionaries, and priests and (3) related to the second point raised, there is an observable increase in the number of earthquakes during the second half of the 19th century; and this is primarily attributed to the arrival of instruments that can measure different intensities of earthquakes, not only the high-intensity, and highly destructive tremors.

Gaspar de San Agustín made one of the earliest accounts about an earthquake that was written by Spanish missionaries in the Philippines in 1597. Though this was written in the Philippines, the event did not happen in the islands. The account was about an earthquake that occurred in Japan and devastated many parts of it.[312] In his accounts, he mentioned how a ship from the Philippines was affected by the said event:

> The weather was unfavorable and on July 22 (1597), a frightening comet was seen whose tail tapered to the north. This was an indication of the disaster to come. On September 4, a powerful earthquake occurred in Japan where many buildings were leveled. It caused such turbulence in the ocean that it split the mast of the San Felipe. It swept the boat along so horrible without a mast, sails or rudder that it was shipwrecked in Japan on October 18 off the island of Thoza in Xicoke.[313]

In the catalog of destructive earthquakes in the Philippines he made, Miguel Saderra Masó (1910) mentions that the first devastating tremor that was put into the chronicles was that of 25 June 1599.[314] Applying the standard Rossi-Forel scale of earthquake magnitude measurement, he estimated that it was Intensity 9. It had affected the capital city, Manila, and its neighboring provinces; *"*it damaged many private buildings in Manila, cracked the vault of the Jesuit Church so badly that it had to be demolished and replaced by a ceiling; fissured the walls and ruined the roof of Santo Domingo Church.*"*[315] Most of the affected or damaged were the stone building in Manila and provincial town centers. The earthquakes proved the almost two-decade current trend in edifice construction, especially in Manila, where stones were the primary material used, thus lessening the reliance on wood. This can be traced back to 1583 when then Manila Archbishop Domingo de Salazar directed the construction of stone buildings as a response to the threat of fire conflagration.[316] One chronicler wrote that Manila had *"…*beautiful structures, and dwelling houses were reared, so high and spacious that they resembled palaces; magnificent churches with lofty and graceful towers, within the walls of Manila as well as outside of them: all of which made the city very beautiful and gay and contributed equally to health and pleasure."[317]

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[312] Gaspar de San Agustín, "De la venida del sexton Gobernador propirietario, don Francisco Tello de Guzmán, y sucesos various de su gobierno hasta fin del año de 1597", *Conquistas de las Islas Filipino, 1565-1615*, translation by Luis Antonio Mañeru (Manila: Museo de San Agustín, 1998), pp. 1034.
[313] Ibid., p. 1035.
[314] Saderra Masó, *Catalogue of Violent and Destructive Earthquakes*, p. 2.
[315] Ibid., p. 7.
[316] Ibid., pp. 2-3.
[317] Ibid., p. 3.

From this point, we can understand the fact that only in 1599 a "historical" earthquake was documented. Only in the latter part of the 16th century more infrastructures that were of huge sized were seen, and these were the ones, which were severely affected by the tectonic ground movement. Saderra Masó does not dismiss the possible fact that before 1599, strong earthquakes might have occurred, but the evidence that it has destructed communities is still to be sought.[318] Several months after, on 02 January 1600, another earthquake struck Manila; it was measured to be an Intensity 8 and had tremors much longer in duration compared to the June 1599 earthquake.[319]

Several months after, on 02 January 1600, another earthquake struck Manila; it was measured to be an Intensity 8 and had tremors much longer in duration compared to the June 1599 earthquake.[320] Miguel Selga, former director of the Philippine Weather Bureau PWB), made a scientific-historical study about the notable Luzon earthquakes in the 17th and 18th century, based on available documentary materials. In his research, he analyzed the *ear*thquake of San Andres in Manila in the year 1645[321], and the big earthquakes of January 1743 that affected towns in the provinces of Tayabas and Laguna.[322] The 1645 San Andres earthquake, which struck during the feast of St. Andrew in November of that year, and had its epicenter at the district of San Andres in Manila, was considered as the largest in the seismological history of the country.[323]The 1934 earthquake in the Southern Luzon region has left significant topographic effects in the area, as well as cultural and historical memories to the people of Tayabas and Laguna.[324] In summary, these are the earthquakes in Luzon during the 16th to 18th centuries that has available information and/or documentation:

[318] Saderra Masó adds: "…as the author of the "Verdadera relación de la grande destrucción * * * del año 1645" tells us, "when first founded, Manila consisted of wooden houses roofed with a certain kind of palm leaves, the same which the natives use in their buildings." Hence the damage done by these earthquakes must have been insignificant.", Saderra Masó, *Catalogue of Violent and Destructive Earthquakes*, p. 2.

[319]Ibid., p. 7.

[320] Saderra Maso, *Catalogue of Violent and Destructive Earthquakes*, p. 7.

[321] Miguel Selga, *Bibliografia del temblor de San Andres en Manila*, Publications of the Manila Observatory Vol. 5, No. 13 (Manila: Bureau of Printing, 1941). Selga also wrote a short research note about this earthquake titled *Victima del temblor de San Andres* (SEL S2.2 144).

[322] Miguel Selga, *Los terremotos de Enero de 1743 en Tayabas y Laguna de Bay*, Publications of the Manila Observatory Vol. 5, No. 1 (Manila: Bureau of Printing, 1941)

[323] Selga, *Bibliografia del temblor de San Andres en Manila*, p. 3. One should assume that this claim was existing upon or before the publication of this specific study in 1941.

[324] Selga, *Los terremotos de Enero de 1743 en Tayabas y Laguna de Bay,* pp. 4-13. In the latter part of this dissertation, this earthquake will be connected to succeeding earthquakes that happened in the region, using diachronic correlation with people's social memory of hazards and disasters.

Table No. 4
List of select 16th to 19th century earthquakes in Luzon Island[325]

YEAR	AFFECTED AREAS
1599	Manila
1600	Manila
1610	Manila, Eastern Luzon
1627	Western Luzon (Cagayan-Caraballo area)
1645	Manila, Cagayan, Ilocos
1658	Manila
1665	Manila
1700	Manila
1728	Manila, most parts of Luzon Island
1735	Eastern Luzon (specifically Baler)
1743	Southeastern Luzon (specifically Tayabas)
1749	Manila and nearby suburbs
1754	Southern Luzon provinces
1766	Manila and nearby suburbs
1767	Estimated most of Luzon
1770	Estimated most of Luzon
1796	Estimated most of Luzon

In his study, Bankoff (2007b) states that during the early years of Spanish occupation, most of the structures built in urban and city centers were made of the most abundant forest resources found in the islands. In Manila, the first edifices erected in inland and indigenous coastal settlements were made of local hardwood, like timber and *molave*, and palm leaves. These structures somehow resemble the traditional *bahay-kubo* of Filipinos.[326] Xavier de Lemps (1998) argues that the Spanish colonial authorities forcibly implemented building regulations that slowly modified the appearance of stone structures without changing zoning considerations to minimize the destruction from earthquakes.[327]

Less than two decades passed, and the colonizers faced one major threat in maintaining the structures in the city. The hazard brought about by fire, and its eventual conflagration frequently burns down the whole city into ashes. This frequency of fire incidents in Manila brought then Governor-General Santiago de Vera to order all houses in the city, particularly in Intramuros, be built of stone.[328] The more economical and ideally durable

[325] Ramirez Martín, *El Terremoto de Manila de 1863,* pp. 16-19; Miguel Saderra Masó, *La seismología de Filipinas: datos para el studio de terremotos del Archipiélago* (Manila: Establicimiento Tipo-Lotográfico de Ramírez y Compañía, 1895); Antonio G. del Canto, *Los Terremotos de Manila Estudios Historicos sobre grandes terremotos que han tenido lugar en el Archipiélago Filipino, desde su descubrimiento por Magallanes hasta el 03 de Junio 1865* (Madrid: Imprenta de D. A. Santa Coloma, 1863).
[326] Greg Bankoff, "Fire and Quake in the Construction of Old Manila", *The Medieval History Journal*, Volume 10 Number 1 and 2 (2007), London: Sage Publications, pp. 415-416.
[327] Xavier Huertz de Lemps, "Materiales Ligeros vs. Materiales Fuertes: The Conflict between Nipa Huts and Stone Buildings in the 19th-century Manila", Elmer Ordoñez, *The Philippine Revolution and Beyond, Volume 1: Papers from the International Conference on the Centennial of the 1896 Philippine Revolution* (Manila, 1998), p. 161.
[328] Ibid., p. 418.

stone houses were erected; thus, the phenomenon of the *bahay-na-bato* commenced.[329] Fire, no doubt, pushed the Spanish to recreate a city resistant to its threat. But this didn't make the capital safe from another environmental hazard. In most recorded cases, the movement of the ground made the fire-resistant stone structures into pieces of rubbles. Indeed, earthquakes caused an incredible amount of damages to Manila starting in the middle of the 17th century. Earthquakes occurrences are not considered to be purely a 19th-century phenomenon; due to source limitations, these earthquakes were recorded during these times, primarily because if its "notably-destructive", thus making it "historic" for the people of that time. Bankoff adds that the Spanish were not unaware of such seismic movements; it is just they were not a cause of significant apprehension until the middle of the 17th century.

Following the identified effects of earthquakes to the city, Manila was refashioned architecturally; structured were made to be both resistant to fire, and adaptive to seismic movements. The era of "earthquake baroque" started; massive buttresses, low-bodied structures, and squat edifices, especially rural churches were clear testaments of the heightened awareness of the perils of an earthquake-prone colony.[330]

The fusion between the use of hardwood and stone was later seen in the 19th century. The earthquakes experienced in this century accelerated the use of timber as a substitute or as a component of the house foundation, as this gives greater flexibility for houses to withstand ground movement[331]Bankoff argues that centuries of transformation was not merely a form of social progress or cultural grandeur, but rather an environmental response to the determined risks of living in a relatively “alien” setting in the Pacific.[332] Manila represents a fascinating interplay of culture, architecture, and hazard over time.[333] The pattern of urban planning and structure building was used in other colonial centers, such as in Cebu, Iloilo, and the Ilocos region. This up-to-date mechanism was localized only on cities and major pueblos or towns. Many *arrabales* or suburb communities in the peripheries of cities were left with the traditional wood and *nipa* structures. Different images of coping with identified environmental and human-induced hazards can be noted in these different structures.

Earthquakes have been perceived as a hostile force of nature that cannot be prevented; yet damages can be alleviated. Divine means and rehabilitation were some of the universal appreciation of earthquakes and volcanic eruptions. Scientific inquiries later served as an imperative for people to understand earthquakes as a common natural event. The sixteenth century, in general, remains unchartered territory for students of Philippine history partly.

[329] Ibid.
[330] Ibid., p. 422.
[331] Ibid., p. 424.
[332] Ibid., p. 422.
[333] Ibid.

d. The possibility of historical seismology of the early modern period in Philippine History

Earthquakes are, no doubt, an inevitable force of nature that influenced or shaped a immense fragment of the Filipino past. Though presented briefly, we can assume that these hazards had left impacts and created mentalities, which, in the succeeding centuries, due to the increase on the number of literature and chronicles produced in and by the colonial state, had been more visible and the effects have been assessed comprehensively. Thus, knowledge of "historical" earthquakes" became more scientific and numerical come the 19th century.

With the 19th century as a turning point in more scientific documentation and appreciation of earthquakes, by expert seismologists and engineers, seismology became a thriving discipline, promoted and supported by the colonial government, with the active participation of the said experts. Writing the tremors that hit the archipelago in the 19th century pushed these scientists to take a step back and look at the previous earthquakes and make serious documentation and re-documentation of the "seismological past" of the Philippines. Some of these works that took a historical seismological approach in their works, through the form of catalogue's and narrative are Antonio García del Canto's *Los terremotos de Manila* (1863), José Centeno's *Memoria sobre los temblores de tierra ocurridos en julio de 1880 en la isla de Luzón* (1881), Abella's *Terremotos de Nueva Vizcaya* (1884) *and Terremotos experimentados en la Isla de Luzon* (1893), Saderra Masó's seminal work *La Seismología de Filipinas* (1895) and *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909* (1910)[334] These works were results of the phenomenological needs of the 19th century, by visibly rooted on previous narrative and accounts of earthquakes that were less scientific as it may seem given the fact that they were not written on the parameters of seismology as a field of study.

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Sum Up

This part of the dissertation provided a historical assessmenet on how we can understand the phenomenon of earthquakes in the 19th and 20th century. By bringing in to the discussion of Philippine history and historiography the discourse of historical seismology, and how it can be problematized as part of the historical consciousness, even though actual seismological research only started in the 19th century, we are provided with a context where the stories of towns are included in the literature considering their historiographical limitations, and how scholars intellectualized earthquake experiences as part of the formation of old communities, or as historical and societal experiences in general. The geographic and cultural narratives presented offer us a view of how the qualitative approach can be used in discussing the topic of historical seismology, as geographic and cultural contextualization respectively.

[334] Extensive discussion of these works can be found in Chapter 3.

CHAPTER 3

Earthquakes in Luzon in the 19th Century: Post-disaster response, institutional seismology, and the Spanish bureaucracy

"En resumen, por donde quiera se dirige la vista, no se ven mas que ruinas y desolación, pues todo el vecindario ha buscado y busca refugio en las casas de nipa de los arrabales, dominado por el terror que infuden los estragos del terrible fenómeno, que ocupará una pagina muy triste en los anales de estas islas y dejará sentir sus efectos, por muchos anos, en razón a la incalculables pérdidas que ha ocasionado."

- Miguel Selga, *El temblor de 1863 y las actas del Ayuntamiento de Manila* (1941)[335]

This chapter presents a historical analysis of the response of the government and the people after the June 1863 and July 1880 earthquake disasters. It provides a discussion of the extent of damage caused by the two earthquakes, and the post-disaster responses of the Spanish civil government in Manila and the central government in Madrid. This study also narrates the varying interpretation of the earthquakes, from the point of view of the Church, and from the perspective of the scientific community. The two earthquakes became profound catalysts for the changes that had taken place in its immediate aftermath. First, it prompted the civil government to initiate and implement a systematic disaster response plan, and to institutionalize earthquake studies as a prerequisite in crafting seismic engineering and architectural plans for the communities. Second, what transpired after and in-between the two earthquakes disasters, specifically the responses of the state and other sectors of society, revealed the long-standing problems in organizational governance and the need to implement modern scientific thinking especially with respect to urban planning and infrastructural integrity of the city. These catastrophic events paved the way for the institutionalization of scientific, architectural, and public engineering reforms in the colony.

Moreover, this chapter also illustrates the images of political and economic implications of post-disaster rehabilitation and reconstruction projects laid down in communities; these images portray the dynamics of state-subject relations, as well as the complex interaction of state programs and local responses in the context of seemingly repetitive cycles of earth-induced hazard and human-induced disasters. The pattern of discussion is as follows: (1) the destruction of property and effects to human life by the earthquakes, (2) the local situation in communities and the government policies implemented for the rehabilitation of affected areas, (3) state's scientific initiatives to

[335] Translations: "*In summary, wherever one looks at, there is nothing but ruins and desolation, because the whole neighborhood has sought refuge in the nipa houses of the suburbs; dominated by the terror inflicted by the ravages of the terrible phenomenon, which will occupy a very rich page in the annals of these islands and will let you feel its effects, for many years, in reason to the incalculable losses it has caused*."Miguel Selga, *El temblor de 1863 y las actas del ayuntamiento de Manila*, 1941, INS S1.2 025, Manila Observatory Library and Archives.

understand the earthquake as a phenomenon, to further enhance the society's resilience to earthquakes as an environmental hazard.

a. Setting the Context: 19th century Luzon Earthquakes

The world of the nineteenth century, in Spain and its colonies, was a period of significant scientific advancements and volatile political situations. Spain was gambling between its domestic issues and developments, and the idea of directly administering overseas colonies since the wave of independence movements in the Amaericas during the first two decades of the century. In the case of the Philippines, the archipelago was at the crossroads: on the one hand, it was a colony with a government always facing perennial fiscal imbalance, a territory in almost complete control of religious orders and an archipelago hampered by frequent calamities, and on the other hand, it was a site of burgeoning scientific advancements pertaining to the physical environments, instrumentation, and institutionalization of scientific disciplines, and the influx of foreign knowledge for the benefit of the trading sector. Huertz de Lemps (1998) describes this period as an era of massive urbanization, landscape change, and population growth, and the rise of complex socio-economic movements that made towns, such as the capital city Manila, experience major urban sprawls and transformation.[336]

Earthquakes as a Philippine life experience are not exclusively a 19th-century phenomenon. In the compendium made by Saderra Masó (1910), he listed 58 earthquakes in different parts of the archipelago from 1599-1862, based on available documentary records gathered by the Philippine Weather Bureau.[337] Given these historically recorded earthquakes, we can infer the frequency and regularity in the occurrence of earthquakes. From this standpoint, the Spanish authorities in the Philippines needed to device urban engineering mechanisms in establishing towns and building infrastructures. Generally, from the 17th to the late 18th century, the presence of colonial professionals was lacking, and most of the "architects" of towns and its administrators were priests, military personnel, or local community leaders.

During the second half of the 19th century, military engineers, and later on, scientists and civil engineers, played vital roles in intellectualizing the cause, effect, and response mechanism of the state in dealing with earthquake threats. Scientific inquiries offered as an alternative for people to understand earthquakes as a common natural event. At this point, we will focus on discussing the history of *terremotos or temblores de tierra,* or earthquakes/seismic events/movements in the 19th century. There were several earthquake experiences in the colonial Philippines based on a horde of primary accounts and sources. These made varying levels of effects and destructions in different urban centers and rural communities. Examples of these are the two notable earthquakes in the second half of the 19th century that show different responses from the Filipinos and the colonial government. These were the earthquakes of June 1863 and July 1880 that

[336] Xavier Huertz de Lemps, "Materiales Ligeros vs. Materiales Fuertes: The Conflict between Nipa Huts and Stone Buildings in the 19th-century Manila", Elmer Ordoñez, *The Philippine Revolution and Beyond* Volume 1 (Manila: Philippine Centennial Commission, National Commission for Culture and the Arts, 1998), p. 160.
[337] Miguel Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909, with an appendix of earthquakes in the Marianas* (Manila: Bureau of Printing, 1910), pp. 7-16.

destructed Manila and neighboring provinces in the island of Luzon. These significant earthquakes in Luzon during the second half of the 19th century, present us an image of Philippine society in distress and shock, and reactive and decisive, in terms of responding to the needs of devastated by major terrestrial tremors.hese earthquakes destructed Manila and neighboring provinces in the island of Luzon, and the scenarios after showed different responses from the Filipinos and the Spanish colonial government.

On 13 October 1852, the *Imprenta Boletín Oficial de Filipina*s published a comprehensive government report about the effects of a series of earthquakes in the Philippines, which destructed major towns, especially the capital city, Manila.[338] In a separate report made by Antonio de Urbiztondo on 12 October 1852[339], he communicated to the president of the Council of Ministers in Madrid the effects of the said earthquake to state buildings, as well as the government's initial response. The said series of September 1852 earthquake resulted in cracks in the land, high tides in some shoreline areas, and overflowing of rivers to lowland urban communities.[340] Affected were the people living in *casa de nipas*, government and other public buildings, specifically the Palacio de Manila, and the Casa de Campo in Malacañan, churches, *casa de recogimient*o, and similar military facilities.[341] In the *Reseña* published in the *Imprenta Boletín Oficial*, it reported the damaged edifices in Manila and nearby towns: one (1) state building, twelve (12) military facilities, sixteen (16) ecclesiastical buildings, mostly churches and convents, four (4) buildings owned by religious orders, fourteen (14) hacienda structures, and several public buildings in the provinces of Bataan, Pampanga, Cavite, Zambales, Nueva Ecija, Batangas, up to the island of Mindoro.[342] The government spent almost 2,300 pesos to repair and reconstruct these buildings and structures.[343]

Described as “golpes de trepidación”, it can be inferred from the reports that they considered the 1852 earthquake as the strongest one in recent memory of the islands, as far as documentary records are concerned. The said *Reseña* also made an outline analysis of notable, documented earthquakes since the 1645[344]. It presents intervals per major earthquake: 18 years (Between 1627 and 1645), 30 years (between 1645 and 1675), 121 years (between 1675 and 1796), 26 years (between 1796 and 1824), and 28 years (between 1824 and 1852).[345] Given the extent of the destruction the September

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[338] “Reseña de historia de temblores esperimentados en Estas Islas desde el 16 Setiembre hasta el 12 del actual, y noticias estadisticas acerca de los occuridos desde ano 1645”, Imprenta Boletin Oficial de Filipinas, 13 October 1852, *Consecuencias de los terremotos ocurridos en las islas 1852,* ULTRAMAR 5163, Archivo Historico Nacional (AHN).

[339] “Dando cuenta detalladamente de los temblores occuridos en la noche de 16 de Setiembre y días siguientes hasta dia decha, y de los muchos estragos que han causado en los edificios militares, eclesiasticos, y de Haciensa de esta Capital y Estramuros, y en las provincias qe se espresan, segun la hoja volante que se acompaña”, *Consecuencias de los terremotos ocurridos en las islas 1852,* ULTRAMAR 5163, Archivo Histórico Nacional (AHN).

[340] Ibid.

[341] Ibid.

[342] Ibid.

[343] Ibid.

[344] Greg Bankoff, “Fire and Quake in the Construction of Old Manila”, *The Medieval History Journal* 10(1-2), 2007.

[345] Reseña de historia de temblores esperimentados en Estas Islas desde el 16 Setiembre hasta el 12 del actual, y noticias estadísticas acerca de los occuridos desde año 1645”, Imprenta

1852 earthquakes have caused, it somehow suggested that the government might have taken up steps to prepare for a possible occurrence of the same disaster, of the same or greater gravity. But looking at the intervals of "major" earthquakes the islands experienced, there might probably be hesitation and reluctance, given the fact that there was generally an average of fewer than two decades before the land "might" move and cause havoc. But the method of estimation based on the interval outline proved to be wrong, as a year more than a decade after, the archipelago experienced and suffered two major earthquakes that put towns and cities down.

As mentioned previously, nineteenth-century Englishman Sir John Bowring (1963), during his visit in the Philippines, described the earthquakes in this manner: "The destructive ravages and changes produced by earthquakes are nowhere more remarkable than in the Philippines. They have overturned mountains, they have filled up valleys, they have desolated extensive plains; they have opened passages for the sea into the interior and from the lakes into the sea."[346] Prominent Filipino propagandist Graciano López Jaena (1996) considers earthquakes as a tempest and a "revolution of nature" that both devastate and nourish the islands.[347] One can argue that these kinds of "at awe" observations in the country are typical and ordinary. But do these observations reflect the general sentiment of the concerned public?

One way of looking into the colonial realities of the century is by assessing the way people have perceived, viewed, and responded to such natural hazards and rehabilitation efforts. Was suffering much intense, or did people consider destructions caused by earthquakes as a mere frequent or rare instance of nature getting after or revenging against human settlements? Given the advancements in institutional science, seismology and earthquake engineering in particular, was there a reinvention of perception and appreciation of hazards as part of a society's life? Did the scientific advancements of the century offer a better understanding of such environmental processes? How did the colonial society, cope with the threats of tremendous seismic movements? How did they mitigate the effects of earthquakes? The succeeding discussion on the history of the two major earthquakes during second half of the 19th century attempts to answer these specific questions

b. The June 1863 Earthquake

b.1 The June 1863 earthquake and the destruction it caused

On the evening of 03 June 1863, an earthquake struck in Luzon, damaging major urban centers in the island. It devastated Manila and its adjacent provinces. The said earthquake made the magnificent city into a "pitiful tomb". Selga writes:

Boletín Oficial de Filipinas, 13 October 1852, *Consecuencias de los terremotos ocurridos en las islas 1852,* ULTRAMAR 5163, Archivo Histórico Nacional (AHN).

346 Sir John Bowring, *A Visit to the Philippine Islands* (Manila: Filipiniana Book Guild, Inc., 1963), p. 48; Sir John Bowring, *A Visit to the Philippine Islands* (London: Smith, Elder & Co., 1859), p. 81.

347 Graciano López Jaena, "Discurso pronunciado por D. Graciano López Jaena el 25 de Febrero 1889 en el Ateneo Barcelonés", *La Solidaridad*, trans. Guadalupe Fores-Ganzon, Vol. 1: 1889 (Pasig City: Fundación Santiago, 1996), p. 22.

> In the evening of 04 June 1863, a violent tremor turned the opulent city of Manila in a pitiful tomb where the living laid together with dead bodies…The Queen City of the East, with great palaces which have a rich and intricate design, and with its commercial products that are of abundant and amusing to neighboring countries, after the earthquake, was destroyed and became a heap of ruins and cadavers. She was no stranger to how God humiliates humans due to their arrogance, perverseness, and extreme fantasy.[348]

The earthquake happened 7:30 in the evening, Wednesday, a day before the Feast of the Body of Christ (Corpus Christi)[349] A priest that was inside the Manila Cathedral described the quake as a terrible movement, followed by some ground shaking coming from the North and the South, making him hide in the *sacristia* for protection.[350] Manuel Peralta (1863), in his speech, read before an audience five days after the earthquake, recalls that the precursor of the tremor, an extreme heat he felt while inside the church, causing him almost an asthma attack.[351] Selga (1941) describes the earthquake as a series of strong tremors, followed by upward and southward oscillation felt in Manila's center, the city suburbs, and towns outside of it. [352]

The sudden tremors on this night of 03 June 1863, as recorded, were described to have resulted in several voices of agony and suffering. The earthquake that lasted for only half a minute caused the Spanish capital major infrastructures to ravage and incalculable loss, both state- and private-owned, and left hundreds of dead bodies.[353] Montero y Vidal in his *Historia General de Filipinas* wrote, "if it lasted longer, the city had disappeared completely...the voices of those who were pinned down by rubble, asking water and love from God for them to be removed out of the debris for they cannot do anything, and a little movement of the fragment will surely cause their death; one who heard their grief once will not forget it! [354] As animals are as vulnerable as humans, they have suffered

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[348] Original text: "*Al anocheser del dia 3 de junio de 1863 un violente temblor convirtió la opulente ciudad de Manila en un lastimoso sepulcro en que confusamente estaban amontonados vivos y difuntos…La Reina del Oriente, que por la grandeza de sus palacios, por la riqueza de sus galas y pedreria y por la abundancia y valor de sus productos comerciales cautivaba las atenciones y afectos de las naciones circunvecinas, quedo con el temblor, destrozado cadaver y confuse monton de ruinas. No es ajeno de los designios de Dios esperar el paroxismo de la soberbia para humillar la cerviz proterva de la fantasia humana.*", Miguel Selga, "El Horrendo Terremoto del 03 junio de 1863 en el Arzobispado de Manila", SEL S2.2 056, Personnel Data Records, Manila Observatory Library and Archives, p. 1.

[349] Miguel Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila* (Manila: Bureau of Printing, 1941), INS S1.2 024, Institutional Data Records, Manila Observatory Library and Archives, p. 3

[350] Dean D. Manuel Peralta, "Relación del terremoto occurrido en Manila el 03 de junio de 1863 especialmente en la cathedral, leida ante el Sr. Arzobispo y clero catedral", EAR S1 072, Earthquake Data Records, Manila Observatory Library and Archives, p. 1.

[351] Ibid., p. 2.

[352] Acta No. 32, Selga, "El Temblor de 1863 y las actas del ayuntamiento de Manila", Miguel Selga, *El temblor de 1863 y las actas del Ayuntamiento de Manila*, SEL S2.2 060, INS S1.2 025, Personal Data Records, Manila Observatory Library and Archives, p. 3.

[353] Selga, *El temblor de 1863 y las Actas del Ayuntamiento de Manila*, p. 4.

[354] Jose Montero y Vidal, *Historia General de Filipinas*, Tomo III (Madrid: Imprenta y fundacion de Manuel Tello, 1887-1895), p. 397, cited in Selga, "*El temblor de 1863 y las Actas del Ayuntamiento de Manila*, p. 4.

after the earthquake much as the residents of the city had. A memoir reveals the shared experience of other living beings aside from the human population. The cattles, dogs, and birds were heard making unusual sounds and movements before the quake; and after the tremors, many of these animals were seen dead on the banks of Manila's waterways. [355]

A correspondent in Manila of *The Illustrated London News* made a short report about the quake:

> The earthquake took place on the evening of the 3rd of July, about half-past seven. The shocks did last over a minute. The first was from north to south, followed almost instantaneously by another from east to west. People at a distance from the noise of the ruins said that loud rumblings underground accompanied the earthquake. Captains of ships lying in the harbor say that they saw a brilliant halo of what appeared to be phosphoric light over the city, and felt a shock which resembled the sensation caused by a ship striking the bottom. The strength of the shock was confined in Manila; the effect in the nearest provinces was much less, and at the extreme north and south of the island it was not felt at all…The weather, for some time previous to the earthquake, had been more than usually sultry. Since that event, the heat has been equally tremendous but varied by very heavy thunderstorms. On one evening notably, the lightning continued in an almost uninterrupted blaze during several hours, and I hear accounts of houses in Manila and the neighborhood having been struck. Today the rains usual at this period seem to have set in. The numbers of lives lost during the shock are tiny in proportion to the destruction of buildings. No complete estimate of the number of people killed has yet been done. I fancy it cannot be much under a thousand; the casualties principally being among the Indians and Chinamen. The hour at which the disaster occurred was, fortunately, one in which few people are usually in their houses. The casualties, however, in the marketplace must have been very significant, as it was precisely at the time of the evening market. Many are still buried under the ruins of the cathedral and in the hospitals.[356]

The quake destructed all the symbols of Manila's progress.[357] A review article published in the *Diario de Manila* on December 1879 reports that the city was in grief; Manila was crying not only because of the death of her sons buried in the tormented edifices but

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[355] *Del gran temblor que padecio Manila y ruina de casi toda la ciudad*, EAR S1 016, Earthquake Data Records, Manila Observatory Library and Archives, p. 2.

[356] "The Earthquake at Manila", The Illustrated London News, p. 213, from Rudolph J.H. Lietz, *The Philippines in the 19th Century: A collection of prints* (Mandaluyong: RLI Gallery Systems, Inc., 1998).

[357] Diario de Manila, 14 de deciembre 1879, cited by Selga, "El Horrendo terremoto", p. 1.

also because that if they survive the catastrophe, they cannot endure the suffering of the tormented populace.[358] Montero y Vidal (1882) tells that the memory of the 03 June 1863 earthquake filled Manila with mourning – the collapsed buildings serve as a memory to the disastrous event years after the disaster.[359] In her study, Ramirez Martin (2006) considered this earthquake as the most catastrophic regarding effects: number of people that perished, the mobilization of public opinion towards Manila, and the difficulty of obtaining materials for reconstructions due to lack of funds and complex bureaucracy of the civil government.[360] Selga (1941) compares it with the 1645 disastrous Manila earthquake, which left the newly built Spanish capital a city in rubbles. The number of people killed reached almost 400 and injured was 2,000 individuals.[361]

The description of *Diario de Manila* of the city several days after the earthquake sums up what has been emotionally described by the previous accounts cited: Manila "…was transformed into immense beams of rubbles; the places filled before with magnificence and splendor - where the faithful congregated; and in ruins were the factories and warehouses of commerce; and the shelters of the families collapsed; and everywhere walls there were threatening to bury the passer-by, and obstacles to the activity and work of the people."[362]

Documentary sources reveal that the assessment of the destruction caused by the earthquake came in a gradual, daily basis, as the civil government wasn't able to act upon for almost two days. Initial operations to assess the situation and identify priority measures came nearly 2 days after the earthquake struck. In one of the initial reports released by Governor General Rafael Echagüe about the destruction of the Manila, on the 10 June 1863 for example, it was indicated that twenty-six (26) public buildings were destroyed, and twenty-eight (28) were severely damaged.[363] According to Selga (1941), there was an account of forty-six (46) public buildings destroyed, twenty-eight (20) are in danger of collapsing, 400 to 500 houses were ruined, and 528 were severely damaged and were considered inhabitable.[364] These number increased in succeeding reports made, after weeks of clearing operations and building assessment was made, more houses were identified to be demolished or threats to public safety.[365] In the *La Relacion Official* (1941), the number of houses severely damaged rose to 578, and edifices identified as inhabitable was 1172.[366] The earthquake destroyed the wealth of Manila,

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[358] Cited text: *"Todo simbolo de progreso barrido por el desastre: Manila no lloro solo entonces la muerte de muchos de sus hijos sepultados entre los escombros de sus moradas y que, si sobrevivian algun momento a aquella general hecatombe, era para tormentar en animo de los vivos con la impotencia de todo auxillo"*, Ibid.

[359] Jose Montero y Vidal, *Cuentos Filipinos* (Madrid: Tip. Del Asilo de Huerfanos del Sagrado Corazon de Jesus, 1993); excerpt cited in EAR S1 042, Earthquake Data Records, Manila Observatory Library and Archives.

[360] Ramirez Martín, *El terremoto de Manila de 1863*, pp. 11-12.

[361] Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909,* p. 13.

[362] Diario de Manila, Ano 14, No. 130, 09 June 1863, ULTRAMAR 5196 Expediente 9. Archivo Histórico Nacional (AHN).

[363] Letter No. 1, Report of Governor General Rafael Echagüe, *Terremotos de Manila: Taza de jornales, materiales, y articulos de primera necesidad*, ULTRAMAR 5196 Expediente 9.

[364] Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila*, p. 14.

[365] Letter No. 3, Report of Governor General Rafael Echagüe, ULTRAMAR 5196 Expediente 9.

[366] Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila*, p. 10.

which consists primarily of urban properties.[367] Subsequent incidents came as results of the destruction of public infrastructures. These include fire and inundation in streets and of crops due to crack in rivers and water lines.[368] Selga (1941) considers the earthquake as one that will go down to the history of the archipelago as one that caused the exodus of people outside the city, in fear of death and injuries due to debris and sudden movements, as well as the incalculable losses the earthquake caused to Manila.[369]Summarizing the reports, an estimated 1,172 buildings were affected by the earthquake: 46 public buildings were laid to ruins, including the palace of the Governor-General, the Audiencia Real, the barracks warehouses, and commercial buildings, and churches, except the San Agustín Church; 25 other public buildings were severely damaged, and 570 private buildings were destroyed.[370]

The state and religious buildings and structures that were destructed include the Palacio Real, Palacio de la Autoridad Superior, Casa Moneda, Almacenes de Estancadas the military hospital, the *beaterios* of Santa Catalina and Sta. Rosa, and the churches of Sto. Domingo, San Juan de Dios, and Santa Isabel, and the churches and seminaries of San Agustín and Recoletos.[371]It must be noted that the church building and monastery of San Agustín generally survived the earthquake.[372] Rodriguez (1976) made a short study about the "journey" of the San Agustín Church, particularly with its record of surviving great disasters, especially the earthquakes in Manila, from the 17th to the early 20th century.[373] Engineers, labeling the church as the "Escorial Filipino"[374], the church gained the recognition as the most earthquake resistant in Manila, "…*el convento de San Agustín de esta capital ha sido de los edificios qu en major estado ha quedado*."[375]

In the districts of Binondo, Tondo, Sta, Cruz, and Quiapo, terrible damages were seen, as the churches and government offices were severely destructed; in Quinta and Divisoria, the markets were severely damaged causing a severe blow to the fishing industry.[376] Other important state offices and building were also destroyed and damaged.

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[367] Ramirez Martín, *El terremoto de Manila de 1863*, p. 40; In Federico Moreno y Jerez's *Manual del Viajero en Filipinas*, he mentions that there were, 453 properties destroyed and 356 estate goods lost in the earthquake. EAR S1 046, Earthquake Data Records, Manila Observatory Library and Archives.

[368] Ibid., p. 15; *Del gran temblor que padecio Manila y ruina de casi toda la ciudad*, p. 1.

[369] Selga, *El Temblor de 1863 y las actas del Ayuntamiento de Manila*, p. 4.

[370] Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909,* p. 13. The account of Manuel Peralta shows the same observation, *Relación del terremoto occurrido en Manila*, pp. 1-2.

[371] Act No. 32 in Selga, *El Temblor de 1863 y las actas del Ayuntamiento de Manila*, p. 4.; Parte detallado del terremoto de 01 Octubre 1863, ULTRAMAR 5210 Expediente 44, Archivo Histórico Nacional (AHN).

[372] A bibliographic compilation of accounts from various primary and secondary sources can be found on Isacio Rodriguez, OSA, *Histroia de la Provincia Agustíniana del Smo. Nombre de Jesus de Filipinas* IV: Bibliografía (Manila, 1968), pp. 75/79/

[373] Isacio Rodriguez, OSA, *The Augustinian Monastery of Intramuros: The People and the Events that contributed to its Grandeur*, trans. Pedro Galende, OSA (Makati: Colegio de San Agustín, 1976), pp. 71-84.

[374] José Centeno, *Memoria sobre lost temblores de tierra occuridos en Julio de 1880 en la Isla de Luzon*, p. 129.

[375] Archivo de Valladolid, Legajo 3759, Folio 3, cited from Isacio Rodriguez, OSA, *Historia de la Provincia Agustíniana del Smo. Nombre de Jesus de Filipinas* IV: Bibliografía (Manila, 1968), p. 169.

[376] Ibid.

These include the Administración de Tributos, Administración General de Rentas Estancadas, Administración General de Aduanas, and the Administración General de Collecciones de Tabaco de Luzon y Adjacentes.[377] In the latter, an estimated amount of two million pesos worth of tobaccos were lost in the earthquake, inside the factories and warehouse where those were stored.[378]

In several parishes in Manila, nearby towns such as Pasig, and provinces like Bulacan and Pampanga in the north, Bataan in the west, and Cavite, Laguna, and Batangas in the south, most of the severely damaged structures were the churches. The damaged churches and parochial houses include those in Provincia de Tondo (Tondo, Binondo, Sta. Cruz, Quaipo, Sampaloc, San Miguel, Sta. Ana, Pandancan, and Navotas), Vicariato de Pasig (Pasig, Taguig, San Mateo, Angono, Cainta, and Antipolo), Vicariato de Bulacan Sur (Bocawe [Bocaue], Sta. Maria, and Polo), Vicariato de Bulacan Norte (Malolos, Bulacan, Angat, San Rafael, Polilan [Pulilan], and Guiguinto), Vicariato de la Pampanga (Macabebe, Lubao, and Sta. Ana), in Bataan (the churches in Orion, Pilar, Calaguiman, Abucay, Mabatan, and Balanga, and several *Hacienda Publica* in some towns) Vicariato de Cavite (Bacoor, Maragondon, and Caridad), Vicariato de la Laguna-Partido de Sta. Cruz (Panay and Pililia), Vicariato de la Laguna-Partido de Binang (Cabuyao and Tunasan), in Batangas (Taal church, the *escuela publica*, public market, and the *Hacienda Publica*).[379] The tremors also reached area in the central plain, such as some towns in Nueva Ecija.[380] Several days after the earthquake struck the capital. Certain provinces, like Tayabas, have recorded a series of oscillatory movements, which furthered damaged some edifices in their localities.[381]

Peralta (1863) considers the earthquake as the triumph of death[382], where agony is the only one heard in the city. Screams conquered the stillness of the night after the earthquake. These were from mothers who were in search of their children, who were gone after structures and houses collapsed, some of whom were laid down by rubbles

[377] Reports of Pedro Rodriguez, Teodoro Roca, Antonio Enriquez, and Manuel Garrido on the status of their respective offices, *Calamidades Publicas*, Legajo 6 Rollo 375, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigaciones Científicas (CCHS-CSIC).

[378] Report of Juan Caba, "Partes relativos a los destrosos causados a consecuencia del terremoto experimentado en la noche del 03 de Junio del mismo año," *Calamidades Publicas*, Legajo 6 Rollo 375, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC); Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila*, p. 15; Fedor Jagor, *Travels in the Philippines* (London: Chapman and Hall, 1875); EAR S1 084, Earthquake Data Records, Manila Observatory Library and Archives.

[379] "Extracto de la Noticias recibidas de los curas parocos del Arzobispado, relativas a los quebrantos sufridos por sus respectivas Iglasias y casas paroquiales a consecuencia de terrible terrmoto de la noche de 03 de Junio de 1863", EAR S1 028, Earthquake Data Records, Manila Observatory Library and Archives; Parte detallado del terremoto de 12 Octubre 1863, ULTRAMAR 5210 Expediente 44, Archivo Histórico Nacional (AHN).

[380] *Reparación de Casa Real de Nueva Ecija*, ULTRAMAR 5196 Expediente 10, Archivo Histórico Nacional (AHN).

[381] Diario de Manila, Ano 14, No. 131, 10 June 1863, ULTRAMAR 5196 Expediente 9, Archivo Histórico Nacional (AHN).

[382] Peralta, "Relación del terremoto ocurrido en Manila el 3 de Junio de 1863 especialmente en la catedral", pp. 9-10.

and debris.[383] A sorrowful narrative tells that both the rich and the poor were of the same fortune, and were on their knees crying for the destruction of Manila; it's just that the rich had more to cry because of the loss of their houses and properties.[384] But, it should be noted that many people became casualties of the earthquake because it struck not only public places in a time where people were out of their house, but also some structures destroyed by the tremor also served as residences of a sum of Manila's outside-the-center population. Most of the deaths and injuries were registered in highly dense urban areas, mostly with edifices and public structures.[385] Selga notes that the "indigenas" made provisions at the time the earthquake struck, and some of the areas where structures damaged by the earthquake, particularly the markets, were also their house or habitation.[386]

Generally, the earthquake affected an approximate of 0.6% of the Philippine population at that time.[387] Some estimates indicate 300 dead individuals; but as operations to clean the areas affected by collapsed structures and debris, it increased to about 350.[388] There is an apparent failure to immediately recover as many dead bodies as possible, several days after the earthquake. The fear of a possible disease outbreak due to the spread of cadavers' *miasma*, was mentioned, considering it to cause more deaths than the quake itself.[389] One recorded death was that of Governor-General Echagüe's wife.[390] Whatever the reason there might be, immediate medical support and attention were not available for the survivors - injured and wounded, and event to the deceased.[391] Known wounded individuals reached an approximate number of 450; which included some recorded incidents such as broken body parts, people salvaged from ruins, and workers injured in houses, offices, and factories.[392] Fedor Jagor (1875), in his book about his travel in the islands, mentions 400 people died in the earthquake, and 2000 individuals were injured.[393]

The following photos show the extent of destruction of the June 1863 earthquake to major buildings and edifices in Manila.

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[383] Miguel Selga, "El horrendo terremoto del 3 de junio de 1863 en el Arzobispado de Manila", SEL S2.2 056, Personal Data Records, Manila Observatory Library and Archives, p. 1
[384] *Del gran temblor que padecio Manila y ruina de casi toda la ciudad*, p. 3.
[385] Ramirez Martín, *El terremoto de Manila de 1863*, pp. 28-29.
[386] Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila*, p. 4.
[387] Ramirez Martín, *El terremoto de Manila de 1863*, p. 32.
[388] Ibid., p. 14; Selga, *El temblor de 1863 y las Actas del Ayuntamiento de Manila*, p. 4.
[389] Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila*, p. 5.
[390] Ibid., p. 15.
[391] Ramirez Martín, *El terremoto de Manila de 1863*, p. 29-20.
[392] Ibid., p. 14; Parte detallado del terremoto de 12 Octubre 1863, ULTRAMAR 5210 Expediente 44.
[393] Jagor, *Travels in the Philippines*; EAR S1 084, Earthquake Data Records, Manila Observatory Library and Archives.

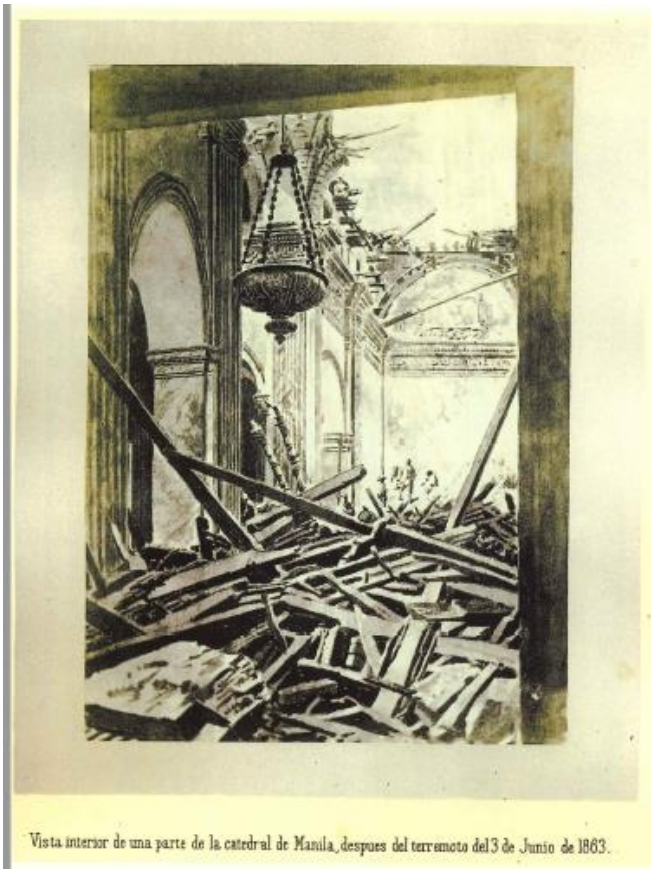
Photo No. 2
Destructed Public Buildings in Manila after the June 1863 Earthquake[394]

Photo No. 2.1: Palacio del Capital General

[394] Seleccion de Fotos despues del terremoto de Manila en 03 Junio 1863, Fotografias de Martínez de Herbert, cited from Ramirez Martín, *El terremoto de Manila de 1863.*

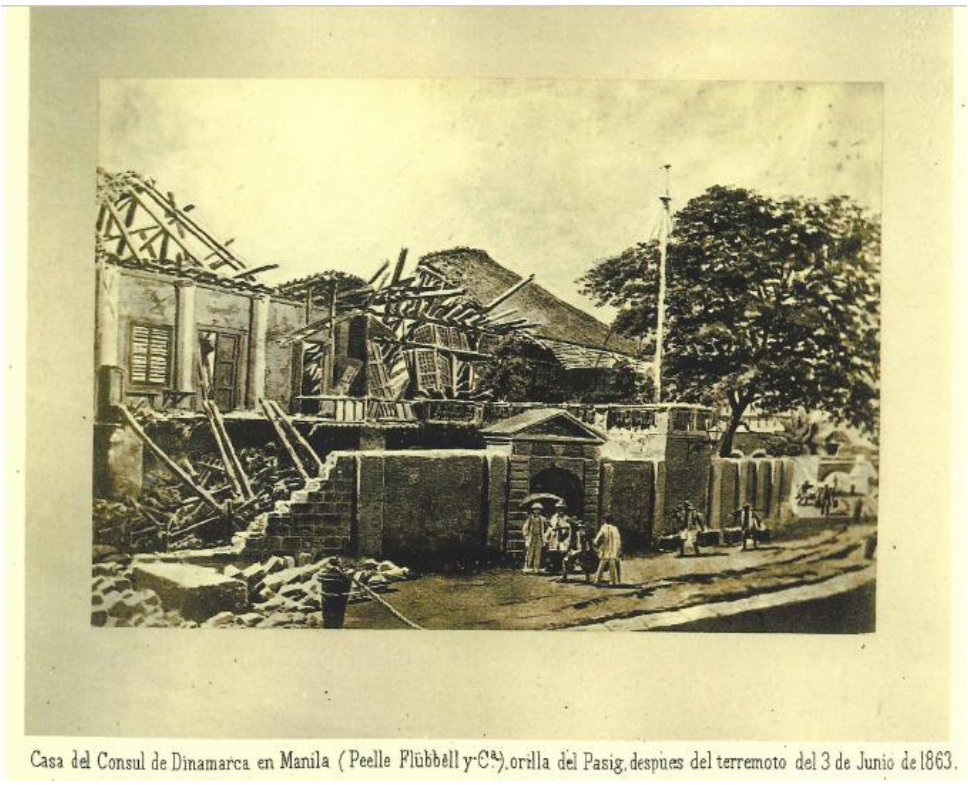
Fachada de la Catedral de Manila despues del terremoto del 3 de Junio de 1863.

Photo 2.2: Catedral de Manila



Vista interior de una parte de la catedral de Manila, despues del terremoto del 3 de Junio de 1863.

Photo 2.3: Catedral de Manila



Casa del Consul de Dinamarca en Manila (Peelle Flübbell y-C.ª), orilla del Pasig, despues del terremoto del 3 de Junio de 1863.

Photo 2.4: Casa del Consul de Dinamarca en Manila

Casa Ayuntamiento vista por el frente, donde se hallaba la torre del reló, despues del terremoto del 3 de Junio de 1863, en Manila.

Photo 2.5: Casa del Ayuntamiento de Manila

Alcaicería de San Fernando. Almacenes generales de tabaco del Gobierno, en Manila, despues del terremoto del 3 de Junio de 1863.

Photo 2.6: Almacenes General de Tabaco

Vista de la fachada N. E. de la Aduana de Manila, despues del terremoto del 3 de Junio de 1863.

Photo 2.7: Aduana de Manila

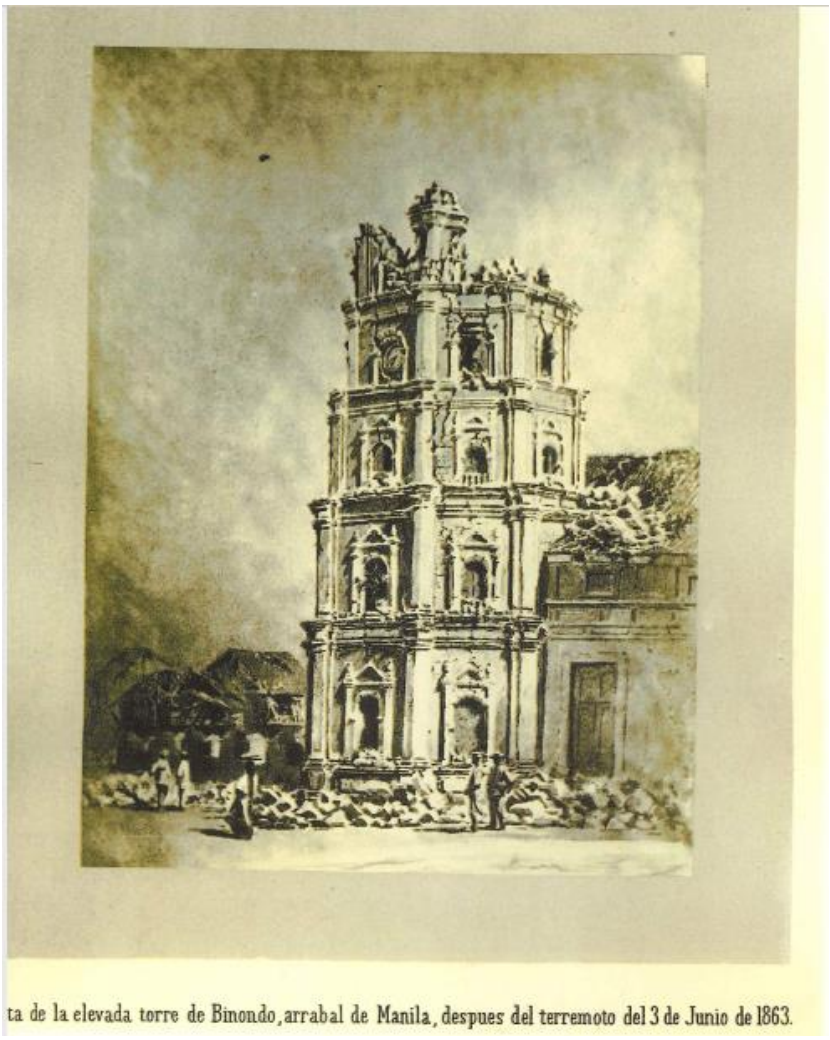


Photo 2.8: Torre del Iglesia de Binondo

b.2 Initial measures implemented by the Spanish civil government in Manila

The primary challenge to the Spanish civil government was (1) how to immediately facilitate rescue operations and (2) to expedite certain reconstruction efforts for the government to have infrastructural capacity to operate. Manila was severely destructed, making it almost on ground zero. Centers of adjacent towns and provinces were also affected, making vital commercial and administrative functions paralyzed. Manila was at the brink of urban comatose after the earthquake, as it changed the city not only physically, but also in term of its human component. Refuge was the majority's first reaction, and then pain and dejection followed as many have witnessed the extent of the disaster.[395] Almost all social groups in the city were affected by the disaster: officials, military personnel, business owners, the indigenous population, as well as the Chinese.[396] Concerning response, the way state actors responded to the needs of the

[395] Ramirez Martín, *El terremoto de Manila de 1863*, p. 35.
[396] Ibid., pp. 25-27.

city is a measurement of politics in the 19th century.[397] After two days of apparent inaction or lack of capability to act on the situation, the civil government created an ad hoc group of officials and experts, which would facilitate and monitors all plans to be approved and executed. The government considered the event as one of the most violent earthquakes Manila has experienced; thus Governor General Echagüe called a meeting of the *Junta de Autoridades Superiores* (Board of Superior Authorities), giving military engineers a critical role to study the situation.[398] But looking closely, Junta was composed of officials from various civil, military, and ecclesiastical offices.[399] Its multi-sectoral composition was aimed at making a comprehensive assessment of the situation of affected communities, maximizing the bureaucratic network of each sector involved. Governor Echagüe also prepared a report sent to the *Ministerio de Ultramar* in Madrid. It contains the description of the destruction of Manila and nearby towns and a plea for immediate support from Spain.[400] Succeeding letters contain updated reports about the work and measure taken up by the civil government to alleviate the suffering of the public.[401]

The Junta created a commission, composed of the same, to study the effects of the earthquakes in the city, and recommend the necessary steps to strengthen the foundation of the city's edifices.[402] One of the measures adopted by the board was:

> [The] Commission of the Corps of Engineers [was] to be named for the reconnoitering of public buildings [existing in] the capital, its neighborhoods and outlying towns, and which with [these data] the demolition of buildings in danger of collapsing to be verified […] To promote construction, subject to appropriate models of *hárigues* [or upright] houses with roofs of zinc, iron galvanized metal, cardboard and other materials which are not flammable such as nipa, cogon, and black boat, and with which Indigenous people use for roof building.[403]

The same junta composefd the Junta de Socorros that was created to facilitate financial activities related to the rehabilitation programs of the government. On 05 June 1863, the first official report of the earthquake was released, and it also carried out the implementation of the Junta's orders and decisions. The Act No. 32 contains the first details of the cost of devastation in the city, and the measures were initially taken to

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[397] Ibid., p. 12.
[398] Aitor Anduaga, "Earthquake Building Overseas: Military Engineers, Cyclonic-Seismic Affinity and the Spanish Dominion in the Philippines, 1860-1898", *Engineering Studies* 6(1): 2013, p. 4; Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila*, pp. 6-7.
[399] Selga, *La Relación Official del Terremoto del 04 de Junio de 1863 en Manila*, p. 6.
[400] Selga, El Temblor; Miguel Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863* (Manila: Bureau of Printing, 1941), p. 6; also labeled as EAR S1.2 026, Institutional Data Records, Manila Observatory Library and Archives)
[401] Document No. 2, *Terremotos de Manila: Taza de jornales, materiales, y articulos de primera necesidad*, ULTRAMAR 5196 Expediente 9, Archivo Histórico Nacional (AHN).
[402] "El discurso del Ingeniero Yrureta y los temblores de 1880", EAR S1 026, Earthquake Data Records, Manila Observatory Library and Archives, p. 1.
[403] Selga, *La Relación oficial del terremoto del 03 junio 1863 en Manila*, pp. 10-11; Anduaga, "Earthquake Building Overseas", p. 4.

alleviate the suffering of the people in Manila and affected provinces.[404] They also give focus on how the Manila's order, public services, and flow of commerce can be restored immediately, primarily how to obtain capital resources to purchase construction materials from the provinces and outside the Philippines.[405]

The first set of measures taken fall under public wellness and city welfare. On the one hand, the civil government had to restore daily life and order; and on the other hand, the authorities also needed to revive public service and the economy of Manila.[406] As the Gaceta de Manila pointed out, "Y si se detiene Manila, muere totalidad de Filipinas."[407] (If Manila is gone, the whole Philippines dies) The following day, clearing and cleaning up streets, as well as demolishing hazardous structures that were either damaged or destroyed by the earthquake were started. Given that almost hundreds of its major infrastructures and houses collapsed or were impaired, Manila needed a new urban construction system for it to adapt to the "environmental epiphany" that the earthquake caused. Demolition of severely destructed buildings commenced, except for several private homes, which suffered slight damages.[408] Assessment of the total damage and the estimation of construction activities were done, lead by military engineers and architects, were started after the city was cleaned from debris and rubbles.[409] It took the civil government almost three months, to thoroughly clean the city from debris and collapsed structures. For 86 days, from 06 June to 17 September 1863, workers were hired to clean main roads, streets, and thoroughfares in the city, specifically those with utmost importance to the public, to trade and commerce, and those buildings with the threat of subsequent collapse. These workers, called in by some as *polistas*[410], took on the heavy work of clearing the streets of the city to normalize commercial and public traffic, good and transportation in particular. Local owners and contractors of carruajes (carriages) and carros (carts) participated and helped in the work to be done.[411] The budget for the clearing operations was release in fractions; workers were paid daily with the amount of 0.25 pesos, while certain contracts were awarded for areas that must be cleaned and be cleared of debris as immediate as possible.[412] The period of 06-22 June was crucial, as observed that it had the bulk of hiring of workers to clean the city. For the clearing operations, the civil government spent 2779 pesos for the salary of workers,

[404] Selga, *El Temblor de 1863 y las actas del Ayuntamiento de Manila*, p. 4.
[405] Providencia tomades el Ayuntamiento de Manila para aliviar las desgracias causadas por el terremoto, EAR S1 061, Earthquake Data Records, Manila Observatory Library and Archives.
[406] Ramirez Martín, *El terremoto de Manila de 1863*, p. 78.
[407] Ibid.
[408] "Sobre el terremoto que ha sufrido Manila el dia 3 del corriente," in Antonio G. del Canto, *Los Terremotos de Manila Estudios Historicos sobre grandes terremotos que han tenido lugar en el Archipiélago Filipino, desde su descubrimiento por Magallanes hasta el 03 de Junio 1865* (Madrid: Imprenta de D. A. Santa Coloma, 1863), Biblioteca Nacional de España, p. 30.
[409] Ibid.; the Diario de Manila commended the Cuerpo de Ingenieros for in tirelessly working out to assess the overall situation in the city despite only having a handful of personnel, Diario de Manila, Ano 14, No. 131, 10 June 1863, ULTRAMAR 5196 Expediente 9.
[410] Term used to the local people who do the required (or forced) work for the government, paid by a certain amount accordingly, for a designated period in a year.
[411] Gaceta de Manila, Ano III, No. 96, 07 June 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 6.
[412] Report by Pablo Ortega y Rey dated 24 November 1863, Document No. 6, ULTRAMAR 5198, Expediente 18. Formal approval from Madrid only came on 20 August 1863, but documentary sources suggest that budget for salaries have been disbursed at an earlier period.

with the little amount allocated on certain materials needed for the work.[413] As early as the second day of the operations, there were reports of polistas or workers declaring their grievances because of overwork and possible exhaustion.[414] Aside from the additional work due to the earthquake, they were not relieved of the required work they have to fulfill in their respective areas, thus leading to double tasks and multiple work requirements.[415] Government employees and army soldiers, mainly from civil and military offices that were bureaucratically indispensable in the rehabilitation of the city, were also tasked to come with the clearing operation, to salvage documents from their offices, and resume work if possible.[416]

Table No. 5
Expenses of the Civil Government for salaries of workers in the clearing operations and demolition of damaged buildings, 06 June-17 September 1863[417]

Days	Dates	No. of paid work (0.25 pesos per work item)	Amount paid (in pesos)
1-10	06-15 June	5560	1390
11-20	16-27 June	2751	687.75
21-30	30 June-08 July	342	85.5
31-40	09-21 July	370	92.5
41-50	22 July-01 August	286	71.5
51-60	03-13 August	260	65
61-70	14-26 August	264	66
71-80	27 August-09 September	255	63.75
81-86	10-17 September	180	45
		10268	**2567**
The total budget released: 2779 pesos Expenses for workers: 2567 pesos Expenses for materials: 126.86 pesos Discrepancy, unreported: 85.14 pesos			

The local government of Manila also acted accordingly to the resolutions released by the Junta.[418] In their 05 June 1863 session the Ayuntamiento de Manila passed a resolution that orders the immediate reconstruction of public utilities, such as water supply, city

[413] Ibid.
[414] Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 4.
[415] Ibid., p. 6.
[416] Gaceta de Manila, Ano 3, No. 98, 09 June 1863, cited in Selga, *Índice y breve resulmen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 5; Diario de Manila, Ano 14, No. 131, 10 June 1863, ULTRAMAR 5196 Expediente 9; Report of Juan Caba, "Partes relativos a los destrosos causados a consecuencia del terremoto experimentado en la noche del 03 de Junio del mismo año," *Calamidades Publicas*, Legajo 6 Rollo 375
[417] Report by Pablo Ortega y Rey dated 24 November 1863, Document No. 6, ULTRAMAR 5198, Expediente 18.
[418] Selga, *El Temblor*, pp. 4-7.

transportation, public health facilities, streetlights (*faros* and lamp posts), to prevent any further damage brought by the earthquake.[419] The local government ordered the following measures, formally implemented after 2 weeks to the municipal architect, based on the 05 June 1863 session of the city council:[420]

1. to propose the necessary budget needed to repair the bridges in the city, which connects it to the *arrabales;*
2. to check the condition of the town halls and list down the necessary budget to demolish destructed parts and preserve the water sources in the city;
3. to verify the status of Quinta and Divisoria and inform the *Ayuntamiento* which part can be used for continuous commercial activities while conducting provisional reparations, and if stalls made out of nipa can be erected;
4. to make a list of materials needed for the rebuilding of structures in the city;
5. to ask the Governor Superior Civil (Governor General) to authorize to enlist the service of *polistas* for Manila for it needed a workforce to rebuild its edifices and for public works;
6. to ask the Governor Superior Civil (Governor General) to exempt from importation tax materials which are preferred for the rebuilding of structures, like metals (zinc, galvanized iron, *hoja de lata, carton impermeable*) and other *materiales ligeros* (light materials)

The "flattening" of Manila was through spot-on assessment, and not on existing criteria or policy, or even inter-agency advice from experts.[421] Areas such as that of Arroceros, Magallanes, Universidad de Santo Tomas and the Aduana de Manila were prioritized.[422] Certain structures were spared from the quick clearing operations, like the Cabildo de Manila, Santo Domingo Church, and Binondo Church, as these did not manifest observable damages as of the time of assessment.[423] One consequence seen of the demolition is the “expansion”[424] of Manila; Intramuros was decongested, and certain suburbs were somehow rearranged due to changes in the urban landscape. There were reports of some property owners leaving their houses, with little hesitation and restraint, after government authorities had identified their homes as dangerous and needed to be demolished for the general safety of the public.[425]

As stated, demolitions were done to structures that posed a hazard to the public, or people occupying those structures. One of the government buildings where attention

[419] Ibid., p. 3.
[420] Ibid., pp. 5-6; Proyectos iniciados o secundados por el Ayuntamiento de Manila para aliviar las desgracias causadas por el terremoto, EAR S1 062, Earthquake Data Records, Manila Observatory Library and Archives.
[421] Ramirez Martín, *El terremoto de Manila de 1863*, p. 53.
[422] Document Nos. 1-3 and 6, *Autorizado el gasto de 2779 para la limpia de las calles de Manila de los despojos de los edificisios arruinados por el terremoto*, ULTRAMAR 5198, Expediente 18, Archivo Histórico Nacional (AHN).
[423] Ramirez Martín, *El terremoto de Manila de 1863*, p. 52.
[424] Ibid., p. 54.
[425] Diario de Manila, Ano 14, No. 131, 10 June 1863, ULTRAMAR 5196 Expediente 9.

was immediately paid for was the prison. The community jails of Sta. Cruz and Tondo suffered severe damages, and those were considered hazardous not only to the employees but to the prisoners in particular. After a month after the earthquake happened, the civil government allotted a budget of 1791.08 pesos for the demolition, repair, additional construction work, and supplementary budget for the two jails.[426]

For the objective to centralize and make a comprehensive, long-term the rehabilitation of Manila and other affected towns, Governor General Echagüe issued a circular on 08 June 1863, colloquially labeled in newspapers as the "Bando de 08", to address specific immediate needs in the city's urban rehabilitation, as well as some concerns on the access to basic commodities and additional number of workers needed by the government. Several newspapers published the circular - the Gaceta de Manila on 08 June 1863 and Diario de Manila on their 10 June 1863 issue. The circular contains four orders pertaining to: (1) maintaining standard and fixed prices of materials for construction, to prevent manipulators from taking advantage of the high demand for materials[427], (2) standardizing the payment of jornaleros (daily salaried workers) and/or polistas to prevent any form of manipulation from certain individuals about work and pay for the clearing operations, (3) provisional freezing or exemption from tariffs and duties in the importation of certain construction materials from abroad, such as zinc, hierro galvanizado (galvanized iron), hoja de lata (tin foil), and carton impermeable (waterproof board).[428] The "Bando del 08" was based on the initial recommendation of the Junta de Autoridades, as well as the requests of the local government of Manila. It was recognized as an efficient decision given the fact that prices needed to be controlled given the demand for materials is much higher compared to the supply, to avoid abuses and manipulation.[429] The Ayuntamiento de Manila, have formally reported the case of logreros (loggers), described as “hombres desalmados” (heartless men), taking advantage of the high demand to raise prices of goods, as well as hoard supplies for people, with no choice because of the need, to buy materials in the highest price as possible.[430] It also contained an attached circular, addressed to provincial chiefs in Luzon, asking them to send to Manila construction materials that can be obtained from their respective, as well as additional personnel support and human resources, that can work even during weekend and holidays.[431] The latter is a call as the civil government faced shortage in people to work, as the available human resources they had at that time, which composed only of soldiers and military personnel[432], cannot finish demolitions and clearing operations. Diario de Manila made recognition of the valuable

[426] Documents Nos. 1-3, Reparacion de las Carceles de Sta. Cruz y Tondo, ULTRAMAR 5194 Expediente 14, Archivo Histórico Nacional (AHN).
[427] Several newspapers such as the *Diario de Manila* has reported the complaint of some of their readers about the manipulation and taking advantage of some retailers in selling construction materials.
[428] Diario de Manila, Ano 14, No. 131, 10 June 1863, ULTRAMAR 5196 Expediente 9.
[429] Ibid.
[430] Gaceta de Manila, Ano 3, No. 98, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 5.; *Franquicia aduanera para materiales de construccion*, EAR S1 029, Earthquake Data Records, Manila Observatory Library and Archives.
[431] Ibid.
[432] On 14 June 1863, the Capital General de Ejercito issued an appraisal to the soldiers who worked in the clearing operations, considering their work as an act of patriotism. Published in the Gaceta de Manila Ano 3, No. 104, 15 June 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 7.

effort of some employees, as well as non-government groups, such as the religious orders and ecclesiastical personnel of church institutions in Manila.[433] Local indigenous residents of the suburbs of the province of Manila, as well as nearby provinces of Tondo, Bulacan, Cavite, and Pampanga were mobilized, but still, manpower was a bit short compared to the gigantic task cleaning the whole city.[434] The sudden copious rains experienced days after the earthquake caused more difficulty in the work, as well as in separate operations aimed at extracting cadavers and saving victims still trapped under debris and buildings that collapsed.[435] Given the gravity of the situation in Manila, the civil government was in sheer frustration of mobilizing all available workforce, that personnel who refused to take part in the work to rehabilitate the city can be penalized. One case has been reported in the Gaceta de Manila; about an employee who was fired from the government after reports had reached the Governor General's office that the employee consciously evaded work because of unknown reason.[436] On 02 July 1863, Governor General Echagüe revised his 08 June 1863 circular to the provincial chiefs, making it clear to prioritize the work of polistas in the city, rather than in their localities, as it is the much urgent need.[437]

Provisional structures were gradually built as soon as important zones and areas were cleared from debris. Construction of temporary shelters for military personnel and workers, as well as finding suitable places where bureaucratic offices can be housed commenced after several weeks when the regular order and function in the city have been observed. Some of these temporary structures were made out of light materials, *caña* and *nipa* for in particular, or house already built out of these structures were repaired first[438], as there were readily available, and the supply partially abundant as provinces have committed to sent materials to Manila, as well as accessible due to its relatively fixed price. Indispensable structures such as footbridges were also made, and these required more materials and manpower. For example, a temporary bridge was constructed to enable people and light carriages to cross Pasig River, and this structure required massive cutting of trees in the San Mateo area, located in the province of Morong, north of Manila, to supply the needed wood.[439]

b.3 Measures implemented by the Madrid government

b.3.1 Initial Madrid response

The 1863 earthquake catastrophe shows, as Ramirez Martín (2006) argues, that the monarchy was not prepared to quickly respond to the needs of the Philippines, despite its absolutist nature of leadership.[440] The apparent geographic isolation of the

[433] Diario de Manila, Ano 14, No. 131, 10 June 1863, ULTRAMAR 5196 Expediente 9.
[434] Document No. 1, ULTRAMAR 5196 Expediente 9; Ramirez Martín, *El terremoto de Manila de 1863*, pp. 76-77; See García del Canto, *Los terremotos de Manila.*
[435] Document No. 2, ULTRAMAR 5196 Expediente 9.
[436] Gaceta de Manila, Ano III, No. 1000, p. 2, cited in Selga, Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863, p. 6.
[437] Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 6.
[438] Ramirez Martín, *El terremoto de Manila de 1863*, p. 50.
[439] Gaceta de Manila, Año 3, No. 241, p. 1, cited in Ibid., p. 8.
[440] Ramirez Martín, *El terremoto de Manila de 1863*, p. 122.

Philippines[441], and Spain, having political and economic challenges in the Iberian Peninsula due to attempts to be a stable state, the royal government showed ineptness and slow decision-making character during the first few weeks since the earthquake. But it's better late than never, after two months, Manila received formal support from Madrid. The response of the Madrid government to the disaster that struck Manila was through providing resources, which can be categorized into three: human, financial, and "moral" resources. It was able to mobilize its resources to gather humanitarian aid for the Philippines, banking on the call for patriotic duties to help their "hermanos de ultramar."[442] The government tapped institutions, both civil and ecclesiastical, to help in gather people and resources for the rehabilitation of Manila. The Madrid government sent technical experts that can help plan and erect building that are geologically and climatologically stable; while the clerics in Madrid played a vital role in convincing people to donate for Manila.[443] The national subscription program opened is being considered to make Manila a ‘‘part" of Spain – the economic support of the peninsula reinforces the economic dependence of Manila to Madrid, as well as the mobilization of Spanish territories for financial aid.[444]

Almost two months after the earthquake struck Luzon, devastating primarily Manila, and nearly two months since Governor General Echagüe started sending regular reports to Madrid, the royal government, through the Ministerio de Ultramar, had formally responded to the Philippine civil government requests. On 06 August 1863, a royal order signed by Overseas Minister Francisco Permanyer was issued, stating the following rules:

> (1) granting the Philippine Governor General to open a crédito extraordinario (subsidiary credit) worth two (2) million pesos aimed at those residents who have lost properties and for the reconstruction of public infrastructures, churches, and convents whose owners do not have resources to facilitate it on their own;
> (2) allocating parts of the credit to be opened to individuals who have been subjected to poverty because of losses due to the earthquake, and cannot do their work or profession, their business or any related fields;
> (3) the opening of a national subscription program in Spain and its provinces overseas, to help in supporting the rehabilitation of Manila and its residents; and
> (4) authorizing the Governor General to communicate and negotiate with the Banco Español Filipino, the Obras Pias, or with the tobacco companies of the state, regarding the needed funds of the civil government, to be used for the rehabilitation of affected communities.[445]

[441] Ibid., p. 121.
[442] Ibid., p. 98.
[443] Ibid., pp. 100-104.
[444] Ibid., p. 122.
[445] Gaceta de Manila, Año 3, No. 222, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 9.

Operationalizing the decree from the Overseas Minister required the Governor-General specific bureaucratic considerations and related "approvals" for them to be realized. At first, the Governor General, upon receipt of the order, issued a decree regarding the availability and purchases certain materials, such as tin sheets, to be used in edifices.[446] On 10 August 1863, the formal approval from Madrid on this economic measure was received in Manila.[447] Other stipulations from the decree needed to be studied, since most of it required additional orders from Madrid, or required to be communicated with the appropriate state financial institutions. Three days after, he received formal approval from the Overseas Minister on the measure he took during the first weeks after the earthquake.[448]

b.3.2 Donations and subscriptions

In the succeeding days, the royal government in Madrid sent additional decrees and orders to facilitate the sending and distribution of financial aid from the monarchy to the people of Manila. These decrees include a variety of relief procedures and monetary donation programs as a remedy to affected residents and communities. To partially alleviate the effects of the earthquake, although a little bit late or delayed, the Spanish colonial government made the first distribution of relief necessities to the people upon formal approval of the royal government. Some approvals were necessary for measures to be implemented; some were mere formalities or commendation of work done for the city.

In a telegraphic communication received in Manila on 17 August 1863, through the Spanish Consul of Egypt, the Queen, Isabela II, through a royal decree dated 09 August, formally relayed her desire to personally help and donate for the victims of the 03 June 1863 earthquake.[449] The letter says that the Queen, together with the people of Spain, were extending their grief and support to their brother in Manila, and that the message of the Queen and the royal family can be published in Manila newspapers.[450] A *Gaceta Estraordinario*, a special issue of the Gaceta de Manila, was published on 30 September 1863 containing the message from the Queen, which was sent to Manila on 09 September 1863 through the Spanish Consul in Egypt.[451]

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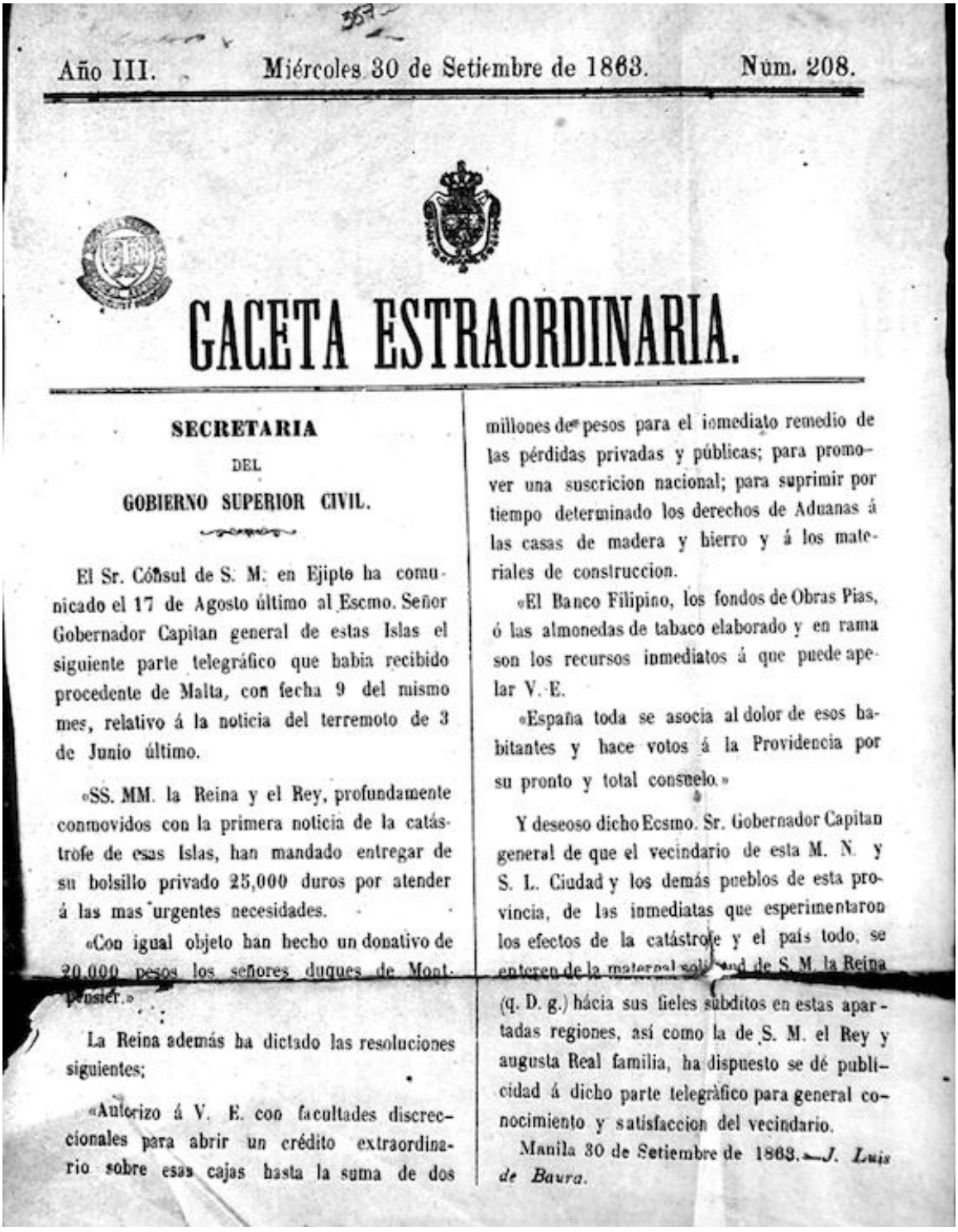
[446] Gaceta de Manila, Año 3, No. 155, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 9.
[447] Gaceta de Manila, Año 3, No. 212, p. 1, cited in Selga, *Índice y breve resulmen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 9-10.
[448] Gaceta de Manila, Año 3, No. 220, p.1, Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 9-10.
[449] Telegraphic communication with the Consul of Egypt on 09/17 August 1863, Rollo 7421 Legajo 10 (1863-1870), Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigaciones Científicas (CCHS-CSIC).
[450] Ibid.
[451] Ibid.

Photo No. 3
Gaceta Estraordinaria, 20 September 1863[452]



Año III. Miércoles 30 de Setiembre de 1863. Núm. 208.

GACETA ESTRAORDINARIA.

SECRETARIA
DEL
GOBIERNO SUPERIOR CIVIL.

El Sr. Cónsul de S. M. en Ejipto ha comunicado el 17 de Agosto último al Escmo. Señor Gobernador Capitan general de estas Islas el siguiente parte telegráfico que habia recibido procedente de Malta, con fecha 9 del mismo mes, relativo á la noticia del terremoto de 3 de Junio último.

«SS. MM. la Reina y el Rey, profundamente conmovidos con la primera noticia de la catástrofe de esas Islas, han mandado entregar de su bolsillo privado 25,000 duros por atender á las mas urgentes necesidades.

«Con igual objeto han hecho un donativo de 20,000 pesos los señores duques de Montpensier.»

La Reina además ha dictado las resoluciones siguientes;

«Autorizo á V. E. con facultades discrecionales para abrir un crédito extraordinario sobre esas cajas hasta la suma de dos millones de pesos para el inmediato remedio de las pérdidas privadas y públicas; para promover una suscricion nacional; para suprimir por tiempo determinado los derechos de Aduanas á las casas de madera y hierro y á los materiales de construccion.

«El Banco Filipino, los fondos de Obras Pias, ó las almonedas de tabaco elaborado y en rama son los recursos inmediatos á que puede apelar V. E.

«España toda se asocia al dolor de esos habitantes y hace votos á la Providencia por su pronto y total consuelo.»

Y deseoso dicho Ecsmo. Sr. Gobernador Capitan general de que el vecindario de esta M. N. y S. L. Ciudad y los demás pueblos de esta provincia, de las inmediatas que esperimentaron los efectos de la catástrofe y el país todo, se enteren de la maternal solicitud de S. M. la Reina (q. D. g.) hácia sus fieles súbditos en estas apartadas regiones, así como la de S. M. el Rey y augusta Real familia, ha dispuesto se dé publicidad á dicho parte telegráfico para general conocimiento y satisfaccion del vecindario.

Manila 30 de Setiembre de 1863.—*J. Luis de Baura.*

[452] Ibid.

It indicates that the Queen, together with the Dukes of Montespier donated 25,000 *duros*[453] and 20,000 pesos to the government respectively, to address urgent needs of the victims of the earthquakes.[454] Moreover, the Queen authorized, or reiterated, the implementation of the orders stipulated in the 06 August 1863 decree of the Overseas Minister: (1) the opening of a *credito extraordinario* of 2 million pesos for public and private property losses, (2) the opening of a national subscription, (3) lessening the bureaucracy in customs to access from abroad important materials for reconstruction, and that (4) the government funds in the Banco Español Filipino, Obras Pias, and Almoneda de Tabaco, can be tapped, for approval, for the use in the projects related to reconstruction and rehabilitation of the city.[455]

On 09 August 1863, based on the royal decrees issued by Queen Isabela II and the Overseas Minister, a national subscription program was opened in the Philippines and the overseas Spanish territories and possessions at that time.[456] Overseas Minister Permanyer, in a separate circular, ordered the governors of Cuba, Puerto Rico, and Santo Domingo to open respective subscription programs in their localities.[457] On 13 August 1863, a separate decree opening the subscription program in Spain was issued.[458] But like many overseas programs, one "problem" that needed to be solved is how to facilitate it, given the complicated nature of Spanish bureaucracy, the financial aspect in particular. Two proposals were submitted to the Madrid government on how to realize the said subscription program. On the one hand, on 12 August 1863, a certain Manuel Borjas wrote a letter addressed to the Ministerio de Ultramar, proposing the following mechanisms to collect money and donations: (1) a subscription program that entails less bureaucratic processed, (2) a national lottery, (3) a national raffle that can collect 500,000 to 3,000,000 pesos for Manila.[459] On the other hand, on 04 September 1863, a confident M. Rodriguez Álvarez proposed to the Ministerio de Ultramar a *Recaudacion Nacional* (national collection) program that will order the following: (1) Every capital of a province must form a council that will look provide resources to attend to the needs of Manila, (2) every town must be able to collect 8000 reales, (3) chiefs of military groups must initiate subscriptions, and (4) In Madrid there must be point persons who will coordinate with newspapers, theaters owners, with the Plaza de Toros and other groups for donations as part of the national subscription program.[460]These proposals, though there was no proof that the Madrid government used the first or the

[453] Duro(s) = 5 pesetas or 20 reales. The donation is approximately 500,000 reales

[454] Ibid; "Apuntes historicos sobre temblores de Filipinas", *Archeion, vol XXII, 1940, No. 1,* pp. 71-85, cited in Selga, *El Temblor*, p. 6; *Disposiciones y medidas a consecuencia del terremoto de 3 de Junio de 1863*, ULTRAMAR 1378, Archivo Histórico Nacional (AHN).

[455] Telegraphic communication with the Consul of Egypt on 09/17 August 1863, Rollo 7421 Legajo 10 (1863-1870).

[456] Gaceta de Manila, Año 3, No. 230, p. 1 and Gaceta de Manila, Año 3, No. 225, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 9-10.

[457] Gaceta de Manila, Año 3, No. 225, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 10

[458] Gaceta de Manila, Año 3, No. 224, p. 1, cited in Selga, *Índice y breve resulmen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 10.

[459] Manuel Borjas propone modo de ayuda a Manila tras terremotos, ULTRAMAR 5196 Expediente 12, Archivo Histórico Nacional (AHN).

[460] M. Rodriguez Alvarez propone modo de ayudar a Manila tras seismo, ULTRAMAR 5196 Expediente 13, Archivo Histórico Nacional (AHN).

latter, a combination of their ideas came into fruition during the succeeding months that the subscription program ran.

Several juntas or groups were reorganized and created both in the Philippines and in Spain, respectively. In the Philippines, as early as 05 June 1863, there was an existing Junta de Socorros, established together with the Junta de Autoridades Superiores, the group that led the rehabilitation efforts in Manila after the earthquake. On 13 October 1863, two months after formal approval from the Ministerio de Ultramar was received in August 1863, the Junta de Socorros in Manila was improved to a more centralized Junta Central de Socorros de Manila.[461] A collective Juntas de Socorros en Provincias, Distritos y Parroquias was established on 18 October 1863; this is aimed at collecting donations from the provinces, particularly those far from Manila.[462] On the part of Spain, a separate Junta de Socorros en Peninsula was established on 13 August 1863[463], coinciding with the issuance of the decree of national subscription. The central juntas in the Philippines and Spain coordinates with donations, recommend importation of materials, suggest mechanism on price control of certain trade goods, and other relevant matters about financial flow and expenses.[464] Both juntas in the Philippines and Spain had Caja General de Depositos; but in Spain, several banks were also involved in receiving and accounting donations, such as the Banco de España and Sucursales Provinciales del Banco de España.[465] Subscriptions in Spain lasted for a year until August 1864.[466]

One can observe that Spain implemented in the subscription program its tradition of highly bureaucratic governance. With separate juntas coordinating with each other, and within each junta, there were three different sectoral juntas working: *provinciales* (provincial), *de partido* (regional and judicial), and *parroquiales* (local), one can infer the overlapping and intertwined roles that make the management prone to sluggish, time-consuming, and tedious bureaucratic processes.[467]

b.3.3 National subsidiary and loan funds

The 09 August 1863 royal order of Queen Isabella II authorizing the release of a national subsidiary fund amounting to two million pesos, to be used for lending in monetary support for victims, and for lowering the customs duties imposed on imported materials to be used for reconstructing houses in the affected areas.[468] The promise of a more extensive, extraordinary credit system worth 2 million pesos was also mentioned to be in process. But before this formal decree by the Queen, Governor General Echagüe had requested to the Overseas Minister for the approval of two separate public credits, worth 2000 and 2500 pesos respectively, for residents to access available funds for their

[461] Ramirez Martín, *El terremoto de Manila de 1863*, p. 86.
[462] Ibid, pp. 86-87.
[463] Ibid., pp. 88-98.
[464] Ibid., p. 98.
[465] Ibid., pp. 87-89 and p. 105.
[466] Ibid., p. 105.
[467] Ibid., p. 87-98.
[468] Ibid.

respective property reconstruction.[469] And after the decree from the Queen was received, several other layers of bureaucracy had to be streamlined to be able to implement the public credit system. On 17 October 1863, the civil government, upon consent of the Superentendencia Delegada de Hacienda, published an open credit system worth 1.5 million pesos, divided into 60 *series*.[470] The Capitan General was the first to receive formal granting of the credit system, on 04 November 1863, as the repair of military facilities in Cavite was deemed urgent.[471] The first large-amount of the public credit system was only approved on 04 December 1863. The release was in two tranches – 15,000 and 20,000.[472] Although, the final budget received, upon approval, were only 15,121, used for the demolition, repair, and construction of quarters and military buildings.[473] Government banks and income-generating institutions of the government were tasked to help in the facilitation of the release of funds. The Madrid government also issued a specific decree authorizing the civil government to look for loans from other possible sources. On 21 November 1864, a royal order indicated he approved of the loans worth 500,000 pesos, contracted with private lending companies T.M. Tuazon and Russel and Sturgis, as well as the Banco Español Filipino.[474] To verify the availability of funds for the public credit, the Ministerio de Ultramar and the civil government had to validate the financial stability of the Banco Español Filipino and the Obras Pias. In the 07 December 1863 letter of Governor-General Echagüe to the Minister Permanyer, it was reported that the former had equal debit-credit account figures, amounting to 1,531,613.77 pesos, as of 30 November 1863; while the Obras Pias had 1,156,763.77 pesos worth of active, passive, advances, and additional collections as of 17 August 1863.[475]

b.3.4 Mobilizing professionals and workers in Spain

Rebuilding the urban glory of Manila and its nearby provinces required not only financial capital, but human and professional expertise as well. One of the "effects" of the 1863 earthquake was the influx of professional civil engineers (*ingenieros coloniales*) and architects. On 10 August 1863, in accordance to the series of royal decrees issued by Queen Isabela II and the Ministerio de Ultramar, an order authorizing professional architects and engineers from Spain was signed and made available in local newspapers. It served as a call to the creative workforce of Spain to volunteer and help rehabilitate Manila through their professional and technical expertise. The Overseas Ministry also wrote a letter to the Academia de San Fernando regarding the possibility of studying the architectural situation in the Philippines and informing about the creation of

[469] Letter of Governor General to the Overseas Minister, 07 August 1863, and Letter of the Capitan-General to the Overseas Minister, 03 July 1863, Rollo 7420 Legajos 8-10 (1863-1892).
[470] Gaceta de Manila, Año 3, No. 228, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 13.
[471] Ibid.
[472] *Disposiciones y medidas a consecuencia del terremoto de 3 de Junio de 1863*, ULTRAMAR 1378.
[473] Approval of the allotted budget for the demolition, reparation, and construction of cuarteles and edificios militares in Manila and Cavite, *Calamidades Publicas*, Legajo 6 Rollo 375.
[474] Real Orden 1128, 21 November 1863, Rollo 7420 Legajos 8-10 (1863-1892).
[475] Letter of the Governor General to the Overseas Minister, 07 December 1863, Rollo 7421 Legajos 8-10 (1863-1892).

plazas for architects to be sent to the Philippines.[476] Dozens of invitations and applications were sent and received calling for these experts. Some of whom were the following: Vicente Serrano Salaverri (Jaen), Francisco Verea Romero (Madrid), Eduardo García Perez (Sevilla), Jose Fuentes (Valladolid), Juan Martín Gonzalez (Madrid), Antonio Moraleda (Toledo), Luis Cespedes (Oviedo), and military engineers Carlos Campo y Escuder, Alberto Arsal, and Francisco Duran.[477] The call in the decree also stated that these architects, and engineers as well, had their plazas or regular items in the Philippine civil government's annual budget, with a yearly salary of 2000 pesos per month.[478]

On 16 August 1863, Francisco Mazarración, a resident of Manila, sent a proposal to the Ministerio de Ultramar, regarding the establishment in Manila of a "Gran Tallier de Canteria de Reina Doña Ysabel Segunda" – a body of expert workers which includes *jefe/maestro mayor, ynspector de trabajos, jefe de contabilidad, oficiales de cerpenterias, ayudantes, oficiales de albaniterias, oficiales de cerrageria y herreria, pintores, didrieros* and *plomberos*.[479] It is not clear whether this proposal was considered but the idea plans to bring in professionals to Manila was ordered so by the 10 August 1863 royal decree.

The said decree also led to a separate call for the enlistment of other professional workers. On 14 October 1863, a public all for expert workers such as carpenters, masons, locksmiths, and glassmakers, and plumbers was issued, encouraging people to help in the reconstruction of edifices in Manila.[480] Considered masters in their specific fields, many experts were invited and appointed to work for the rebuilding of state and public edifices in Manila. These *maestros de obras* and *subalternos* (junior interns)– in carpentry, *agrimensura* (surveying), mechanics, and other related fields, took the offer and appointments were prepared and issued later on. Compiled appointments of these individuals suggest there were fifty-nine (59) of them: six (6) maestros, thirty-four (34) subalternos, two (2) additional engineers (industrial and mechanical), five (5) *oficio carpiteros*, and twelve (12) other specialized master workers.[481] Engineers and *obreros* or workers from other countries such as France and Italy were invited, as Spanish architects and engineers who had previously worked with them recommended them.[482] Governor General Echagüe welcomed the sending of these workers to Manila; although

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[476] Gaceta de Manila, Año 3, No. 230, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 10.

[477] Document Nos. 1, 7, 12, 23, 33, and 38, *Creación de plazas de arquitecto de Administración Local en Filipinas, su provision y suppression*, ULTRAMAR 606, Expediente 7; *Carlos del Campo y Escuder, solicita ransporte gratis para Manila, 26 Agosto 1863,* ULTRAMAR 5196, Expediente 1; Document Nos. 3-5, *Solicitudes del Obreros Yngenieros y Maestros de Obras pediermo pasar a Manila a ocuparse en las obras de reconstrucccion de edificis que destruyo el terremoto*, ULTRAMAR 5196 Expediente 5, Archivo Histórico Nacional (AHN).

[478] Document No. 4, ULTRAMAR 606, Expediente 7. A comprehensive study about government bureaucracy and corruption in the 19th century can be seen in Xavier Huetz de Lemps, *L'archipel des* épices*. La corruption de l'administration espagnole aux Philippines, fin XVIIIe siècle – fin XIXe siècle (*Madrid: Casa de Velázquez, 2006).

[479] Document Nos. 16-18, *Solicitudes del Obreros Yngenieros y Maestros de Obras pediermo pasar a Manila a ocuparse en las obras de reconstrucccion de edificis que destruyo el terremoto*, ULTRAMAR 5196, Expediente 5, Archivo Histórico Nacional (AHN).

[480] Document Nos. 1 and 2, ULTRAMAR 5196, Expediente 5.

[481] Documents 3-15, 19-103, 105-117, ULTRAMAR 5196, Expediente 5.

[482] Documents 40-41, 72-77, and 115-116, ULTRAMAR 5196, Expediente 5.

he stated that by October of 1863, they had achieved relative sufficiency in the number of workers – *indigenas* and *chinos operarios*, despite the small salary they give.[483]

Ordinary skilled workers were also sent to Manila to help in the work. There is an estimate of more or less 479 requests and invitations, almost all of whom are men, with a mention of two (2) women enlisted in, as *mujeres* (wives) of workers.[484]

Table No. 6

List of workers invited and enlisted in to help in the reconstruction of Manila, 1863[485]

Work	Number of workers
Carpentero	156
Cerragero	49
Albañil	104
Ebanista	13
Panadero	8
Yesero	9
Herrero	13
Mampostero	1
Tallista	3
Auxiliar Ynginiero (Francia)	1
Barbero	2
Espartero	1
Adernista y escayolista	1
Pintor	13
Barrenero	2
Sastre	1
Carretero	3
Cajista	1
Sobrerero	1
Calederador	1
Formero	1
Confitero	1
Escultor	3
Mecanico	1
Maestro de Obras y Subalterano	7
Vidrero	10
Modista	1
Cocinero	1
Plomberos	8
Pizarrero	8
Cartero	7
Maquinista	4

[483] Letter of Governor-General Echagüe to the Ministerio de Ultramar, 14 October 1863, Document No. 104, ULTRAMAR 5196, Expediente 5.
[484], ULTRAMAR 5196 Expedientes 6-8, Archivo Histórico Nacional (AHN).
[485] Document Nos. 1-143, ULTRAMAR 5196 Expedientes 6-8.

Cargo de capataz	1
Constructor de Armaduras	1
Verderodo quinsala ambulante	1
Ynginiero de Caminos	3
Arquitecto civil	2
Academico	1
Revocador	3
Armarero	2
Embolsador	2
Forjador	1
Zapatero	5
Aparejador	3
Hoja latero	1
Absernador	1
Plastero	3
Jornalero	1
Serrador	4
Estadístico	1
Inginiero Industrial	1
Tejero	1
Carbonero	1
Cortador	1
Sobrestante	1
Platero	1
Total	**477**

Realizing these appointments, as well as sending this workforce from Spain to Manila also suffered from the complicated and tedious processes in the Spanish bureaucracy in Madrid and Manila. Formal appointment as state architects for Luciano Oliver, an architect who was commissioned before to lead some projects in the Philippines, like the San Sebastian Church, and for Cespedes and Serrano Salaverri, were made almost seven years after the official royal order was issued.[486] Official and workers with official appointments were sent to Manila; Madrid shouldered their transportation expenses.

b.4 *Socorros*, donations from the provinces, and petitions from the residents of Manila

To operationalize the aim to distribute the donations promised, received, and to be received by civil government from Spain and its overseas provinces, and different parts of the country, the Superintendecia de Hacienda named members of the established Junta Central de Socorros de Manila to primarily organize the receiving donations, approval of beneficiaries, release of donations, and facilitation and accounting every financial transaction of the national subscription program being done. On 06 October 1863, Superintendecia de Hacienda named the members of the junta, which include

[486] Gaceta de Manila, Año 10, Tomo 1, No. 93, p. 661, EAR S1 051, Earthquake Data Records, Manila Observatory Library and Archives; Expediente relativo a la formacion de una memoria de los edificios publicos destruidos por el terremoto de 1863, Rollo 7420 Legajos 8-10 (1863-1892).

people from the civil government (Governor General Echagüe, Gobernador Militar de la Plaza Salvador Valdés, Comandante General del Apostadero Manuel Dueñas, Gobernador Civil de la Provincia Rafael de Comas, the Brigadier Subinspector de Ingenieros Manuel de Heredia and the Secretario del Ayuntamiento de Manila), the Church (Manila Archbishop Gregorio Melitón Martínez and the parish priests of some parishes in Manila), and the military (Intendente General de Luzon Sebastián de León).[487] The Governor-General served as the president of the junta. The civil government was given a hand at managing the donations sent to Manila. Starting the end of 1863, for three years until September 1866, Manila collected and received, in several tranches, millions of pesos of domestic and international financial donations to rebuild the Spanish capital, in terms of infrastructures, public utilities, and financial support to residents and people in need.

The subscription program opened in Spain and Cuba, as well as in Puerto Rico, collected millions of amounts of donations. Although the contributions for Manila was closed at the end of August 164, almost a year after it was opened, the subscription system formally closed at the end of December 1864.[488] The total collection recorded reached 39,110,677 reales and 10 cents.[489] But for Manila, as documented, a total of 20,756,439 pesos were collected from the subscription program, the donation of the Queen and the royal family, and certain private individuals. The donations from Spain and Cuba were received by the institutions and banks assigned: the Caja General de Depositos, which collected 42.1% of the donations, the Banco de España that had 13.3% collection, and the Sucursales Provinciales del Banco de España, which had 44.7% of the collected donations.[490]The donation from Puerto Rico was transmitted directly to Manila in August 1865. The table below shows the transfer of donations sent to Manila starting April of 1865, until November of 1866.

Table No. 7
International subscriptions from Spain and Puerto Rico for the victims of the June 1863 earthquake in Manila, April 1864-November 1866[491]

Origin	Date of Arrival in Manila	Office that received	Nature	Amount
Spain	21 April 1865	*Dirección del Tesoro*	4 *cargames*[492]	4,149,700 *reales* and 32 cents
Puerto Rico	12 August	*Tesorería*	1 cargo	39,296 *escudos*[493]

[487] Gaceta de Manila, Año 3, No. 214, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 12-13; Ramirez Martín, *El terremoto de Manila de 1863*, p. 86.
[488] Ramirez Martín, *El terremoto de Manila de 1863*, p. 108.
[489] Ibid.
[490] Ibid., p. 105.
[491] Official royal orders can be found in ULTRAMAR 3153, Archivo Histórico Nacional (AHN), cited in and summary provided by Ramirez Martín, *El terremoto de Manila de 1863*, pp. 116-119; Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 16-20; Rollo 7421 Legajo 10 (1863-1870).
[492] aCargames – a document that contains the record of entry and receipt of the amount to a treasury. Ramirez Martín, *El terremoto de Manila de 1863*, p. 116.

	1865	*Central de la Hacienda Publica*		and 680 thousandths (approx.. 392,960 reales and 68 cents)
Spain	01 December 1865	*Tesorería Central de la Hacienda Publica*	3 *cargames*	697,561 *reales* and 47 cents *de vellon*
Spain	14 November 1866	*Tesorería Central de la Hacienda Publica*	2 *cargames*	22,503 *escudos* and 877 thousandths (approximately 225,030 reales and 877 cents)
Approximate Total				**5,465,253 *reales* and 35 cents**

It can be observed that Madrid sent only 26.33% of the total donations to Manila. The amount promised by the Queen in her 09 September 1863 letter, which was 500,000 reales (25,000 *duros*), is included in here. Therefore, from the total subscriptions collected from Spain, excluding the amount from Puerto Rico, Manila only received 11.69% (4,572,292 reales and 67 cents out 39,110,677 reales and 10 cents).

Not only the Iberian Peninsula and the territories in the Caribbean were mobilized to come up with financial support for Manila and other affected localities. On 18 October 1863, Governor-General Echagüe, concerning the 10 August 1863 royal decree by Queen Isabela II, ordered the provincial chiefs to establish their separate junta de socorros, which will facilitate a public subscription program to gather funds to help the victims of the earthquake.[494] One proof that indeed, the order to establish these ad hoc groups to gather donations was implemented was seen three months after, as remittances started to arrive and be received by the central junta in Manila. The provinces that remitted their contributions to Manila, from January to August 1864 were Bulacan (San Miguel de Mayumo, 27 January 1864), Ilocos Norte (twice on 04 August 1864 and on 07 September 1864), Union (February 1864), Nueva Vizcaya (twice on 16 February 1864 and on 28 June 1864), Cebu (03 February 1864), Isabela (08 March 1864), Camarines Norte (08 March 1864), Surigao (01 May 1864), Albay (20 May 1864), Distrito Militar de Davao (10 August 1864) and Pangasinan (17 August 1864).[495] Some reports contain the names of each who donated, and the amount they gave. One can observe that everyone seemed to have participated in the endeavor, from Spanish,

[493] An *escudo*, in the 1860s, can be converted into 10 reales.

[494] Gaceta de Manila, Año 3, No. 230, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 13-14.

[495] Rollo 7420 Legajos 8-10 (1863-1892); Rollo 7421 Legajos 10 (1863-1870); Rollo 7453 Legajos 4-5 (1858-1897); Document No. 1, Temporal en Albay sobre a esta provincial con el product de la suscricion a el terremoto de Manila, ULTRAMAR 5197, Expediente 13, Archivo Histórico Nacional (AHN). Receipts issued by the Tesoreria de la Junta Central on 11 March 1864 from 16 provinces and donors verify this fact.

mestizos, indigenas, and chinos. For example, almost 50 Chinese residents of Tuguegarao contributed for the victims of Manila on March 1865.[496]

In a report by the Junta 3 years after the public subscription in the provinces was opened, it had accounted a collection of 47 remittances amounting to 16,734.04, from 30 provinces, six (6) military districts, two (2) individuals, one (1) foreign town (Valparaiso, Chile), one (1) newspaper, two (2) islands territories, and from the sale of wood in Tayabas.[497]

Table No. 8
Report of donations from the public subscription program opened in the provinces, about the June 1863 earthquake, 26 March 1867[498]

No.	Source of Donation	Amount
1	D. Pedro de la Yloz de Madrid	500
2	Provincia de la Union	105.18
3	Provincia de Paragua	1065.18
4	Provincia de Tayabas	181
5	Escuadron de España Segunda Lancerdo	6.5
6	Cura de San Miguel de Mayumo	13
7	Provincia de Pampanga	972.5
8	Provincia de Cavite	501.82
9	Provincia de la Union	632.39
10	Provincia de Zambales	133.79
11	Provincia de Lepanto	14
12	Establecimiento de Balabac	42.5
13	Provincia de Camarines	390.5
14	Distrito de Morong	62.43
15	Distrito de Tarlac	155.25
16	Provincia de Nueva Vizcaya	72.87
17	Redaccion del Periodico la Esperanza Subscription	200
18	Ysla de Corregidor	98.68
19	Provincia de la Isabela	1919.80 7/8
20	Valparaiso de Chile	543.75
21	Provincia de la Unión	854.57
22	Provincia de Cagayan	812.60
23	Cotabato	282.47
24	Provincia de Ylocos Sur	862.41
25	Provincia de la Pampanga	120
26	Primer Distrito de Mindanao	159.33
27	Provincia de Batangas	583.31
28	Distrito de Romblon	57.81
29	Distrito de Benguet	15.5
30	Yslas Marianas	188

[496] Rollo 7421 Legajos 10 (1863-1870).
[497] Rollo 7420 Legajos 8-10 (1863-1892).
[498] Ibid.

31	Producto de maderas de Tayabas	35
32	Provincia de Pangasinan	801.26
33	Provincia de Bataan	237.96
34	Provincia de Yloilo	263.38
35	Provincia de Cebú	979.88
36	Provincia de Samar	412.73
37	Provincia de Surigao	45.2
38	Provincia de Leyte	417.11
39	Distrito de Porac	113
40	Provincia de Tayabas	118.3
41	Provincia de Antique	105.87
42	Provincia de Samar	7
43	Provincia de Misamis	411
44	Provincia de Davao	27.62
45	Provincia de la Ilocos Norte	493.45
46	Provincia de la Laguna	600.95
47	Provincia de las Islas Marianas	27.5
	TOTAL	**16734.04**

The Junta Central de Socorros started accepting petitions for the distribution of donations almost three months since the first tranche of donations arrived in Manila from Spain in April of 1865.[499] The junta based the opening of petitions on the 05 August royal decree. The compilation of requests indicates that the period the junta received applications from the residents of Manila, as well as nearby provinces, was from 18 July to 20 November 1865. Petitions contain letters from individuals addressed to the President of the junta; letters state their intention to be granted of a certain amount, as a form of charity and donation, from the civil government.[500] Most of the *solicitantes* or petitioners lost their houses and properties or became widows or widowers, orphans, or lesionados (injured) that resulted in them being not able to work at all. These petitions must also indicate that the parish priest of their localities must endorse it to the junta. Once petitions were initially analyzed, the junta will need to verify claims of the petitioners, either by asking the petitioners themselves to provide proof or documentation of their claims, attested by local officials of their residence and sworn statement of their neighbors, or by summoning witnesses wherein affidavits can and will be required. The junta approves, determines, and decides on the amount of the donation. A list of petitions, endorsed by priests of parishes in the province of Manila, received within the said period indicates almost 351 petitions, 23 of which were returned, reasons were not provided.[501] The petitioners came from the six parishes of the province: 37 from Manila, 120 from Tondo, 82 from Santa Cruz, 57 from Quiapo, 52 from Tondo, one from San Miguel, while two petitions do not have residence of the petitioner indicated. Additional separate petitions were still received until 1867, which show most of

[499] In the documents after 1863, until the 1870s, the junta was also referred to as *Junta de Distribucion de Donativos a los desgraciados por el terremoto de 03 de Junio 1863*. For consistency, I have used *Junta de Socorros* throughout this section of the dissertation.
[500] Rollo 7421 Legajo 10 (1863-1870).
[501] Ibid. In Moreno y Jerez's *Manual del Viajero en Filipinas*, he mentions that there were 359 petitions, EAR S1 046, Earthquake Data Records, Manila Observatory Library and Archives.

them were women petitioners.[502] Interestingly, some petitioners also had prior obligations to the Obras Pías, as stated in a separate note from the latter, listing 14 petitioners.[503]

In his study about the documentation of seismological disasters in the 19th century, Gealogo (2016) argues that these petitions reflect several images of how the colonial society handles issues of people's needs in times of disaster given the power relations and state of bureaucracy in the 19th century: (1) "voice, agency, and literacy, therefore, provides yet another bureaucratic layer in the attempts at state documentation and in the victims' expression of their personal conditions after the disaster;" (2) "The disaster made the poor more impoverished, as the casualties were those who enabled the household to subsist;" (3) "the survivors who appealed were mostly poor and illiterate natives who were already vulnerable to poverty and became even more incapable of mere survival as a result of the disaster; " and (4) "women appellants constituted the bulk of those who declared themselves in need of assistance, with widows and orphans comprising a sizeable portion of the surviving population."[504]

Looking at the summary reports made by the Junta, some of these observations can be validated and updated. In an April 1870 report published in the Gaceta de Manila, of the 188 resolved petitions, 228 were the beneficiaries; 132 are men, 92 are women, with four unidentified individuals.[505] Minors consist of more than 19% of the beneficiaries indicated in the approved petitions.

The 12 November 1863 report of the junta contained the plan how to implement the distribution of donations, upon anticipation of the arrival of collected funds from Spain. The junta indicated that contributions must only be used for the purchase of materials of construction, the reconstruction itself, and alms for the needy.[506] Two months after, in a January 1864 reports, they reiterated that the donations are for financial support of the people in need of immediate assistance, people who lost their properties, and for the poor, indigents/residents, dependents, orphans, etc., but proof must be presented to avoid confusion, repetition, and abuse.[507]The junta further stated that the local governments and the parish priests must identify and recommend those entitled to be beneficiaries, especially the poor, indigenous residents of their localities.[508] In the 16 March 1869 report of the junta, they narrated the process of distribution of donations and alms for the victims of the 1863 earthquake, from the remittance of contributions to the allocation of funds.[509]It is apparent that the most probable explanation is that the authorities in Manila used the funds for other projects, such as for public infrastructures

[502] Letter from Letter to the President of the Junta de Socorros, from Lina Soto de Esguerra, 20 November 1866; Letter to the President of the Junta de Socorros, from Nicolasa Dolores vda. De Guevarra, 01 April 1867; Letter to the President of the Junta de Socorros, from Joaquin de Piernia vda. De Guevarra, 01 April 1867, Rollo 7420 Legajos 8-10 (1863-1892).
[503] Letter from the Obras Pias, 27 October 1865, Rollo 7420 Legajos 8-10 (1863-1892).
[504] Gealogo, "Historical Seismology and the Documentation of Postdisaster Conditions", PSHEV 64(3-4), pp. 377-380.
[505] Unidentified because of the deteriorated document. Gaceta de Manila, 07 April 1870, Rollo 7421 Legajo 10 (1863-1870).
[506] Rollo 7420 Legajos 8-10 (1863-1892).
[507] Rollo 7453 Legajos 4-5 (1858-1897).
[508] Rollo 7420 Legajos 8-10 (1863-1892); Rollo 7421 Legajo 10 (1863-1870); Rollo 7453 Legajos 4-5 (1858-1897).
[509] Rollo 7453 Legajos 4-5 (1858-1897).

and urgent urban projects. Though it is clear that providing financial support to the victims was one of the aims to be accomplished using the donations from abroad, and apparently by November 1866 the fourth tranche had come to Manila, the civil government might have prioritized the general rehabilitation of the city, rather than individual support, despite the present public credit system private residents can avail of. It appears that the civil government made decisions regarding the petitions as early as 1866, and 450,984 peso-worth of donations were distributed to petitioners, most of who belong to the middle and upper middle-class strata of Manila. But a year after, on 16 November 1867, the junta decided to distribute the allotted alms for the victims and claimed that the failure to implement previous decisions is because of some difficulties in the release of the requested amount of 726,503 pesos from the Tesorería Central.[510]

And the idea of allocating or exhausting all funds received for donations appeared again in February 1870 that the Junta opened the program of alms distribution. Whatever the reasons were, this program was "revived" four years after. In a meeting of the junta on 22 February 1870, they approved the proposal to allot 7% of the remaining donations to individuals with pending petitions, with the parish priest of Binondo and the Treasury representative as point persons for the distribution.[511]

Table No. 9
Number of Beneficiaries of the Junta Central de Socorros (as of 22 September 1866)[512]

No. of Expedientes	No. of Individuals in expedientes		Classification based on Gender				Observations
	Adult	Minors	Men		Women		
			Adult	Minors	Adult	Minors	
188 (Resolved)	191	37	102	34	89	3	(1) Information in houses destroyed (2) Properties destroyed – obras, muebles, etc (3) Donations received (4) Places of residence: Tondo, Binondo, Quiapo, Sta. Cruz, Intramuros,

[510] An agreement that the Tesoreria General will forward to the junta an amount of 1000 pesos per month was settled, but it did not push through after several months of implementation. Socorros a consecuencia del terremoto de 03 de Junio de 1863, *Calamidades Publicas*, Legajo 6 Rollo 375.
[511] Gaceta de Manila, 07 April 1870, Rollo 7421 Legajo 10 (1863-1870).
[512] Ibid.

							Dulumbayan, Tanduay, Trozo, Isala de Romero
	228		132		92		Donation Worth: 450,984 pesos
	There are minors that genders were not indicated.						
96 (Pending)							Pending Donation: 163,276

One noticeable in the reports of pending petitions released in April 1870 is that it's almost a census-like profiling of victims of the earthquake. The petitions were summarized based on *clase* (indio/a, mestizo/a, Español/a, "mestizo sangley), *estado civil* (vuido/a, soltero/a, casado/a), *oficio* (work), *vecindad* (residence), and reason of their petition (injured, unable to work anymore, lost their parents, lost their sons/daughters, lost spouses, lost siblings, lost other relatives/dependents, orphaned). Unfortunately, the report is incomplete of all the information for each for every petition, but one can infer on it regarding the background of the earthquake victims asking for help. Among the resolved and pending appeals, 59 are *indigenas*, 10 are mestizos/as, 6 Spanish, and 2 *mestizos/as sangleyes*; 36 are widows/widowers, 25 unmarried, 27 are married; 6 women are c*igarreras*, 3 *pescador/as*, 2 *escribentes*, and one *costurera*, *marinero*, *carpintero*, and *cocinero* each. Concerning geographic distribution, most of the people on the 1866/1870 lists are from Tondo, Binondo, Manila, Quiapo, and Sta. Cruz. Many of those, 75 people as counted, included in the records indicated that they lost family members; 23 lost a parent, while eight were orphaned entirely. Ten minors were also listed in the petition, with the youngest aging four years old, who lost her mother in the earthquake.

In the next 14 years after, not seen was the execution of the April 1870 decision of the junta to revive the distribution of cash donations to the victims of the earthquake of June 1863. This is a result of a series of auditing orders from Madrid received by the civil government in Manila from 1879 to 1883. The first one arrived on 25 June 1879; herein a royal order instructed the Governor-General Domingo Moriones to submit to Madrid a report on the funds used and those remaining in the hands of the civil government, from the national subscription program for the victims of the June 1863 earthquake.[513]This auditing order was sent upon the reports that reached the Ministerio de Ultramar that some funds were not distributed. The auditing order also stated that upon submission of necessary reports and identifying the amount of remaining funds, it must be initially

[513] Royal Order, 25 June 1879, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 22-24.

allocated for the identified victims, in the form of cash.[514] This order was seemingly placed in the file box and left with no explicit action by the succeeding civil government chiefs in the next three years. On 15 November 1882, the Ministerio de Ultramar sent a telegram addressed to the Tesoreria Central, asking them to comply with the June 1879 Royal Order.[515] It took the civil government, through the Intendencia de Hacienda, to track the accounting reports of the government, to determine the request of the Ministerio de Ultramar. Indeed, they admitted that there was no compliance made in accordance to the June 1879 Royal Order, and there were funds not used concerning the national subscription's aim to distribute cash donation to the victims of the June 1863 earthquake.[516] It was discovered that there were unused and not relegated funds amounting to 409,328 pesos and 60 and 6/8 cents. The report submitted to the Ministerio de Ultramar on 18 December 1882[517] contains vital information about the release of funds: only 35,779 pesos and 15 and 6/8 cents were used, that is a little more than 8% of the amount remaining for the donations as of 1868.

On the 02 March 1883 meeting of the junta, the plan to distribute the 7% of the "remaining" funds – which is to say the amount "discovered" after the November 1882 second auditing order, was unanimously approved.[518] The decision also indicates the percentage allocation of the remaining donations: 30% to be donated to the *Monte de Piedad*, 30% to the *Asilo para los Huérfanos and Escuela de Artes y Oficios*, 30% to the juntas parroquiales for them to lead the construction of houses and household properties for the "proletaria", and the 10% for the construction of churches in poor parishes.[519] This decision was given formality on 17 November 1884 by then Governor General Joaquín Jovellar.[520] This caused a wave of petitions and appeals from residents who did not benefit from the previous release of funds. The junta, citing the Aril 1870 order as the basis of their requests, received letters from dozens of residents. A month after, the junta received individuals and consolidated appeals from previous petitioners. Individuals such as the Spanish insulares from Tondo, José Vicente de Velasco and José G. Lopez, submitted their petitions on letters dated 16 April 1863 and 20

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[514] Ibid.

[515] 15 November letter from the Ministerio de Ultramar cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 24-25.

[516] Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 25-26

[517] Letter of the Intendencia General to the Governor General, 18 December 1882, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 26-27.

[518] Ibid., pp. 27-29.

[519] Report of the meeting of Junta Central de Socorros, 02 March 1883, Ibid., pp. 27-31. The case of the funds transferred and kept in and by the Monte de Piedad because a government fiscal issue come the first decade of the 20th century, when the American civil government ordered and filed cases against the Monte de Piedad, then a private charity institution, for the latter to return the said amount it received from the Spanish civil government between 1883 and 1892; orders and cases were filed by the American Insular Government to the Monte de Piedad, see "The Earthquake Fund of 1863", Report of the Secretary of Finance and Justice, six months ending December 31, 1913, *Report of the Philippine Commission to the Secretary of War, July 1, 1913 to December 31, 1914* (Washington: Government Printing Office, 1915), pp. 223-224; see Ibid., pp. 29-35; Letter of the Governor General to the Intendencia de Hacienda, 08 June 1893, *Calamidades Publicas*, Legajo 6 Rollo 375.

[520] The decree from the Governor of Luzon, 17 November 1884, *Calamidades Publicas*, Legajo 6 Rollo 375.

September 1884, respectively.[521] Collective petitions came from residents, most of whom were indigenas, poor, and women residents. Appeals submitted dated 14 November (48 signatories) and 28 December 1884 (8 signatories), and 10 (25 signatories) and 15 September 1885 (37 signatories), indicate the core set of appellants, and many of them appeared in the September 1866 list of pending petitions. Looking closely in these appeals reveal the persistence of women appellants in claiming financial support from the government.

b.5 Comprehensive rehabilitation and reconstruction plans

The field of post-disaster governance is one of the toughest in the disaster risk reduction and management cycle. The idea of recovery and bringing back into the normal state of affairs the communities affected by hazards tests the capability of agencies and the people to get their feet and stand up from the ground. Disaster risk reduction plan should also be an integrative one; the master plan to be made should have a strong local knowledge foundation to be able to relate to the local context and experiences of people. Moreover, disaster risk reduction interventions are to be designed as a development strategy; concerned authorities must make viable comprehensive programs on risk mitigation. Local knowledge is accommodated, in non-conscious matter many times, by the relevant state agencies involved in disaster risk reduction; hybrid forms of knowledge can be produced, where people can benefit from advanced sciences. These ideas appeared, in a stream of thoughts, in how the civil government perceived and used modern construction knowledge in reconstructing houses in the city – an attempt to combine new engineering ideas and local experiences of the people

The June 1863 earthquakes posed a great challenge, as well as an opportunity, to the state actors and local authorities and peoples to “modernize” Manila’s civil structures and urban landscape. Although it is arguable that structural modernity in this period of the 19th century hasn't been achieved, a wave of thinking starting from the Bourbon reforms in the last decades of the previous century took its principal place in the bureaucracy's priority programs. Public opinions, communication exchanges between pertinent stakeholders, and actions taken by government authorities reflect the building of comprehensive actions and propositions to address the needed urban rehabilitation of Manila and its suburbs. The urban reconstruction problem after the June 1863 earthquake intensified what Huertz de Lemps (1998) argues as a period when Manila was implementing urban zoning measures that focused on the concentration and reconcentration of houses based on type, whether stone houses or houses made out of nipa.[522]

In a 09 July commentary from the Diario de Manila points out important issues and recommendation on how to rehabilitate the city. The opinion of the broadsheets reflects the eagerness of one sector of Manila's population to have the city restored most suitably and immediate time as possible. The opinion provided a historical survey of Manila's transformation from the 16th to the 19th centuries due to disasters caused by nature and of its inhabitants; from the use of stones instead of wood, due to the problem

[521] Letter from Jose Vicente de Velasco to the Governor General, 16 April 1883 and Letter from Jose G. Lopez to the GG, 20 September 1884, *Calamidades Publicas*, Legajo 6 Rollo 375.
[522] Huertz de Lemps, “Materiales Ligeros vs. Materiales Fuertes: The Conflict between Nipa Huts and Stone Buildings in the 19th-century Manila”, pp. 162-165.

of frequent fire incidents in the city in the 16th century, to the historic 1645 earthquake that destroyed Manila which saw the unfamiliarity of Manila authorities of the Latin American system that uses the combination of wood and stones.[523] The newspaper came into the conclusion that the people of Manila forgot the lessons of disasters – specifically the tremors, for the city government had prioritized beauty over strength and safety, for example, the use of glasses in both public and private edifices.[524] Given these considerations, the newspaper calls on the authorities to revisit the skeleton of the city, by gathering the architects and military and civil engineers to work on the rehabilitation of Manila.[525] Moreover, the newspaper argues that the problem not only lies in assessing the cost of destruction but on establishing the will to rebuild the city.[526] Given that, it suggested to the authorities the following propositions in rehabilitating Manila: (1) expand Manila's landscape to prevent decongested areas and high houses, thus leading to the creation of larger spaces in the suburbs in case of emergencies or calamities and for permanent settlement, for the smooth and faster movement of people, and for the city to "breathe", and (2) us a call against traditional building system, and therefore the use of modern science in public infrastructure projects.[527]

During the initial week since the earthquake struck Manila, Governor General Echagüe created the Junta de Autoridades Superiores to gather the expert opinion and service of professional engineers and architects to respond to the immediate needs of the city. After the clearing operations and initial assessments were made, On 27 July 1863, the authorities agreed to establish a separate board, the *Junta Facultativa*, headed by the Inspector de Ingenieros, to serve as the main governing body in the assessment, rehabilitation, and reconstruction of Manila's urban structures and landscape.[528] The first sets of decisions and orders implemented by the new commission dealt on closure of public infrastructures: (1) on 01 August 1863 ordered the temporary closure of several churches and convents, such as the Recoletos, San Francisco, Santa Clara, and San Sebastian, (2) on 06 August 1863, it ordered the permanent closure of the churches of San Juan de Letran and San Juan de Dios in Intramuros, the church of San Gabriel in Binondo and the church in Quiapo, but offering alternative religious accommodation in Malate and San Miguel for parishioners displaced by the commission's order; and (3) on 11 July, the commission handed down the order closing permanently the churches of San Fernando de Dilao, Binondo, Paco, and appointing the Ermita and Malate churches, and the cemetery chapel in Dilao as substitute churches to parishioners.[529] From 01 to 10 October 1863, the governor general ordered the omission of some religious and city activities in the city, like some feats and procession, as well as the Dia del Rey and the celebration of the Queen's birthday, due to the danger posed by the damaged infrastructures.[530]

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[523] Diario de Manila, 09 June 1863, Año 14, No, 130, Ultramar 5196 Expediente 9.
[524] Ibid.
[525] Ibid.
[526] Ibid.
[527] Ibid.
[528] Gaceta de Manila, Año 3, No. 148, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 8.
[529] Gaceta de Manila, Año 3, No. 149, p. 1, and Gaceta de Manila, Año 3, No. 154, p. 1, cited in cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 8-9.
[530] Gaceta de Manila, Año 3, No. 209, p. 1 and No. 218, p. 7, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 12.

The measures driven by the Junta are essential because these were the first public and official recognition of the effects and intensity of the tremor, precisely as senior officials and military commanders of the government had witnessed.[531] Extraordinary powers were given to Governor General Echagüe for him to be exercised in exceptional cases, such as the maintenance of law and order, in response to natural hazards/disasters.[532] He issued proclamations, which functioned as the primary mechanisms of response to rebuilding the Spanish capital after the destruction of the earthquake. Governor General Echagüe invited a group of military engineers to be commissioned in Manila to study the possibility of adopting a system of construction that would harmonize the local conditions, as well as where government buildings should be located.[533] Committees made by the civil government seemed to be short-lived or for ad hoc purposes only. After the July 1863 commission, another one was created on 12 September 1864, with specific tasks on proposing another plan for the reconstruction of Intramuros and its suburbs, as well as managing the sale and distribution of viable and idle lands around the region.[534] This reflects that the civil government heeded to the proposal to expand Manila's landscape through settlement and resettlement of various lands outside the pre-1863 occupied areas. The members included military and civil engineers, such as Fernando Fernandez (Comandante de Ingenieros de la Plaza) E.M.D. Luis Roig de Lluys (Comisario de Guerra), Jorge de Vivero, Juan Manuel de la Matta, Nicasio Suarez Llanos, Pablo Ortiga y Rey, Pio Fernandez de Castro, Joaquin Loyzaga, and Juan Alegre.[535]

Practically, colonial authorities were left with two options in reconstructing Manila: (a) commission the service of urban planners and architects abroad or (b) adopt a system made by colonial military engineers.[536] During the last five months of 1863, since the Madrid government had bureaucratically acted on the needs of Manila, it has received and welcomed proposals from different experts to comprehensively build a suitable plan to rebuild the Philippine capital. On 20 August 1863, architect Fernando de Aguirre sent a letter, where he described as a manifestation of "espiritu patriotico", containing an assessment and proposal on how to reform on the architectural structure and integrity of the edifices for tobacco storage in Navotas to Cavite, which included the El Campo de Arroceros, La Princesa in Malabon-Navotas, Almacenes de San Fernando, and Fabrica de Binondo.[537] He identified these edifices as prone to accidents and possible incident of fire. In his proposal, he suggested the following: (1) relocation of buildings, (2) introduction and application of iron and other metals that are cheap and sustainable, as alternatives to caña and nipa, for temperature and ventilation to be managed efficiently.[538]

On 14 October 1863, the Overseas Ministry in Madrid received a letter and proposition from Prince Edgar de Rheina Wolleck, Comte du Lannoy-Clervaux (now Liege,

[531] Anduaga, "Earthquake Building Overseas", p. 4.
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[533] Ibid., pp. 4-5.
[534] Gaceta de Manila, Año 4, No. 201, 17 Septiembre 1864, *Testigo del expediente sobre el sistema de construccion de edificios en Filipinas, propuesto por Gregorio Verdú*, Ultramar 522, Expediente 10, Archivo Histórico Nacional (AHN).
[535] Ibid.
[536] Anduaga, "Earthquake Building Overseas", p. 5.
[537] Letter from Fernando de Aguirre, 20 August 1863, ULTRAMAR 5196 Expediente 15.
[538] Ibid.

Belgium).[539] The letter contains a summary of a study about earthquake-resistant houses in some of the Belgian kingdom's territories. It starts with the causes of earthquakes or volcanic eruptions, wherein it attributes movements of the surface as a result of corresponding movements of liquid or gases produced at the interior of the earth.[540] It then proceeds with its recommendations, which included the following: (1) a strong base floor of house be built; use of materials that has strong resistant to strong floor movements, (2) walls be made out of combination of *armaduras de madera* and *curejocado de hierro*, as recommended from an architect of the French Empire, (3) suggests the use of *vigas de madera de teak* (teak wood beams) as platform of houses, (4) recommended technical consideration on the weight of the fachada for it to resist movements, and weight for every floor, so that structures can sustain movements, sudden movements, and aftershocks that last from seconds to minutes.[541] On 22 October 1863, the civil government expressed its interest in the aseismic building plans proposed by the English merchant house Samuel C. Hemming & Co. The proposal contains the use of iron for civil, religious, and military edifices.[542]

The government tried to balance the options by experimenting with different mechanisms in public construction. Lieutenant Coronel Gregorio Verdú, an engineer who arrived in the Philippines in 1855 to head the naval command, a post he held until 1864, implemented a notable contemporary construction system.[543] In a letter and report he sent to the Overseas Ministry on 21 November 1863, he presented his ideas and proposal in reforming the building construction in the Philippines.[544] He observed that most of the houses in the city were plain houses made out of nipa, cana, and madera, and in main buildings, people used *madera* and *entrapanos de mamposteria, ladrillo madera y teja*.[545] Verdú focused on applying one of his specialixzations – earthquake-resistant construction. In his assessment of Manila's situation after the 1863 event, as published in the report *Nuevo sistema de construcción de edficios para preservarlos de los terremotos*, was that the government failed to provide sufficient stability to public buildings.[546] He advocated lightweight-type construction, through the use of materials such as iron, for it is "perfectly resistant and light, long-lasting and easy to erect", compared to timber, which is more expensive.[547]

This series of committees created plans, which were proposed and executed eventually, were evident on the official report made by military engineer Rafael Cerero y Sáenz, *Informe sobre el sistema general de construcciones de los edificios publicos y particulares de las Islas Filipinas* (1889)[548]. But it can be inferred that the reconstruction plans in Manila after the June 1863 earthquake tended to be based on varying theories

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[539] Nuevo sistema de construcciones para preservar a los edificios de los efectos de los terremotos, Ultramar 522, Expediente 11.
[540] Ibid.
[541] Ibid.
[542] Gaceta de Manila, Año 3, No. 232, p. 1, 24 October 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 14.
[543] Anduaga, "Earthquake Building Overseas", p. 5.
[544] "Letter of Gregorio Verdú, 21 November 1863", ULTRAMAR 522, Expediente 3.
[545] Ibid.
[546] Anduaga, "Earthquake Building Overseas", p. 6
[547] Ibid.
[548] A summary of this work was translated into English, titled "Construction in Earthquake Countries" in *Transactions of the Seismological Society of Japan* 14 (Tokyo: Government Printing Office, 1889): 100-109

and experiments, but it lacked a comprehensive and standardized response regarding reviving the city based on a single and progressing long-term program. I argue that the next years seemed to be a period of estimations and experimentations concerning the capital's civil engineering projects. Not until 1866, when one government agency was created, which was focused on public works and urban development was established, the city grappled with the unconsolidated urban reconstruction program. From 1864-1869, records suggest that there was a series of government reviews of stability and safety of public buildings in the city after the initial rehabilitation was done. In October 1864, some structures were identified to be in need to repair, which include the Yntendencia y Secretaria General, Contaduria y Tesoreria General, Inspector y Estancadas de la Administracion Provincial de la Tercera de Manila, Administracion y Almacen de efectos Estancadas de Cavite, Oficinas de la Aduana de esta Capital, Almacenes de Tabaco en Rama, Fabrica de Tabacos, La Fabrica de Tabacos de Tanduay, La Fabrica de Tabacos de Fortin, La Fabrica de Cigarillas de Arroceros, La Fabrica de Princesa de Malabon, La Fabrica de Tabacos de Cavite, La Camarin Carinero, El Cuartelillo llamado del Fortin, El Cuartel situado en el citada sitio de la Riveria, and the Casa de Moneda.[549] On September 1869, several military facilities and government offices in the provinces outside Manila, such as Bulacan, Cebú, Laguna, Nueva Ecija, Cavite, Antique, Pampanga, Iloilo, Batangas, Bataan, Ilocos, Pangasinan, Zambales, and Ambos Camarines[550] underwent review and were to determine their structural integrity, and if there were unnoticed effects of the previous earthquake that were not identified in earlier assessments, but manifested as years passed.

On 10 March 1866, a royal decree was issued creating the Inspección General de Obras Públicas (IGOP), aimed at institutionalizing public works as a state priority project. This decision to establish a new agency that will facilitate the modernization of public utilities and structures was influenced by a much more comprehensive report detailing the effects of the 1863 earthquake to Manila and its suburbs.[551] More than a year after its establishment, on August 1867, the IGOP was again tasked to make a report that composed a comprehensive analysis, with corresponding vital information about the whole status of the city - number of buildings destroyed and their current state, purpose and importance of reconstructing the edifices, and executable measures used in restoring and repairing buildings.[552] In general, the report contained what has been known, what has been done, what has been repaired. The memoria or report, previously drafted and approved by the Junta Consultativa, served as the basis of public manners and methods of the construction work, on which the IGOP banked on an initial study for their report.[553]

In the decade of 1860s, two main structures were given priority as these did not only focus of Manila's magnificent architectural legacy, but because of the dangers and problems of the slow rehabilitation of it posed to people, the economy, and the population in general. These were the Puente del Rio de Pasig (Pasig River Bridge) and

[549] Rollo 7453 Legajo 4-5_1858-1897.
[550] Ibid.
[551] For an extensive institutional history of the Inspección General de Obras Publicas (IGOP), see Ros Costelo, *Construyendo la Colonia: La Inspección General de Obras Públicas de Filipinas, 1866-1898*. Trabajo Fin de Master. Master Interuniversitario en Historia Contemporánea, Universidad Complutense de Madrid.
[552] Rollo 7421 Legajo 10 (1863-1870).
[553] Ibid.

the Manila Cathedral. On the one hand, the Puente had scheduled construction a year before the 1863 earthquake struck the capital. The government had allotted 25,000 pesos for it; but after the disaster of June of 1863, it extended as a grand bridge connecting Binondo to the other side of Manila.[554] An improved plan for a Fuente de Barcos in Pasig was communicated during the first three months of the following year, worth 28,396.33 pesos.[555]

On the other hand, the Manila Cathedral waited for several years for it to receive serious attention from the civil government. Certain parts of the cathedral were identified, and were subjected to demolition based on a 08 October 1870 report; the government has allotted more than 10,000 pesos budget for it.[556] The head of IGOP, Vicente Serrano y Salaverri served as the head architect of the metropolitan church's restoration.[557] In the plans proposed for the restoration and rehabilitation of the cathedral, the main suggestion, to make the edifice more earthquake-resistant, was to make use of different species of wood, as primary materials for the church's skeleton. These include dungun, betis, cauayuan, yacal, malarujat, batititiuan, dasac, ypil, banaba, supa, molave, arunguis, yacal de Augat, and desconocida.[558] The project went on, not through at direct government expense, but through donations collected from Manila, its suburbs, and provinces in Luzon, like Bulacan, Laguna, Zambales, Cavite, Morong, Pampanga, and Bataan.[559] In a 10 March 1874 report, one can observe the composition of donors for the restoration of the cathedral, which included wealthy individuals, parishes and parish priests, and unnamed devotees. The donation drive collected 49,013 pesos, where more than 48,000 pesos of which were used for the rehabilitation of the edifice.[560] In an *ante-proyecto memoria* or alternative proposal on 27 November 1877, the civil government identified an amount of 36,528.23 pesos for the tower of the cathedral only.[561]

These two infrastructures projects were not the only ones given attention. The civil government identified other facilities as a priority, and the necessary budget was allotted, expedited by the approval of the Queen herself. From 1864 to 1865, some navigational and military facilities within the Manila region, like the Escuela Nautica, the Farole Murallon del Norte, and army installations of the Ministerio de Guerra in the Manila Bay and Cavite.[562] Provisional and semi-permanent structures made out of nipa and other available hardwood were built as a replacement to actual government edifices, as the latter will take more time to be created.

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[554] *Gasto para la construcción de un Puente en el Rio Pasig*, ULTRAMAR 5188, Expediente 70.
[555] Rollo 7453 Legajo 4-5_1858-1897.
[556] *Sobre demolición y reconstruccion de la Catedral de Metropolitana de la ciudad de Manila*, ULTRAMAR 540, Expediente 1, Archivo Histórico Nacional (AHN).
[557] Ibid.
[558] *Restauración y Reedificación de Catedral de Manila*, ULTRAMAR 540, Expediente 2, Archivo Histórico Nacional (AHN).
[559] Document No. 22, Ibid.
[560] Ibid.
[561] *Restauracion y Reedificacion de Catedral de Manila*, ULTRAMAR 540, Expediente 3, Archivo Histórico Nacional (AHN).
[562] Approval of the budget of Escuela Náutica, 17 April 1964; Acuerdo del espediente relative a la separación de la farolas de murallon, 11 January 1864; Espediente acerca de la devolución de una instancia a sus interesa dos presentada al GG sobre el terremoto del 63, 28 August 1865, in Calamidades Publicas Codigo 9.6.1 Legajo 6 Camara 9 Rollo 375; Real Decreto 244 of 20 February 1864; Rollo 7420 Legajos 8-10_1863-1892; Rollo 7453 Legajo 4-5_1858-1897.

b.6 Other responses and initiatives of the local population

The local population – composed of both residents and state officials, responded to the call to help the affected communities of the earthquake. These responses, although influenced to related to the state-level actions, provide an image or reflect how the local communities view disasters, appreciate help from the outside, or help people affected by such catastrophes. The offering of prayers from different ecclesiastical districts and organization outside Manila, sharing and sending of resources to the capital, and improvised acts of individuals and civil organization are some of these non-state responses concerning the June 1863 earthquake. Improvisations are mechanisms being made to fill in gaps in policy implementation. These are being done to bridge ideas and practices that are not identified in the decision-making level at the top of the bureaucracy, due to the specific applicability to certain events. And in case of hazards and disasters, improvisation is not peculiar but a spontaneous and on-going practice. Improvisation, as practiced in disaster management cycle, is considered an adaptive strategy; creative and innovative responses that most of the time manifested through extemporaneous actions. Improvisations are practices seen amongst local leaders and officials, as they are the ones who are tasked to manage communities ravaged by environmental hazards. There are cultural responses to ease the risks or effects of natural hazards. Responses such as material culture, construction of houses, and technological innovations are some of the means people cope with the threats of the natural environment.

Also implemented were post-disaster rehabilitation and subsequent disaster mitigation mechanisms. Towns and provinces in remote areas also mobilized for Manila and other affected towns. The religious institutions in the provinces used the power of preaching to engage the community to donate for Manila, in the form of goods and money. The first two months saw how bishops and provincial chiefs offered support to Manila, though available resources from their vicinities.

On 26 June 1863, the bishop of Nueva Caceres issued a circular asking the Bicolanos from all the parishes of the diocese to offer prayers for their “hermanos tagalos”, for the eternal rest of those who died.[563] This was followed by several financial subscription efforts and goods collections in the provinces of Nueva Caceres and Albay, where the national civil government to facilitate the programs tasked the bishop until the following year.[564] The Manila Archbishop also made a religious approach. He asked parishes and parishioners to sing *Te Deum* to pray the Divine Mercy to protect the people not only from the affected provinces, but also for the whole archipelago, and every prelate to lead the legion in praying for the souls of the victims, as well as their families.[565] Likewise, on 14 December 1863, the Bishop of the Diocese of Cebu issued a pastoral letter directed to the parish priests of the towns under the said diocese to participate in the

[563] Miguel Selga, El terremoto de Manila del 3 de junio de 1863 en el Arzobispado de Manila, revista de la Sociedad Astronómica de España y America, tomo XV, p. 76, cited in Selga, *Índice y breve resulmen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 7.
[564] Reports Nos. 1 and 2, Temporal en Albay sobre a esta provincial con el producto de la suscrición a el terremoto de Manila, ULTRAMAR 5197, Expediente 13.
[565] Selga, El terremoto de Manila del 3 de junio de 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 8.

government's efforts to gather funds and donations through a public subscription for the victims of the earthquake in Manila.[566]

The provinces in the northern region like Ilocos Sur, Cagayan, and Isabela voluntarily responded to the needs of Manila by sending materials, workforce, and sellable goods. On 06 August 1863, the Alcalde of Ilocos Sur asked the local people and the ship owners, to use their excess house materials and ships to help Manila, by providing reconstruction materials.[567] The authorities of several towns in Isabela and Cagayan, as well as a group of principalias of the latter, in their communication with Manila on 09 and 11 July 1863, offered to Governor General Echagüe, 2,0433.01 pesos worth of work and tobacco and 2,371.77 pesos worth of excess tobacco sales, respectively.[568] The governor general both declined their offers, as the city cannot look for buyers of the said tobacco supplies. Is this camaraderie and volunteerism between provinces a unique result of the 1863 earthquake? Probably not. Earlier recorded calamities in other towns show the solidarity amongst the people, such as the 07 January 1863 fire in the towns of Lemery and Taal in the province of Batangas, as subscription were open to collect donations for the affected population.[569]

Two months after Manila received the official communication from Madrid, indicating the monarchy's and the overseas ministry's support and plans for the rehabilitation of the city, the authorities and the people of Manila organized several activities honoring the Queen for her kindheartedness and care for her people. Looking back, these included a variety of relief procedures and feudal-type donation programs to give immediate remedy to affected communities. The Spanish colonial government distributed relief necessities to destructed areas. *Dichas* or alms include food such as rice, or house materials such as wood or cement. As stated in the previous parts, on 30 September 1863, the Governor General Echagüe received a letter from the Spanish Consul in Egypt, dated 17 August 1863, indicating that Queen Isabela II and the Dukes of Montepiensier donated 25,000 *duros* and 20,000 pesos respectively, to the government to address urgent needs of the victims of the earthquakes.[570] The Queen also ordered the release of a national subsidiary fund amounting to two million pesos, to be used for lending, as monetary support for victims, and for lowering the customs duties imposed on imported materials for reconstructing houses in the affected areas.[571] As an expression of the city's gratitude to the Spanish monarch, the local government of Manila organized several public activities in to honor the Queen and to express their appreciation for her. On 07 October 1863, the Ayuntamiento de Manila organized a

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[566] "Sobre una suscricion para socorer las necesidades de Manila, á causa de los daños del terremoto", Benito Romero Madridejos, *Pastrorales y Demas disposiciones circuladas a los párrocos de esta diócesis de Cebú pot los Señores Obispos ó sus Vicarios Generales* Tomo I (Manila: Est. Tip. Del Colegio de Santo Tomas, 1885), p. 266.

[567] Gaceta de Manila, Año 3, No. 133, p. 1, 06 July 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 7.

[568] Gaceta de Manila, Año 3, No. 132, 09 July 1863, p. 1, and No. 134, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, pp. 7-8.

[569] The said towns received donations amounting to 4000 pesetas, and the work of the polistas was immediately suspended to co-opt with the human capital needs of the province. *Socorro a los que perdieron en el incencio de los pueblos de Taal y Lemery, Enero 1863*, ULTRAMAR 5193, Expediente 40, Archivo Histórico Nacional (AHN).

[570] *"Apuntes historicos sobre temblores de Filipinas, Archeion, vol XXII, 1940, No. 1"*, pp. 71-85, cited in Selga, El Temblor, p. 6.

[571] Ibid.

public testimony expressing gratitude to the Queen for her support to Manila.[572] The series of public honorific activities started, such as the *Días de la Reina*; they conducted an exposition, a *regatta estraordinaria*, and a *sorteo* or raffle of 22 lots, to be purchased only for 25 pesos each, for those qualified persons that were profoundly affected by the earthquakes.[573] During the celebration of the Días de la Reina on 19 November 86, as declared by the city government of Manila as a public celebration, a special sermón titled *Sermón que en la funci sermon religiosa celebrada por los RR. Párrocos y Españoles de la villa de Bacolor, cabecera de la Pampanga, con el doble y plausible motivo de celebrarse los días de la S. M. la Reina (Q.D.G) y munificencia de SS. MM. en favor de los desgraciados por el terremoto de 3 de junio*, was published, previously delivered by José Torres, a former parish priest of Arayat, Pampanga.[574]

The city government of Manila and a private organization of merchants and businessmen did two major raffle activities. On the one hand, on 22 October 1863, the city council resolved to conduct a raffle of lots and regatta at the Pasig River, in recognition of the Queen's support to the city.[575] The winners of the said raffle were announced through a publication at the Gaceta de Manila on 11 November 1863.[576] On the other hand, the Sociedad del Amigos del País, on 27 October 1863, offered to distribute as prize lots worth 50 pesos, in line with the celebration of the *Dias de la Reina*, as a donation to artists, laborers, and artisans, and for widows, orphans, etc.[577] The list of chosen beneficiaries was also published in the Gaceta de Manila on 28 November 1863.[578]

b.7 The 1863 earthquake and the Secularization movement

The destruction caused by the June 1863 earthquake was so extensive that any people, including the authorities, looked for answers beyond the rationale of human realm. Not only the 1863 earthquakes showed the vulnerability of Luzon towns to earthquakes and the images of overwhelmed colonial state government, but it also surfaced the complexities of the socio-political dynamics of the period. Not only it did unravel the one aspect of the colonial society's social grammar, it also touched one sensitive aspect of colonial politics. The implications of the 1863 *earthquake* transcended up to the political rivalry between the secular and regular priests. It became one crucial turning point in the history of a social movement – the "secularization movement".

The political implications of the 1863 *earthquake* transcended up to the rivalry between the secular and regular priests. Decades before 1863, a movement of secular priests, was gaining ground and was reaching its height; secular or locally-ordained priests –

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572 Selga, El Temblor, p. 6.
573 Ibid.
574 Selga, *Índice y breve resulmen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 15.
575 Gaceta de Manila, Año 3, No. 232, p. 1, 22 October 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 14.
576 Gaceta de Manila, Año 3, No. 245, p. 1, 11 November 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 14.
577 Gaceta de Manila, Año 3, No. 230, p. 1, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 14.
578 Gaceta de Manila, Año 3, No. 252, p. 1, 28 November 1863, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 15.

Philippine-born and locals, rally for their rights to administer parishes by advocating the gradual removal of regular priests (members of religious orders) at the helm of local church administration. The seculars clashed with *frailes* (Augustinians, Dominicans, Franciscans, and Recollects), and in some cases Jesuit priests, over control and administration of parishes in towns and cities. The movement was considered a primary campaign against the traditional colonial power; insular and secular (mestizo and indio) priests uniting to fight for their rights as members of the Church's clergy. One of the leaders of seculars was Father Pedro Peláez, a diocesan administrator of the Archbishop of Manila, and a professor of philosophy at the Colegio de San Juan de Letran and at the Universidad de Santo Tomas.[579] Together with another priest from Cavite, Padre Mariano Gomez, he staunchly advocated for the transfer of control of local parishes from the regulars to the seculars. He was a mentor to some young and intellectual priests at that time, including Padre Jose Burgos. With his stature as a priest-activist and campaigner of secular priests' rights, he attracted a lot of critics and political opponents from the ranks of the frailes. But his enemies got an unlikely ally to eliminate him from the arena of regular-secular rivalry – the nature. Why? During the June 1863 earthquake, Father Peláez, together with some members of the Cabildo Eccelesiatico de Manila, was inside the cathedral as they were attending the solemn vespers of the feast of Corpus Christi.[580] He died when debris fell into them. Together with him are other priests and church workers, who are members of the cabildo, which include Feliciano Antonio, Clemente Lizola, Casimiro Revilla, Felix Valenzuela, Ignacio Ponce de Leon, and Juan Irene Rojas.[581] Fourteen (14) members of the Cabildo survived the incident inside the cathedral, including Peláez's protégée, the young and intelligent mestizo priest from Vigan, Jose Burgos.[582] Other people who survived were Ramón Fernández, Manuel Gastón, Cipriano García, Ramón Martínez Laviaron, Segundo José, Sabino Padilla, Lucas Gutiérrez Calderón, Luis Remedios, Pedro Medel, Miguel Laza, and three more church workers.[583] Substitute prieste were named in a decree dated 28 August 1863, whose names are as follow: Francisco Zudaire, Mateo Martinez Arana, Gabriel B. Moreno del Cinto, Ramon Martinez Labiaron, Luis Gutierrez Calderon, Felipe Morales de Setien, and Manuel Maria Gaston.[584]

The friars attributed the death of Peláez to God's wrath over the seculars who were "demanding" so many reforms. Providential was what a writer of an article that appeared in the newspaper *La Verdad* shortly after the incident; the writer said that the earthquake

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[579] Roberto Blanco, "Pedro Peláez: Leader of the Filipino Clergy", *Philippine Studies* 58(1-2): Festschrift in honor of Fr. John Schumacher, S.J, 2010, pp. 4-11.
[580] Blanco, Pedro Peláez, p. 31.
[581] *Relación del terremoto en Manila el 03 de Junio de 1863, especialmente en la catedral, leidsa ante el Sr. Arzobispo y clero por el Sr. Dean D. Manuel Peralta*, EAR S1 072; Earthquake Data Records, Manila Observatory Library and Archives, p. 1; Gaceta de Manila, Año 3, No. 235, pp.1-2, cited in Selga, *Índice y breve resumen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 11.
[582] Letter from Dean D. Manuel Peralta, Cabildo Ecclesiastico of Manila, regarding their experience inside the Manila Cathedral, 01 October 1863, Legajo 10 (1863-1870), Rollo 7421, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).
[583] *Relación del terremoto en Manila el 03 de Junio de 1863, especialmente en la cathedral, ledisa ante el Sr. Arzobispo y clero por el Sr. Dean D. Manuel Peralta*, p. 7.
[584] Gaceta de Manila, Año 3, No. 235, pp.1-2, cited in Selga, *Índice y breve resulmen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 11.

frustrated the "armed rebellion" under Peláez leadership.[585] Those who didn't dare to criticize Peláez took advantage of his death by censuring him publicly and publicizing of types of unjustified accusations.[586] Nueva Caceres Bishop Francisco Gaínza pondered: *"Only under the pressure of that nebulous and suffocating atmosphere brought about by the dust of the ruins of the earthquake can one fabricate and speak the way they did,"*[587] In an editorial in the Diario de Manila on 09 June 1863, Peláez was described as one of the illustrious members of the Cabildo, the man behind the editorial core of a Catholic Filipino newspaper in Manila, and a true public servant.[588] In the newspapers necrological message for him, they stated:

> And finally, even in his death, he showed that enlightened piety and Christian sacrifice that distinguish the true Catholic; because it is assured that his corpse is on his knees, as if he understood the impossibility of saving himself, offered himself to the will of the All-Mighty, prostrated himself under the ruins and sacrificed himself in disaster.[589]

Though the secularization movement weakened after Peláez's death, it did fade away as Burgos stepped up and took over the leadership in the call for reforms inside the Church. The movement continued for almost a decade until the last major blow to the seculars happened in January 1872, as the civil authorities implicated them in the mutiny that occurred at the Spanish naval base in Cavite (known as the *El Motín de Cavite*). Moreover, Aguilar (2016) argues that the 1863 earthquake and its impact on the Secularization movement transcended two decades later, in the infamous speech by José Rizal in a brindis in 1884[590] to honor fellow ilustrados who were victorious at the Exposición de Bellas Artes in Madrid. Despite this, his event, like many other disasters in the Philippines, did not resound too loudly in many of the political writing of the Propaganda Movement. Aguilar adds that the student activists in Spain "did not regard calamities as constituting an arena that called for their intervention."

c. The July 1880 Earthquake

c.1 The July 1880 earthquake and the destruction it caused

Almost two decades later, another devastating earthquake hampered Manila. Luzon Island frequently had experienced tremors in different provinces since 1863. On 18 and 20 July 1880, a major seismic movement was felt in Manila and its nearby provinces.

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[585] John Schumacher, *Revolutionary Clergy: The Filipino Clergy and the Nationalist Movement, 1850-1903* (Quezon City: Ateneo de Manila University Press, 1998), p. 11.
[586] Ibid.
[587] Francisco Gainza, *Amovilidad de los curas regulares de las Islas Filipinas*, 902/2, APAF, cited by Blanco, Pedro Peláez, p. 31.
[588] Diario de Manila, 09 June 1863, Año 14, No. 130, ULTRAMAR 5196 Expediente 9.
[589] Diario de Manila, 10 June 1863, Año 14, No. 131, Ibid.
[590] Filomeno Aguilar, "Romancing Tropicality: Ilustrado Portraits of the Climate in the Late Nineteenth Century", Philippine Studies: Historical and Ethnographic Viewpoints 64(3-4), p. 430.

Saderra Masó described these as “violent, vertiginous, and destructive”.[591] The tremors of the earthquake reached hundreds of kilometers from Manila up to the northern, southern, and southwestern parts of Luzon. Manila was the most ravaged amongst places, but the earthquake also caused immense destruction to towns in the provinces contiguous to the capital, in central and southern Luzon, such as Morong, Bulacan, Bataan, Pampanga, Tarlac, Nueva Ecija, and Pangasinan.[592] Manila, again, suffered significant losses in its urban infrastructures, from buildings, churches, convents, court-houses, schools, and a few private houses, up to the natural landscapes and water barriers of the region, such as subsidence[s], fissures, lateral displacements and similar effects, especially in the alluvial lands along the banks of the Rivers Pasig, the great and little Pampanga rivers, the Agno, and even on towns surrounding Laguna de Bay, especially in those southern and western part of the lake.[593] Diario de Manila reported that extreme physical destruction and communal grief felt in Manila and nearby areas after the event. From 18 to 21 July 1883, the “ground movements shattered three days of lustrous efforts and work, causing misfortunes everywhere, as well as consternation and fright, paralyzing regular work and the orderly completion of potential progress of this unfortunate land… prosperity and happiness, now, entire provinces are in pain, seeing the heap of ruins of their stone houses, and valuable treasures under the fallen debris.”[594] The rice fields in Pangasinan suffered large patches and desiccation; people saw vapor and smoke in some water bodies in Cavite; inundated crops and landslides happened in the Infanta district; at the eastern slope of the Sierra Madre mountain rain, that resulted in several long deep cracks everywhere in the province, mostly in the vicinity of rivers, estuaries, and in the sea.[595] The July 1880 earthquake in Manila and its adjacent provinces was considered instantly as a manifestation of God's hostility, and "the research of man hasn't touched it."[596]

Governor General Rafael Primo de Rivera on the day of the first major tremor on 18 July 1880 immediately sent a telegram to the Overseas and War ministers about the situation in the archipelago. He described the tremor on that day as a result of “*constantes temblores de tierra por espacio de cinco dias*" (constant earthquakes for five days); the quake killed dozens of people in cities and towns, it ruined public buildings and destroyed churches, and caused the collapse of some the military facilities.[597] On 20 July 1880, two major aftershocks were felt in the city, more than and less than a minute long, that resulted to 9 deaths and 11 wounded, and two deaths and 50 wounded (mostly

[591] Miguel Saderra Masó, *La Seismología de Filipinas: datos para el studio de terremotos del Archipiélago* (Manila: Ramiíez, y Cia, 1895), p. 69, cited by Anduaga, “Earthquake Building Overseas”, p. 7.
[592] Ibid., p. 24.
[593] Ibid.
[594] Miguel Saderra Masó, *Historia del Observatorio de Manila, fundado y dirigido por las Padres de la Compańía de Jesús de Filipinas, 1865-1915* (Manila: E.C. McCullough & Co., Inc., 1915), p. 45.
[595] Excerpts from *El Archipiélago Filipino*, EAR S1 038, Earthquake Data Records, Manila Observatory Library and Archives, p. 1.
[596] Ibid.
[597] “Telegram of the Governor General to the Ministers of War and Overseas, 18 July 1880”, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1, Archivo Historico Nacional (AHN).

Chinese and natives), respectively.[598] A third earthquake was felt on 22 July 1880 late evening, and lasted for almost a minute.[599]

The communication of Governor-General Fernando Primo de Rivera with the Overseas Ministry in the succeeding days reveals the order of the Madrid government to the civil government in the Philippines to take appropriate measures to alleviate the effects of the earthquake, and his request for immediate support from the capital.[600] The officials in Madrid were also concerned with the main infrastructures in the city, such as the Manila Cathedral, the Palacio Arzobispal, the Universidad de Santo Tomas, the Cuartel, the Intendencia, and the stone bridges.[601] The Governor General replied a week after, reporting that most of the main buildings of the state were in good condition, except the UST, which was abandoned by the Dominicans due to fear of collapse, the bridges that were slightly damaged, and the Palacio Arzobispal which was affected by rains due to openings in its walls.[602]

A Junta de Autoridades was convened on 18 July 1880 to assess the situation and act on the immediate needs of the public. The Overseas Minister authorized the civil government to utilize the available finances needed to undertake the measures.[603] The Consejo de Ministros in Madrid expressed disgust over the calamities that hit the island of Luzon but wished strength for the individuals suffering after the disaster.[604] "Tranquilidad" was experienced in Manila a week after the three days of tremors[605]; and this was the time that civil government was able to communicate and compile all the local reports from the provinces affected by the earthquake.

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[598] "Telegram of the GG to the Overseas Minister, 20 July 1880" (Documents No. 6 and 7), *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[599] "Telegram of the Governor General to the Overseas Minister, 22 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[600] "Telegram of Overseas Minister to the Governor General, 18 July 1880", "Telegram of Governor General to the Overseas Minister, 19 July 1880", "Real Orden of 20 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[601] "Letter of the Overseas Minister to the Governor General, 22 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[602] "Telegram of the Governor General to the Overseas Minister, 29 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[603] "Letter of the Overseas Minister to the Governor General, 21 July 1880" and "Real Orden of 21 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[604] "Letter of the Consejo de Filipinas to the Overseas Minister, 24 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[605] "Telegram of the Governor General to the Overseas Minister, 27 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

c.2 Luzon-wide assessment of the effects of July 1880 earthquake

Authorities immediately convened to take the urgent measures, to know the condition of public buildings and rehabilitate them and to prevent harmful effects from affecting the city. The quake also caused destructions in the provinces of Laguna, Nueva Ecija, Cavite, Bulacan, Tarlac, Nueva Vizcaya, Pampanga, Pangasinan, Batangas, Tayabas, Bataan, and the military district of Infanta. The Luzon-wide assessment of the destruction of the July 1880 earthquake reveals the priorities of state government on what to rehabilitate, reconstruct, and to where to put the budget. The civil government was spot on maximizing the power of recently established telegraphic lines in the islands in communication with the local government units in the provinces to gather information about the extent of destruction of the earthquake. Provincial officials sent reports regarding the condition of the provinces to Manila through telegraphic dispatches.

Telegraphy in the late 19th century is considered not only as a significant development in communication but in the colonial empire building as well. Historians consider the decades of 1870s-1890s as a period of 'wiring the world'; empires built telegraphic cable networks in and between Asia and African colonial entities. Wenzlhuemer (2013) argues, '…the telegraph was primarily an instrument of imperial control that served administrative and strategic purposes. If facilitated communication between the different echelons of colonial rule and, in times of crisis, made the efficient movement of troops so much easier….[E]specially regarding the uses of submarine cables…'[606] He adds, "the telegraph was as much an instrument of imperial control as it fostered business in the region and made hitherto hard-to-reach areas accessible to British produce and capital…communications systems in the British Empire– across the oceans and on land – were usually shaped by a coalition of businessmen and politicians."[607] We can see here the intimate relationship between telegraphy, imperial governance, and the colonial economy. The benefits of this new mode of communication offered merchants, bankers, investors or ship owners a progressive avenue for information flow.'[608] The swift and reliable flows of information made investments more predictable and safer; they opened up new markets for traders and investors, such that quick and accurate information itself developed into a commodity which had its very own value.'[609] The infrastructural growth of the submarine telegraphs network immediately resulted in global communication where large continents were practically reduced into smaller spaces.[610] Wenzlhuemer furthers, the resemblance between major trade and cable routes alluded to in this short passage is all but surprising. The detachment of information flows from material transport brought about by the telegraph is extremely useful for the control and coordination of international shipping and for time-critical trading. Therefore, business interest produced a demand that rendered cables to particular regions profitable. The cable routes roughly followed the flows of money and commodities."[611]Moreover, telegraphy also became an instrument of cross-government communication and international diplomacy, wherein colonial empires in the region have managed to

[606] Ronald Wenzlhuemer, *Connecting the Nineteenth-Century World: The Telegraph and Globalization* (New York: Cambridge University Press, 2013), p. 78.
[607] Ibid, p. 84.
[608] Ibid, p. 85.
[609] Ibid, p. 86.
[610] Ibid, p. 127.
[611] Ibid, p. 130.

establish formal and "peaceful" relations, manifested through information sharing.[612] With these, telegraphy did not only spread amongst government institutions, but it also made its impact on the public press. The press was among the first regular customers of telegraphic services in a national as well as in an international context; a quick and the constant inflow of information from all parts of the world enabled the newspapers to present their readers with most up-to-date and accurate news and was, therefore, very much in their interest.[613]

To synchronize the action of the civil government, the authorities need to comprehensibly gather and study all the information from all affected areas. Gealogo (2016) argues that "indeed, the immediate response of the authorities after the earthquake was the documentation of the extent of damage incurred by public and private buildings in towns that suffered the most devastation…local officials were tasked to submit to the colonial authorities in Manila a detailed report on the condition of the buildings, with narrative reports on the state of devastation, the street-based assessments of buildings, and the estimated amount of damage suffered in the locality."[614] In his catalog published in 1895, Saderra Masó emphasized how important the proper listing and cataloging of seismological information were: "Una de las cosas que más nos han hecho discurrir al tartar de dar á conocer los datos recogidos sobre los terremotos Filipino, ha sido la manera como los presentariamos." (One of the things that we have done the most to try to make known the data collected about the Philippine earthquakes has been the way we would present them.)[615]

During the period from 18-27 July 1880, the civil government in Manila and the alcaldes mayors of the Luzon provinces were in constant communication with each other regarding information gathering and orders to be implemented to alleviate the effects of the earthquakes to public infrastructures and the people. The Junta de Autoridades, and the Inspección General de Obras Publicas (IGOP) convened on the afternoon of 18 July 1880 to plan out the actions to be taken by the civil government. Present in the meeting were the governor general, Manila Archbishop Pedro Payo y Piñeiro, General Cabo Antonio Moreno del Villar, Regent of the Audiencia Manuel Adrianeses, Head of the Intendencia General Eduardo de Castro y Serrano, Fiscal de S.M. Antonio F. Cañete, Secretary Enrique de Mesa.

Based on the assessments received from provinces, Manila's infrastructures had the most destruction. Civil, religious, and military buildings were damaged and destroyed by the 3-day tremors. The Junta de Autoridades, the IGOP, and respective agencies such as the offices of the Gobernador Militar de la Plaza de Manila, the Real Audiencia de Manila, the Gobernador Civil de Manila, and the Archbishop of Manila came up with their respective reports on the status of public and religious infrastructures in the city and province of Manila the weeks after the earthquake.

From the point of view of the state, the military facilities need to be assessed and repaired first as it deals with security and order. In the report of the Gobernador Militar de la Plaza, generally, it was pointed out that main garrisons and cuarteles in the

[612] Citing Duncan Bell and David Paul Nickles, Ibid, p. 81-83.
[613] Ibid, p. 90.
[614] Francis Gealogo, "Historical Seismology and the Documentation of Post-disaster Conditions: The 1863 and 1880 Luzon Earthquakes", pp. 371.
[615] Saderra Masó, *La Seismologia en Filipinas,* p. 4.

province of Manila were considered inhabitable after the earthquake.[616] A total of 26 military facilities were damaged by the earthquake, inside and outside Intramuros, and within the important strategic points in the province. The destruction affected several divisions and infantries, such as the Regimiento de Visayas en Manila, Regimento de Artilleria Peninsular, Regimento en Malate, Cuerpo de Ingenieros, Cuerpo de Artillería, Escuadron de Lanceros de Filipinas, Cuerpo de Guardia, and the Segunda Compañía de Carabineros.[617]

Table No. 10
List of military facilities in the province of Manila that were damaged by the July 1880 earthquake[618]

Puntos	Cuarteles y Locales
Recinto de Plaza	Puerta Real sus cinco bovedas y puentes
	Puerta de Sta. Lucia
	Puerta de Postigo
	Fuerza de Santiago
	Puestada Almacenes
	Puerta de la Aduana
	Puerta de Sto. Domingo
	Puerta de Isabela Segunda
	Baluarte de San Gabriel
	Puerta de Parian recinto hasta la Real
	Edificio de la Fuerza de Santiago
	Academia de Catedes
Intramuros	Cuartel de Caballeria
	Cuartel de San Diego
	Cuartel de Rey
	Casa alojamiento y oficinas del Excelentisimo Sr. Comandante General de Inginieros. Edificio contiguo llamado Parque de Inginieros
Extramuros	Cuartel de San Francisco de Malate
	Cuartel del Batallon de Inginieros
	Hospital Militar
	Almacen de Polvora
Edificios alquilados	Cuartel de Tanduay
	Oficinas y dependencia de la Capitanía General
	Intendencia Militar
	Factoria de atensilios

[616] Copia del parte dado para Exmo. Sr. Gobernador Militar de la Plaza de Manila, con motivo de los destrozos ocasionado en los edficios militares, por consecuencia de los terremotos del dia 14 al 22 de Julio de 1880, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[617] Ibid.
[618] Relación detallatda de los desperfectos que han sufrido de los cuarteles y locales que estan a cargo del ramo de Guerra en la Gobierno Militar de la Plaza de Manila por consecuencia de los terremotos del dia 14 al 22 de Julio de 1880, Copia del parte dado para Exmo. Sr. Gobernador Militar de la Plaza de Manila, con motive de los destrozos ocasionado en los edficios militares, por consecuencia de los terremotos del dia 14 al 22 de Julio de 1880, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

	Palacio de Sta. Potenciana a cargo de la Ynspeccion General de Obras Públicas
	Cuartel de la Riverita que ocupa el Cuerpo de Carabineros a cargo de la Hacienda

The civil governor of the province of Manila made a sober report of what happened to the buildings in the city and province of Manila. In his passionate plea to the higher authorities, he said that the earthquake erased Manila's legacy, and the damages and misfortunes experienced by people during the "ten days of silence" was caused by haplessness and loss of wealth.[619] With the help of renowned engineers, like Genero Palacios, and the Guardia Civil Veterana, they were able to identify 568 buildings damaged by the tremors and considered ruined, 135 of which were still habitable.[620] The report shows that 27 (Sampaloc, San Miguel, Quiapo, Sta. Cruz, Binondo, Tondo, Ermita, Malate, Pandacan, San Fernando de Dilao, Santa Ana, Pineda, Parañaque, Las Piñas, Muntinlupa, San Juan, San Mateo, San Jose Trozo, Montalban, Mariquina, San Pedro de Macati, Pateros, Pasig, San Felipe Nery, Caloocan, Tambobong, and Navotas) of the province's district, excluding Intramuros, were severely damaged. Different public buildings, from civil, religious, to educational, and commercial, were destroyed; those only became unusable and inhabitable until authorities issued thge necessary clearance. Other matters in the report include details on large cracks emitting water and sand in several towns, churches, convents and casa particulares and casas de piedras (stone houses) ruined; bridges were damaged, cuarteles and tribunals destroyed. The city identified priority edifices in every town that were vital in the civil and economic activities of the province. These include tribunals, casas escuelas, mercados, mataderos, puentes and cuarteles de Guardia Civil.[621]

The Audiencia Real de Manila also submitted a report about the buildings under their jurisdiction. It said that the edifice of the Audiencia and the Tribunal de Justicia suffered significant damages, but it did not interfere with the work of the magistrates and employees.[622] The judicial disticts (distrito de juzgados) of Quiapo, Binondo, and Intramuros reported a total of 10 deaths and 14 injuries amongst their staff personnel.[623] The Carcel Publica de Manila, which was under the auspices of the Real Audiencia, reported seven injured prisoners; the rest were transferred to a safer place, to the

[619] "cumplir con triste deber desenar en detalle los destrogos habidos, las desgracias causadas, los desastres nunca suficientemente llorados y hallar, coo en indefinido reposo, sobre escombros y ruinas, descanzando despues de estos días de angustia Suprema, todo lo que ayer, era motivo de vida, de produccion o riquesa para este tan expedente, como desventurado pais", Report of the Gobernador Civil de Manila, regarding the sum of damages of the 18 and 20 July earthquakes, 28 July 1880, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[620] Ibid.
[621] Ibid.
[622] "Report made by the Real Audiencia de Manila about the destructions of public buildings, 18 and 20 July, 29 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880* and Report of the Fiscal de Sello of the Real Audiencia regarding the sum of damages caused by the 18 and 20 July earthquakes, 28 July 1880, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[623] Ibid.

convent in San Juan del Monte.[624] The authorities regarded this act by some religious orders as manifestation patriotism.[625]

The IGOP made the combined and comprehensive summary of all the reports gathered about the effects of the earthquake to state and other public infrastructures. They admitted that urgent reconstructions are needed, but instant and not thoroughly studied actions can be detrimental to the whole city. Overall, the IGOP listed 43 essential public infrastructures were severely damaged and they needed to be repaired, rehabilitated, and reconstructed. The IGOP report suggested two important bureaucratic measures: (1) a Junta Consultativa de Obras Publicas must be established separately; a multi-agency committee that will create a reconstruction plan that will address the needs of the affected areas, and (2) that the Hacienda Publica must play a central role in finalizing reconstruction projects.[626] Also, the urgency comes from the need not to make any efforts to salvages government documents and properties in the building. Incessant rains in Manila made it harder to execute the retrieval operations.[627]

Table No. 11
Public facilities identified by the IGOP as severely damaged and need to be rehabilitated immediately[628]

Political	Military	Economic/ Commercial	Religious	Other public facilities
Palacio de Malacañang	Almacenes Generales de Estancadas dela plaza de Binondo	Fabrica de cigarros de Fortin	Palacio Arzobispal	Academia de Dibujo y Pintura
Antigua "Aduana" (Centrales de Hacienda)	Almacenes del Carenero	Fabrica de cigarros de Meisic	Palacio de Santa Potenciana	Escuela Normal de Instrucción Primaria
Casa Antigua Intendencia (Administración Central de	Almacenes dela Calle de Anloague	Fabrica de cigarros de Cavite	Catedral de Manila	Obras de Abastecimiento de Aguas

[624] Ibid.
[625] "Report of the Governor General to the Overseas Minister, 31 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[626] "Report of the Inspección de Obras Públicas regarding the damages by the 18 and 20 July earthquakes to public buildings, bridges, farros, and casas particulares occupied by public official, 29 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[627] Ibid.
[628] "Report of the Inspección de Obras Públicas regarding the damages by the 18 and 20 July earthquakes to public buildings, bridges, farros, and casas particulares occupied by public official, 29 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1; Fenomenos geológicos y meteorologicos ocuridos en la Isla de Luzon desde 24 de Mayo al 30 de Agisto de 1881, ULTRAMAR 501, Expediente 1, Archivo Historico Nacional (AHN).

Impuestos)				
Tribunal de Cuentas	Edificios al Servicio del Cuerpo de Carabineros (Casa Comandante del General del Resguado, Comandancia de Bahia, Almacen de Carabineros, Capitania del Puerto)	Fabrica de cigarros de de la Princesa en Malabon	Hospital de San Juan de Dios	Puente de Espana
Casa de Moneda	Almacen taller de forja y oficina del tren de limpia del Puerto de Manila	Edificios de Arrocerros (Fabrica de cigarros, Almacenes generals de Tabaco Rama, Administracion Central de Colecciones y Labores, Departamento de Prensas de Aforo)	Hospicio de San Jose	Puentes de Ayala
Administración de Hacienda Publica de Manila		Camarines particulares de los Senores Ynchausty y Co. (ocupados por la cienda paza el almacenage de Tabaco)		Puente de España
Secretaría del Gobierno General		Inspección General de Telegrafo		Puente de Paco
Consejo de Administración		Faros de la Bahía de Manila (Faro del bajo de San Nicolas, Faro del Rio de Pasig)		Puente de San Andres en Malate
Dirección General de Administración Civil		Faros del Corregidor y Pulo Caballo		

Inspección General de Montes				
Inspección General de Minas				
Inspección General de Obras Públicas				
Carcel Presidio de Bilibid				
13	**9**	**13**	**5**	**8**

The Manila Archbishop, upon the decrees of the Junta de Autoridades, also submitted a report about the condition of churches and other religious edifices that were under the direction of the Archdiocese of Manila. After assessing six provinces and one military district, the report covers the 57 towns/parishes. Based on the report, the affected structures were mostly the churches and belfries, casas parroquiales, and the convents of the parishes. Archbishop Payo y Piñiero sent an immediate request to the Junta de Autoridades to build temporary churches for towns where churches were destroyed by the earthquake.[629]

Table No. 12
List of ecclesiastical towns identified by the IGOP as severely damaged[630]

Provinces	**Towns/Parishes**	**Affected Structured Iglesia/Church (I) Casas Parroquiales (CP), Convent (C)**
Manila (15)	Sta. Cruz	I, CP, C
	San Miguel	I, CP
	Dilao	I, CP
	Sta. Ana	I, CP
	Paranaque	I, CP
	Las Pinas	I, CP
	Tambobong	I, CP
	San Jose de Navotas	I, CP
	San Pedro de Macati	I
	Pasig	I, CP
	Taguig	I, CP
	Cainta	I, CP

[629] Document No. 30, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[630] "Report made by the Archbishop on the effects of the earthquake on the churches, casa parroquiales, and cemeteries in the 15, 18, and 20 July earthquakes, 27 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

	San Mateo	I
	Pandacan	I, CP
	Sampaloc	I, CP
Bulacan (14)	Obando	No major damage
	Marilao	No major damage
	Santa Maria de Pandi	No major damage
	Norzagaray	I (Tribes repaired it)
	San Rafael	I, CP
	Bigaa	I, CP
	Guiguinto	I, CP
	Bulacan	I, CP
	Paombong	I
	Hagonoy	I, CP
	Pulilan	I, CP
	Quingua	I, CP
	Bustos	I, CP
	Baliuag	I, CP
Pampanga (6)	Lubao	I, CP
	Bacolor	I
	Macabebe	I, CP
	Sta. Rita	I, CP
	Mexico	I, CP
	Candaba	I, CP
Cavite (3)	Cavite Viejo	I, CP
	Puerto de Cavite	I, CP
	San Francisco de Malabon	I, CP
Distrito de Morong (5)	Tanay	I, CP
	Baras	I
	Morong	I, CP
	Pililia	I, CP
	Bosoboso	I
Nueva Ecija (3)	Cabanatuan	I, CP
	San Antonio	I, CP
	Baler	I, CP
Laguna (11)	Binan	I, Tribunal
	Sta. Rosa	I
	Vicario de Santa Cruz de la Laguna	I, CP
	Bay	No major damage
	Pagsanjan	I, CP
	Longos	I, CP
	Paquil	I, CP
	Siniloan	I, CP
	Sta. Maria de Caboan	I, CP
	Luisiana	I, CP
6 Provinces 1 Military District	**57 Towns/Parishes**	**70 Church Facilities**

I – Iglesia, CP – Casa Parroquial, C – Convento

The religious congregations in Manila, which were technically not directly under the jurisdiction of the Manila Archbishop, submitted their documentation to the civil government regarding the status of their properties. The Franciscans and the Recollects, stated in their respective separate reports, informed the Junta de Autoridades about the condition of dome church buildings under their supervision, mainly in the ecclesiastical provinces of Manila, Bulacan, Cavite, Laguna, and Tayabas.[631] They also specifically indicated the damages done by the earthquake in some important church edifices, such as the Monasterio de Santa Clara, San Lazaro Hospital, Baluarte de San Andres, and Convento de Santo Domingo.[632] The Congregation of St. Vincent de Paul order and the Sisters of Charity also reported that some of their building outside Manila, such as their diocesan seminary, Hospital Militar of the Hermanas de Caridad, Colegio de Santa Rosa, Hospital de San Juan de Dios, and the Hospital de San Juan de Dios de Cavite were all destroyed by the earthquake.[633]

The educational institutions that were under the supervision of religious orders, such as the Universidad de Santo Tomas (UST) and the Escuela Normal de Maestros, suspended their classes for a certain period as the earthquake destroyed their buildings. In UST, the Vice Real Patron suspended the classes for a month, because numerous classrooms were unusable due to the debris and cracks in the structure.[634] Students (mainly the 112 alumnos internos) and classes of the Escuela Normal de Maestros were transferred from Intramuros to Santa Ana, due to the same reason.[635]

Outside the province of Manila, reports confirmed and documented the severe damages to public infrastructures. Many of the towns in the province of Cavite, including the Fuerza San Felipe Neri, as well as the city proper, were assessed in detail as the whole area was severely affected by the tremor. The alcalde mayor of Cavite reported that even though they felt the tremor as early as the 15th of July 1880, the main earthquakes and their aftershocks happened on 10-20 July.[636] The Comandancia General de Marina del Aportadero reported that the July 1880 tremors destroyed Spanish military facilities in Cavite, and the dependencies in Cañacao Bay.[637] Inside the arsenal area, cuarteles,

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[631] "Report of the Franciscans and Recollects regarding the sum of damages of the 18 and 20 July earthquakes to their properties, 26 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1; El Capítulo Provincial de los Franciscanos y los temblores de 1880, EAR S1 024, Earthquake Data Records, Manila Observatory Library and Archives; Los edificios de los PP. Recoletos y los temblores de 1880, EAR S1 043, Earthquake Data Records, Manila Observatory Library and Archives.

[632] Ibid.

[633] Historia de la Misión de la Compañía de Jesús y los temblores de 1880, EAR S1 031, Earthquake Data Records, Manila Observatory Library and Archives.

[633] Ibid.

[634] Gaceta de Manila Ano XX, No. 210, 30 July 1880, p. 1419, Suspensión de classes en la UST EAR S1 077, Earthquake Data Records, Manila Observatory Library and Archives.

[635] Historia de la Mision de la Compania de Jesus, Tomo 1, EAR S1 032; Jose Ma. Clotet, Noticias Biograficas del R. P. Pedro Torra, S.J., pp. 84-123, EAR S1 035, Earthquake Data Records, Manila Observatory Library and Archives.

[636] "Telegram of the GG to the Alcalde Mayor of Cavite, regarding the effects of the 18 and 20 July earthquakes to the province"; "Response of the Gobierno Politico Militar of Cavite to the GG, regarding the effects of the 18 and 20 July earthquakes to the province", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[637] "Report of the Comandancia General de Marina del Aportadero on the destructions in the Arsenal de Cavite, and Cañacao dependecies in the 18 and 20 July earthquakes, 26 July 1880";

talleres, almacenes, machines and equipment, artilleries, and capillas were all damaged, while in Cañacao, the hospital, the casa de contador, the Faro de la Punta, and the laboratorio de mistos.[638] Several religious buildings in the military zone were also affected, such as the Iglesias de Santo Domingo, San Juan de Dios, Recoletos buildings, the Camina and Puente de Porta Vaga.[639] The Comandante de Marina in Cavite as immediately tasked to the coordinate with the Director General de Administración regarding the creation of a commission that will oversee the reconstruction of the Cavite arsenal.[640]

The experience of the city of Cavite after the July 1880 earthquake falls one interpretation that the said earthquake damaged more private buildings, rather that public.[641] The report about the surveying of the city facilitated by the IGOP on 10 August 1880 reveals 285 public and private edifices affected by the earthquake.[642] Out of less that two dozes and street areas in the city, including that of the arsenal zone, most of the structures affected were houses, solares, and some small built-in properties near the main house. Indicated in the documentation were information such as name of the owner, designation of the lot (casa, solar, posesiones, covachas), and the categorization of the building based on the damages (buen estado con reparació, peligrosa, y ruinoso), and if the property is included in the types of properties to be subsidized by civil government, as per a decree passed on 18 August 1880.[643] In an updated report four months after, the number of damaged structures in the city raised to 313, and more than 200 were cleared to be safe for habitation.[644]

"Response of the Gobierno Politico Militar of Cavite to the GG, regarding the effects of the 18 and 20 July earthquakes to the province*", Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[638] Ibid.

[639] "Response of the Gobierno Politico Militar of Cavite to the GG, regarding the effects of the 18 and 20 July earthquakes to the province", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[640] Document No. 30, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

[641] Gealogo, "Historical Seismology", p. 371.

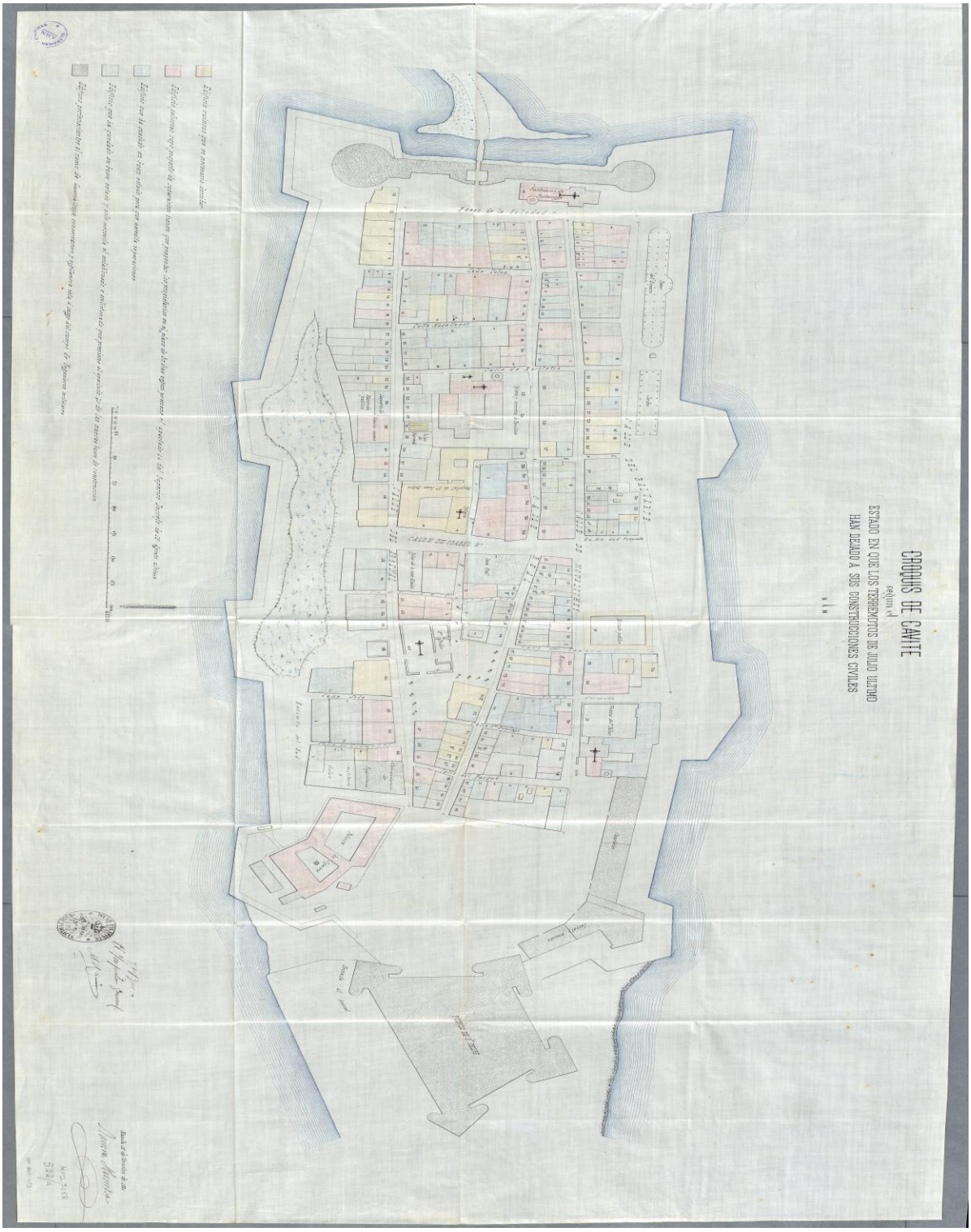
[642] "Terremotos de los días 18 y 20 de Julio 1880, Provincia de Cavite; Inspeccion General de Obras Publicas", Rollo 7651, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).

[643] "Resultado de Reconocimiento Practicado en la poblacion de Cavite", Rollo 7651.

[644] Terremotos de los días 18 y 20 de Julio 1880, Provincia de Cavite; Inspeccion General de Obras Publicas, Rollo 7651, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).

Map No. 3

Croquis de Cavite y Fuerza San Felipe Neri, after July 1880 Earthquake[645]



[645] Croquis de Cavite_Fuerza San Felipe Neri after July 1880 Earthquake, ULTRAMAR MPD.5458_r, Archivo Historico Nacional (AHN).

Aside from the properties in the city proper, important social and economic facilities in the province were destroyed. The Casa de Administración y Hacienda, the Casa Correos, the Hospital Civico Militar, and the Fabrica de Tabacos all had severe damages.[646] Five other towns, names Cavite el Viejo (Kawit), Bacoor, Imus, Peres Dasmariñas, and San Francisco de Malabon also reported having damaged churches, convents, parochial houses, and private houses.[647] Even though the years after 1880 saw the prioritization of the province in terms of budget and infrastructure projects, some effects were still seen and were "problems" a decade after.[648]

Twelve other provinces suffered gravely after the Luzon earthquake of 18-20 July 1880. The constant communication between the civil government in Manila and the provincial chiefs provide comprehensive documentation of the effects of the earthquake to urban and rural towns of Luzon, in the southern and northern regions. The governor general provides seismological information received by his office to the provincial chief, based on the data from the Ateneo Municipal's central and satellite offices. In response, the chiefs of provinces sent to the Manila a detailed narrative report of destructions and damages to properties the earthquakes have caused per town in the province, with particular reference to important infrastructures such as the church, the tribunal, and the convent.

Table No. 13
Effects of the July 1880 earthquake to towns and provinces in Luzon[649]

Province	Towns	Summary of reported destruction
Laguna (20)	Pagsanjan, Biñan, San Pedro de Tunasan, Calauang, Los Baños, Panguil, Siniloan, Sta. Cruz, Longos, Lumban, Paete, Paquil, Cavinti, Lilio, Nagcarlan, Pila, Bay, Calamba, Cabuyao Sta. Rosa	✓ Most of the church, tribunales, and casas particulares and casas de peidras damaged ✓ Schools for children were destructed ✓ Telegraphic posts were slight damaged ✓ Possible crack lines should be identified in several towns ✓ The provincial prison was damaged; authorities tranfered the prisoners to a Manila convent ✓ Cracks where sand and water were seen on towns near the Taal volcano, as well

[646] Response of the Gobierno Politico Militar of Cavite to the GG, regarding the effects of the 18 and 20 July earthquakes to the province*", Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[647] Ibid.
[648] Informe sobre de resultado de los reconocimientos efectuados en varios edificios del Estado en la provincia de Cavite, January 1893, Rollo 375, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).
[649] Reports from Provincial Chiefs, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1; Relación del Alcalde Mayor de Nueva Ecija sobre lost destrozos causados por los terremotos, EAR S1 071, Earthquake Data Records, Manila Observatory Library and Archives; "Acta del reconocimiento verificado en los edificios publicos de esta capital con expression de la seguridad que ofrecen y reparaciones mas urgentes que se necesitan", Desperfector causados en los edificios publicos de la capital de Batangas por los terremotos de 1880, EAR S1 017, Earthquake Data Records, Manila Observatory Library and Archives.

		as near the mountains if Banajao, San Cristobal, and Maquiling; according to the parish priest of Lilio the Banajao is a frightening sight after the earthquake
Nueva Ecija (12)	Gapan, Cabanatuan, Jaen, Cabiao, San Antonio, Aliaga, Santa Rosa, Zaragosa, Bongabon, Pantabangan, Talavera	✓ The capital town was severely damaged; the buildings of Hacienda Publica, Gobierno y Coleccion, Camarines de Aforo de Tabaco, Carcel Provisional, torre and walls of the Iglesia ✓ Large cracks, 2-3 meters, seen in some areas, along the banks of the rivers in the province ✓ Churches and convents, and tribunales were damaged ✓ Some private houses made of stone and wood were partially destroyed
Bulacan (26)	Bulacan, Santa Ana, Santa Ynes, Bigaa, Bocaue, Santa Maria, Marilao, Pulilan, Guiguinto, Sta. Isabel, San Miguel de Mayumo, Baliuag, Hagonoy, Quingua, Obando, Barasoain, Meycauayan, San Rafael, Malolos, Paombon, Polo, Bustos, Calumpit, Angat, San Jose	✓ The infrastructures in the capital town of Bulacan were severely affected ✓ In most towns, the tribunal, church, and convent were the structures damaged by the earthquake ✓ Many houses made out of nipa and other light materials were also destroyed
Tarlac (8)	Tarlac, Camiling, Paniqui, Pura, Victoria, Gerona, Concepcion, Bamban	✓ The Casa Real in the Tarlac, the capital town, was damaged severely ✓ In most towns, the tribunal and church were the structures damaged by the earthquake ✓ A lot of griestas or cracks were seen in many towns
Nueva Vizcaya (2)	Bambang, Solano	✓ Collapsed houses and bridges ✓ Crack in major roads and thoroughfares ✓ Some churches and convents were damaged
Pampanga	Bacolor and contiguous towns	✓ In Bacolor, the Tribunal and Mamposteria, Casa Real, Yglesia, Convento, Carcel publica; guardia civiles were reassigned to guard possible prisoner escape; most part of the town damaged ✓ More towns reported damages in their vicinity, especially the churches; no casualties reported

Pangasinan	Lingayen and contiguous towns	✓ Report only contained the oscillations and trepidations experienced by the province
Union (3)	San Fernando, Agoo, Balaoan	✓ Damages to properties were reported in San Fernando and Agoo ✓ Grietas or cracks were found in the church and convent of Balaoan town
Batangas (2)	Batangas, Alaminos	✓ The part of the Maquiling Mountain that is on the province was monitored because of possible landslide. ✓ Slight damages in the town of Alaminos ✓ Damaged structures in the capital towns: Casa Tribunal, public market, Casa Real, Carcel Publica, and Casa Administración.
Bataan	Balanga and contiguous towns	✓ Report only contained the oscillations and trepidations experienced by the province ✓ No reported damages or casualties
Tayabas (6)	Tayabas, Lucban, Mauban, Pagbilao, Atimonan, Gumaca	✓ In most towns, the tribunal and church were the structures damaged by the earthquake ✓ More towns reported damages in their vicinity, especially the churches; no casualties reported
Ynfanta		✓ The eastern slope of the Sierra Madre mountain rain, that resulted to several long deep cracks everywhere in the province, mostly in the vicinity of rivers, estuaries, and in the sea

There were lapses in certain aspects of the assessment reports. Incomplete reported were the value of damages and the number of deaths and injuries, aside from in the reports on Manila where estimates on the amount of destroyed properties were available. Nevertheless, this assessment is an improvement of the way the civil government responded to large calamities, compared to the way they assessed the situation after the June 1863. The reports provided the civil government an immediate, preliminary overview of the situation, and guided them on what initial and long-term responses must be undertaken. The responses of the Spanish government were not only on the bureaucratic and infrastructural aspects but also on scientific and intellectual domains as well. The government's investments were seen on rebuilding towns and provinces, and on the production of scientific knowledge and propagation of scientific appreciation of earthquakes as geological phenomena.

The following photos show the destruction caused by the July 1880 earthquake on some towns on northern Luzon, namely in Pangasinan and Unión.

Photo No. 4
Destructed structures and landscapes in Pangasinan and La Unión after the July 1880 Earthquake[650]

Photo No. 4.1: Tribunal de Mangaldán

Photo No. 4.2: Iglesia y Tribunal de Mangaldán

[650] ULTRAMAR 595, Expediente 1, Archivo Historico Nacional (AHN).

Photo No. 4.3: Interior de la Iglesia de Mangaldán

Photo No. 4.4: Iglesia de San Jacinto

Photo No. 4.5: Tribunal de Binalonan

Photo No. 4.6: Torreón circular de Santo Tomás

Photo No. 4.7: Iglesia de Baoán

c.3 The initial responses of the Spanish civil government in the Philippines, July-December 1880

Authorities acted on to provide relief and mitigation measures; these actions manifested the bureaucratic and religious nature of how the people and the government perceived earthquakes as a hazard and or disaster. As seen in the work of the Junta de Autoridades and the initiatives of the Church hierarchy, there a more systematic response, though it still entailed the ministerial-structural nature of the Spanish bureaucracy, wherein decisions, whether fiscal or political, needed "formal" approval or go signal from the government in Madrid. There were actions initiated that veered away from the ministerial dilemma that did not need any approval from authorities overseas, and thus show a visible response from the government. For example, on 20 July 1880, the Corregimiento de Manila ordered the construction of casas camarines de caña y nipa, without the required license, for families affected by the earthquake, in zones determined to be good or stable for constructing edifices.[651] Because of the necessity for the city to recover first from this disaster, Governor-General Fernando Primo de Rivera issued an order suspending the official citywide celebration activities of the *Días de la Reina*; it deemed ironic to celebrate due to the unfortunate state of the capital and its nearby provinces.[652] The observed initial actions of the government and of the people in after the earthquake showed better overall response. French explorer Alfred Marché

[651] Gaceta de Manila Año XX, No. 201, p. 1355, 21 July 1880; "Autorización para construir casas de cana y nipa", EAR S1 007, Earthquake Data Records, Manila Observatory Library and Archives.
[652] Gaceta de Manila Año XX, No. 204, p. 1379, 24 July 1880, Suspensión de una recepción oficial, EAR S1 081, Earthquake Data Records, Manila Observatory Library and Archives.

lamented that this quick and improved disaster response of all sectors, particularly the government, a manifestation of "el noble corazon español".[653]

c.3.1 Orders from the Junta de Autoridades

On 29 July 1880, the Junta de Autoridades passed a resolution about the appropriate measures to be taken to alleviate the city's suffering after the series of earthquakes, as well as to mitigate the destruction to be caused by possible aftershocks.[654] The Junta, together with the Intendencia General de Hacienda, worked hand in hand to be able to mobilize the fiscal resource of the civil government. First restored were important government buildings and facilities, especially those that needed immediate clearing operations due to safety issues. Some factories and government storage buildings, such as the Aduana de Manila, Fabrica de Fortin, Fabrica de Arroceros, Fabrica de Meisic, and Almacenes de Generales de Construcciones were given attention as these were near the civil government house in Malacañang.[655] The days after the first major tremor on 18 July 1880 were dedicated in operations to salvage government properties like public records, equipment, and supplies such as tobaccos, among others. From the tobacco factories damaged by the earthquake, the clearing operations team was able to salvage 41,789 tobacco ores, 12,076 arrobas de batida, 800 cigarros de menas, and 208 arrobas de cigarillos.[656] The Fiscal of the Audiencia Real and the President of the Tribunal de Cuenta reported there was threat of collapse to facilities that house the records and documents of the Audiencia, and an immediate transfer of materials to warehouses or temporary archives was a must, to prevent from being damaged by aftershocks and the rain, and these needed additional people and compensation in digging up and rebuilding the documents of the offices.[657] The latter informed that the Dominicans offered one of their convents to house the documents of one of the government's fiscal departments, who identified 7000 legajos or bundles of documents to be transferred.[658]

The Junta de Autoridades also issued several orders related to fiscal matters and reconstruction plans – easier access to construction materials and additional workforce for the public works to be done. To prevent the effects of what they consider as "fenomeno geológico", they implemented critical decisions, such as follows: (1) task the staff of the IGOP and Ynginieros militares about the condition of public and military edifices; (2) task the arquitectos municipals to study the situation of buildings in their areas and suburbs and immediately report it to the Junta; (3) task the IGOP to proceed with the construction of provisional shelters – camarines, almacenes, and public offices of the government; (4) Task the military engineers to proceed with the construction of

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653 El explorador Frances Marché y los terremotos de 1880, EAR S1 027, Earthquake Data Records, Manila Observatory Library and Archives.

654 Document No. 30, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

655 "Report of the Intendencia General de Hacienda about the fiscal decisions to be made concerning reconstruction of the city – 29 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

656 Ibid.

657 Document No. 23 and Document No. 24, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

658 Document No. 24, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.

provisional shelters for the troops and soldiers; (5) task the alcaldes and gobernadores to send to Manila immediately materials for reconstruction such as cana, nipa, and materiales apropositos to build strong edifices; expenses must be shouldered by them; (6) ask the heads of the religious orders to allow the temporary transfer of prisoners of the carceles and presidios located in Bilibid to their edifices, considering the urgency and amount of expenses; (7) task the Treasury to allot budget for the immediate construction of edifices that are important to the State: soldier quarters, prisons; crediting system should be managed considering the amount that is needed, and where to get it; (8) task the alcaldes mayores to divide their areas into zones for the distribution of health and sanitation goods, and; (9) task the IGOP to immediately present a comprehensive plan of the rehabilitation plan of Manila and other affected areas.[659] These, I think, are clear proof of the transition to a scientific response to earthquakes from the point of view of the government. Although the scientific initiatives did not start only after the July 1880 earthquake, the formative plans and requisites were laid down decades before. The emergence of professionals as the leading sector in disaster response resulted to more bureaucratic and scientific character of post-disaster response.

The Junta also ordered, together with the circulars issued by the governor general, (1) the encouragement of urban contribution from the people who were not affected by the earthquake, the (2) immediate importation of construction materials not available in the Philippines, (3) the free purchase of maderas (wood) to the capital, with no dues imposed by the governing body on the wood cutting industry, the Inspección General de Montes (IGM), (4) an order to the provincial chiefs to send to Manila cañas, nipas, and other construction materials, to ensure the availability of construction materials in the market, and the (5) idea to use the prisoners at the Carcel de Bilibid, both indios and chinos, as jornaleros or paid daily workers.[660] The military, the presidiarios, tropas, and cuadrillas, stepped in as the initial workforce in the construction of provisional offices and houses.[661] Later on, authorities hired *jornaleros* as necessary support due to the workload of clearing operations. They were paid 1 peseta per day, as prescribed in the government budget.[662] A separate order was issued to ensure they were paid on time, so that they can purchase construction materials for their own houses, if needed.[663]

Clearing and demolition operations started as soon as the workforce received an order from the Junta. The authorities did not issue those clearances until the Junta adopted the final assessment and reconstruction plan. First issued were precautionary measures and approvals before doing major demolitions, to ensure there was a coordinated action in between the government, and their workforce, as well as with the private property owners doing their won reconstruction activities. Instead, advisories were released and published for the public to know the mechanisms that authorities implemented. For example, in the Gaceta de Manila regarding the threat of certain buildings, for example,

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[659] "Acta from the Junta de Autoridades on 18 July 1880", *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[660] Document No. 30, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[661] Document No. 27, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[662] Document No. 28, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[663] Gaceta de Manila Año XX, No. 203, p. 1371, 23 July 1880, Determinación del precio de los articulos de primera necesidad, EAR S1 018, Earthquake Data Records, Manila Observatory Library and Archives.

the advisory issued for the parishioners visiting the Manila Cathedral.[664] Safety for commuters was immediate considered. The government prohibited Carriages to pass through streets and roads due to ruins and debris; penalties for violators ranged from 5 pesos for the first offense to 20 pesos for succeeding.[665] Less than two weeks after, the Governor General revoked the said order, as clearing of streets underwent in major thoroughfares.[666] On 15 September 1880, the Corregimiento de Manila ordered the immediate clearing and demolishing of properties that threaten and blocks toads and pathways.[667]

One of the first orders of the Junta dealt on mobilizing small-scale voluntary collection mechanism, through a public contribution from the people, for finances to be readily available. In accordance to the circular of the Junta, on 23 July 1880, Governor-General Primo de Rivera created a *plazo legal* for the collection of urban and industrial contributions for the rebuilding of houses, for eight days, from 23 to 31 July 1880.[668] On 26 July 1880, Intendente General de Hacienda published a circular declaring the procedures for the donations of the state to property owners, regarding their destructed houses, properties, etc.[669] This order was based on a 19 December 1879 Real Decreto, stating provisions and procedures on the distribution of contributions collected to alleviate the suffering of people in times of disasters. Donation from private individuals also arrived for the civil government to use for general and specific rehabilitation projects such as for the construction of churches and some public buildings. One example was the donation made by the Marques de Campo, through a private company Sres J. Pena y Compañia, donated a certain amount for the rehabilitation of house.[670] Some government officials also did initiatives to coopt with this particular need of financial resources. The Governor-General Primo de Rivera distributed dichas (alms) for the low-income families affected by the earthquake, in the name of the Queen, while the Alcalde Mayor of Batangas remitted to Manila a sum of 555 pesos, a product of a subscription in Batangas, for the purchase of materials for reconstruction.[671] On October 1880, the governor general also donated worth 23,863.25 pesos for orphans and poor under the auspices of the Colegio de Santa Isabel, in celebration of the birth of Maria de las

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[664] Gaceta de Manila, Ano XX, No. 203, p. 1371, 23 July 1880, Preparativos para el derribo de la torre de la Catedral, EAR S1 057, Earthquake Data Records, Manila Observatory Library and Archives.

[665] Gaceta de Manila Ano XX, No. 203, p. 1355, 21 July 1880 Reglamento de los carruajes, EAR S1 068, Earthquake Data Records, Manila Observatory Library and Archives.

[666] Gaceta de Manila Ano XX, No. 214, p. 1447, 03 August 1880, Suspensión de la orden sobre carruajes, EAR S1 080, Earthquake Data Records, Manila Observatory Library and Archives.

[667] Gaceta de Manila Ano XX, No. 257, p. 1763, 15 September 1880, Disposiciones para que los escombros de las ruinas de las casas no obstruyan las vias publicas, EAR S1 020, Earthquake Data Records, Manila Observatory Library and Archives.

[668] Gaceta de Manila Ano XX, No. 205, p. 1387, 25 July 1880, Proroga del plazo de paro de contribuciones, EAR S1 060, Earthquake Data Records, Manila Observatory Library and Archives.

[669] Gaceta de Manila Ano XX, No. 207, p. 1395, 27 July 1880, Tramitación de expedientes sobre condonación de impuesto, EAR S1 083, Earthquake Data Records, Manila Observatory Library and Archives.

[670] "Distribucción gratuita de fondos alos damnificados po los terremotos", *Gaceta de Manila*, Ano XX, No. 271, September 29, 1880, p. 1859, EAR S1 021, Earthquake Data Records, Manila Observatory Library and Archives.

[671] Ibid.

Mercedes, Infanta Heredera of the Spanish Crown.[672] Certain individuals and religious orders also initiated donations through subscriptions specifically destined to reconstruct churches and religious edifices.[673] Individual donations from abroad also came in as news of the devastating earthquake reached Europe. For example, the donation worth 25 francos, from a group of people from Toulouse, France arrived in Manila on 03 November 1880.[674]

c.3.2 On the use of prisoners as workers

A week after the incident, the government reported that the quake destroyed two major prisons: the Carcel de Bilibid in Manila and the provincial carcel publica of Laguna. On the one hand, the Carcel Publica de Manila, which was supervised by the Real Audiencia, had seven injured prisoners; the authorities transferred while the rest of the prisoners to a convent in San Juan del Monte.[675] On the other hand, the prison in Laguna was severely damaged, making the provincial chief to decide to transfer the prisoners to Manila.[676] Although this act was reported to and hailed by Madrid as commendable humanitarian consideration, the need for additional workforce seemed to replace the praiseworthy act. The Junta de Autoridades issued an order seemingly "approving" the sending of prisoners into the construction field. The said decision was consulted to Madrid, while the civil government implemented it gradually. On the proposal to use prisoners as workers, it was consulted thoroughly with the authorities in Spain. Until the 1880s, there was no legislation that prohibited the use of prisoners for public works, yet as well no law existed that pardons them by doing a public job. The authorities will order the prisoners to work for the reconstruction, and they will pay and reward them of its equivalent judicial value, same as with the Chinese whose paying of tributes can be alleviated once hired as workers for the reconstruction.[677] The communications with Madrid regarding this plan, and action, of the civil government, revealed the tedious nature of the use of the prisoners for public works in times of calamities. The authorities set the rules, on who was allowed to do work – within and outside the carceles; under the supervision of Ministerio de Gracia y Justicia.[678] Prisoners that were "cleared" to work were: prisoners that were already sentenced, and those in different custodial supervision.[679] Authorities included prisoners on the second

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[672] Gaceta de Manila Ano XX, No. 282, p. 1943, 10 October 1880, Reparación del Colegio de Santa Isabel, EAR S1 074, Earthquake Data Records, Manila Observatory Library and Archives.
[673] “Memoria sobre la restauracion de la Nueva Catedral de Manila” by Dr. Mateo Vague y Matcos, Gobernador Ecclesiastico of the Manila Diocese, Donativo de 500 ejemplares de una obra para Socorro de los damnificados en los terremotos de 1880, EAR S1 023, Earthquake Data Records, Manila Observatory Library and Archives. Los edificios de los PP. Recoletos y los temblores de 1880, EAR S1 043, Earthquake Data Records, Manila Observatory Library and Archives.
[674] Document No. 28, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[675] A report made by the Real Audiencia de Manila about the destructions of public buildings, 18 and 20 July, 29 July 1880, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[676] Ibid.
[677] Document No. 27, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[678] Ibid.
[679] Ibid.

group of "mercedores" considered for the construction projects, where more workers were needed.[680] Prisoners conscripted for work are grouped into two: on the one hand, the tributariales, or those who will work with other state workers such as the police and the military, and on the other hand, the gubernatoriales, or temporarily confined prisoners, who will work in public works, under the predisposition resides with local chiefs of towns or provinces.[681] The Chinese were solely assigned in public constructions, not on private works for certain individuals.

The prisoners' salary as workers were used to pay their debts and fines, but if the offenses of prisoners are heinous or grave, they will work for free, such as the [682]construction of murallas, fortifications, works along Pasig River, and public buildings. Imprisoned Chinese due to failure to pay tributos were tapped as workers, and were paid 1the same amount as a regular jornalero. The government employed them in force (trabajos fosozas); whoever worked for can get their sentence lowered, depending on the computation of the court, a judicial practice called complimiento de la condena.[683] These measures were consulted thoroughly with Madrid so as it will not violate any existing laws and international agreements with China. For example, they studied the possible implication of this action to the 1877 Sino-Spanish Treaty regarding the prohibition of recruitment of Chinese coolies in the Carribean.[684] The civil government tasked the Negociado de Politica de la Subsecretaria to check if the measure will violate some provisions of the 06 December 1878 treaty with China, and the Ley de Extranjeria of July 1870.[685]

Conflicting observations can be drawn upon the use of prisoners as workers. On the one hand, it was as a form of exploitation of the judicially segregated sectors of the colonial state. On the other hand, it was also a mechanism of the state to mobilize the available human capital, and make use of the workers as "reliable and manageable" workers. Its was slightly revealed in the reports to Madrid in the finals months of 1880 that, for example, the work to pay debts was in favor of Chinese debtors-prisoners, adding that it was a form of charity in times of disasters.[686] Moreover, the civil government explicitly stated that is was a necessity to treat the prisoners as workers, with cordial respect as part of the labor force. The Negociado de Gracia y Justicia and the Negociado de Contribuciones of the Dirección General de Hacienda made sure that this action would not violate some provisions of the existing laws on foreign workers on the Philippines, would not cause international complications.[687]

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[680] Ibid.
[681] Ibid.
[682] Ibid.
[683] Document No. 28, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[684] F. van Dongen, "The Cautious Imperialists", in The Acta Historiae Neerlandica (Historical Studies in the Netherlands), Volume IV (Leiden: E.J. Brill, 1970), p. 154. As a note, the government implemented the practice of using Chinese prisoners as laborers since the new tax system was imposed in 1828, wherein people who failed to pay their taxes or those who have committed crime can be tapped as laborers in public works of the government. They were paid, but the government deducted their salaries to their unpaid taxes or criminal fines.
[685] Notes of Document No. 28, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[686] Document No. 28, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[687] Ibid.

c.4 Reconstruction of Manila and other Luzon provinces

c.4.1 Immediate suspension orders on construction and control of prices of goods

The bigger challenge, same as the post-1863 earthquake, was the rebuilding of the towns and long-term plans for rehabilitating term. Documentary reports reveal that even though the level of destruction was almost the same with the June 1863 disaster, the attitude and approach of the people and the government was more optimistic than before. Madrid officials were as optimistic as people in the Philippines. In a report of the monarchy to the members of the legislature, they said, "earthquakes that afflicted the Philippines have not stopped the constant development of progress in the islands."[688]

Clearances were necessary as the city was trying to implement a new system of edifice construction that is more resistant to earthquakes and other earth movements. The authorities issued and implemented several orders regarding the appropriate building code, to achieve a standardized way of public construction in Manila and the provinces. On 23, 24, 26, and 27 July 1880, the Corregimiento de Manila issued several orders respectively: (1) commissioning a group of officials to survey all houses damaged and destroyed by the earthquake, (2) suspending of building of houses until there are no recommendations from the IGOP, and (3) prohibition to property owners from rebuilding of houses using strong materials prescribed without government clearance, and (4) halting the reconstruction of houses that do not follow the specified rule, for the general welfare of the public.[689] Concerning the first order stated, on 25 August 1880, the Ayuntamiento de Manila created a municipal service to survey the urban construction plan under the direction of government engineer Genaro Palacios.[690]

Another important matter that was dealt with by the authorities was controlling the price of construction materials. The Corregidor de Manila, on 21 July 1880, ordered the implementation of measures to curve out exploitation in the prices and supply of construction materials.[691] Fixed and standardized prices were implemented to avoid abuse from commercial businesses by providing the needed materials for public and private use. To further enforce this necessity to monitor prices of construction goods, the

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[688] Gaceta de Manila Año XXI, No. 2, 02 January 1881, p. 9, "No han detenido el constante desarollo del progreso en las Islas Filipinas los terremotos que las afligieron", Mencion de los terremotos de Filipinas en el Mensaje de la Corona a las Cortes, EAR S1 048, Earthquake Data Records, Manila Observatory Library and Archives.

[689] Gaceta de Manila Año XX, No. 203, p. 1371, 23 July 1880, Reconocimiento de casas maltratados por los terremotos, EAR S1 067, Earthquake Data Records, Manila Observatory Library and Archives; Gaceta de Manila Año XX, No. 206, p. 1391, 26 July 1880, Suspesion de la autorizacion concebida para reparar edificios, EAR S1 079, Earthquake Data Records, Manila Observatory Library and Archives; Gaceta de Manila Año XX, No. 205, p. 1387, 25 July 1880, Prohibicion de reedificar casas de materiales Fuertes sin autorizacion del Gobierno, EAR S1 059, Earthquake Data Records, Manila Observatory Library and Archives; Gaceta de Manila Año XX, No. 207, p. 1398, 27 July 1880, Recomposicion de edificios, EAR S1 066, Earthquake Data Records, Manila Observatory Library and Archives.

[690] Gaceta de Manila Año XX, No. 238, p. 1627, 27 August 1880, Organización del servicio municipal de reconocimiento de cosntrucciones urbanas, EAR S1 055, Earthquake Data Records, Manila Observatory Library and Archives.

[691] Gaceta de Manila Año XX, No. 203, p. 1371, 23 July 1880, Determinación del precio de los articulos de primera necesidad, EAR S1 018, Earthquake Data Records, Manila Observatory Library and Archives.

Ayuntamiento de Manila ordered the creation of a commission that will oversee the prices of construction materials and combat abusive loggers who are selling wood use for building houses.[692] A separate order was also issued imposing sanctions to businessmen exploiting the demand and illegally raising the price of construction materials and other goods.[693] Moreover, Governor-General Primo de Rivera ordered the suspension of tariffs imposed to materials imported abroad, especially goods that were needed for construction, for five months, from 29 July to 31 December 1880.[694]

c.4.2 Cutting of trees to meet the demand for wood for public construction

The Junta de Autoridades, during the first week of the rehabilitation efforts of Luzon provinces affected by the earthquake, ordered the purchasing of wood to be sent to the capital, as well as to provincial centers, free of dues from the government regulating body on wood trade, the IGM. On 28 July 1880 Governor General Primo de Rivera declared free and available the cutting of trees, to be used for the reconstruction.[695] The Junta presented a proposal of wood cutting activities in public mountains or mountains governed by the state, for three months up to six months.[696] The Madrid government approved the said proposal, as it was vital to the revival of Manila and provinces affected by the earthquake.[697] This measure was to able the government to have a grasp of the whole flow of wood trade, and prevent illicitly and contraband trading, as well as the prevention of excessive pricing in the market as it will assure the constant supply of wood. The Inspector General de Montes immediately implemented the order sands the "formal" approval from Madrid. It was clear that the cutting of timber free of dues was only limited to the post-earthquake rehabilitation efforts only, for the rebuilding of churches, tribunals, other public buildings, and residences, and was not extended to woods for exportation and naval construction.[698]

The government cut trees such as molave, acacia, and banaba, as these wood types can resist sudden and strong earth movements. Twenty-three provinces were identified and became the source of wood for the Luzon-wide reconstruction project, 17 from Luzon itself, three from the Visayas region, and three from Mindanao. From 28 July 1880 to 11 August 1881, these were the provinces trees from government-sanctioned mountains in the provinces of Bataan, Mindoro, Tayabas, Zambales, Manila, Nueva Ecija, Bulacan, Laguna, Zamboanga, Leyte, Cavite, Samar, Romblon, Albay, Batangas, Pampanga, Morong, Isabela de Basilan, Tarlac, Negros, Masbate, Pangasinan, Camarines Norte, and Surigao contributed to the wood demand of the reconstruction

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[692] Gaceta de Manila Año XX, No. 205, p. 1387, 24 July 1880, Nombramiento de una Comisión para fijar los precios de articulos de primera necesidad, EAR S1 052, Earthquake Data Records, Manila Observatory Library Archives.
[693] Gaceta de Manila Año XX, No. 219, p. 1490, Penas a los adulterados de cal, EAR S1 056, Earthquake Data Records, Manila Observatory Library and Archives.
[694] Gaceta de Manila Año XX, No. 210, p. 1419, 30 July 1880, Suspensión de derechos arancelarios, EAR S1 078, Earthquake Data Records, Manila Observatory Library Archives.
[695] Gaceta de Manila Año XX, No. 209, p. 1411, 29 July 1880, Corte de Maderas, EAR S1 013, Earthquake Data Records, Manila Observatory Library and Archives.
[696] Franquicia para la corte y pago de las maderas procedentes de los mates publicos, destinada a la construccion o reparacción de edificio destruido o deteriorados por los terremotos, ULTRAMAR 526 Exp. 4, Archivo Histórico Nacional (AHN).
[697] Ibid.
[698] Ibid.

program.[699] Provincial chiefs, parish priests, and gobernadorcillos supported this order, but some asked for more specific clarifications regarding the execution of the law, particularly the duration of its implementation. For the employees of the IGM and the local government units implementing the order, the government gave special subsidy for them to purchase such wood supply.[700]

Table No. 14
Summary of trees cut in virtue of the 28 July 1880 order[701]

Report date	Period Covered	Number of *facturas*	Number of pieces	Total in cubic feet	Tasacion by the IGM (Pesos)
11 August 1881	28 July 1880-11 August 1881	593	370,588	1,111,318.774	37,117.32/5
11 August 1881	01 January to 31 March 1881	247	107,974	432,037	15355.07/5

Estimates presented show the full reconstruction needed 1,543, 356 cubic feet of wood, and it will cost the government almost 12,000 pesos worth of franchise.[702] In the actual computation made after the implementation of the order, the government determined that it only lost 12,029.15 pesos from their annual revenue, after collecting 18,377.19 pesos, compared to 30,406.34 pesos collected in the previous year.[703] The Corregimiento de Manila on 29 July 1880 reported that policy indeed contributed to the lowering/maintaining the rise of prices of wood. The amount of wood before the earthquake was two reales per cubic feet, but immediately after the quake, it rose to 4 reales per cubic feet.[704] But at the end of 1880, it was pegged at 2.3 reales. In a separate report of Manuel Ramirez, Director de Adminsitración Civil, it echoed the same sentiments regarding the policy: there was enough supply of wood in the market, controlled were the prices, the infrastructural revival of towns destructed started, and that it was an improved response from the state government and local officials, compared to the 1863 earthquake.[705]

c.4.3 Fiscal aspect of the reconstruction: Initial budget allotment and releases

Rebuilding and rehabilitation of the ruined provinces entailed the civil government of the Philippines huge sump of money, as well as proper budgetary allocations and decisions. One lesson of the 1863 earthquake was that decisions on the use of funds, or where to source it from, took a relatively long time. Basing on the actions of the civil government after the July 1880 earthquake, the manifested a proactive stance on major fiscal decisions.

[699] Ibid.
[700] Ibid.
[701] Ibid.
[702] Ibid.
[703] Ibid.
[704] Ibid.
[705] Ibid.

Budget releases made focused on two things: (1) overall budget for the reconstruction of state and public buildings, and (2) payment for jornales and other workers.

The expenses incurred for the transfer of government equipment, rent of new offices, transferring offices, acquisition of utilities for protection from damages, construction of provisional shelters for the troops, and salary of faginantes and jornales, as reported to Madrid on 10 August 1880 was 197,467.99 pesos and 6/8 cents.[706]

In Manila, budget for the immediate repair and rehabilitation of certain state buildings was allotted and released. On 31 July 1880, the Governor General Primo de Rivera ordered the release of 60% of the initially allotted 3000 pesos designated for the repair of 11 buildings, which include Palacio de Malacañang, Casa de Moneda, Palacio de Sta. Potenciana, Camarin para oficinas de la IGOP, Torre de la Catedral de Manila, Tribunal de Cuentas, Central de Impuesto, Almacenes Generals de Estancadas de Binondo, Fabrica de Tabacos de Arroceros, Fabrica de Tabacos de Meisic, and the Tribunal Superior Territorial de Cuentas.[707]

On 05 August 1880, Governor-General Primo de Rivera and the Dirección General de Administración issued two circulars concerning the approval and release of expenses for certain construction activities. The former issued an order authorizing the release of funds for the reparation and rehabilitation of government buildings, specifically the construction of temporary shelters for troops, government employees, as well as for the government documents.[708] The latter supplemented the governor-general's order and tasked the Subdelegados de Ramos to provisionally approve the expenses of reparations and reconstructions of properties damaged and destroyed by the earthquake, both in the provincial and municipal levels.[709] The civil government released an amount of 8,491.69 pesos 4/100 centimos as payment for the workers in the retrieval of documents and cleaning of debris, after almost ten days of operations.[710] For example, the Central de Impuestos needed to be transferred to another place as they kept important bureaucratic documents, so as the fiscal activities of the government needed to continue despite the destruction of the Manila.[711] This kind of urgency was the same in the case of the Almacen de Binondo, where tobacco supplies were stored and needed immediate salvaging, as these are vital trade products.[712]

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[706] Rollo 250_1880, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).
[707] Rollo 948_1880, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).
[708] Gaceta de Manila Año XX, No. 217, p. 1471, 06 August 1880, Autorización de obras de reparacion en los edificios del Estado, EAR S1 006, Earthquake Data Records, Manila Observatory Library and Archives.
[709] Gaceta de Manila Año XX, No. 218, pp. 1481-1482, 07 August 1880, Aprobación de cuentas de gastos en las reparaciones de edificios, EAR S1 005, Earthquake Data Records, Manila Observatory Library and Archives.
[710] Ibid.
[711] "Gastos extraordinarios ocasionados por los terremotos en los días 18 y 20 de Julio", Rollo 7453 Legajo 4-5_1858-1897, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).
[712] Rollo 948_1880, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).

A month after the operations in Manila, the government transfered a portion of its work force to Cavite. Upon the instruction of the IGOP, lot of workers needed to be enlisted to fulfill the reconstruction project. The project in Cavite included the Fabrica de Tabacos, churches, convents, parochial houses, military shelters, and identified priopiedades urbanas, such as casa particulares and casa de piedras. From September to November 1880, the civil government released 13.5 pesos for jornales for three particular days of work.[713]

c.4.4 "Aseismic" structures and towns: Standardization of building construction

On 18 August 1880, Governor-General Primo de Rivera issued a decree detailing the implementation of a new urban construction system, from ordinary to large houses, which will focus on the capacity of structures to be earthquake resistant.[714] On 23 August 1880, the governor general issued a circular to provincial chiefs informing them about the implementation of this new system to build aseismic buildings, for private houses and public structures[715] The system is to prevent the loss of properties and materials, and it will focus on churches, schools, and orphanages, where many people can be affected once an earthquake strikes.[716] Governor-General Primo de Rivera tasked the Corregidor de Manila to monitor every construction project, and those who did not subscribe to the prescribed rule will have their license suspended.[717] The Governor-General expanded the order in a separate decree dated 20 August 1880, which imposed strict submission to the prescribed building code, to prevent unnecessary problems caused by earthquakes or any environmental threat.[718] But it is important to note that despite this strict implementation of the license system in post-earthquake construction attempts, the religious, the Manila Archbishop, in particular, had the discretion to grant some license as well for the reconstruction of ecclesiastical structure that was under the diocesan administration.[719] The release of funds was directly under its discretion. For example, the damaged Paco Church had been allotted in by church funds, amounting to 27,452.77 pesos.[720]

The government took a close watch over the implementation of this up-to-date building code and practices. Governor Primo de Rivera ordered the IGOP chief, civil engineer

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[713] “Expediente Interior: Reedificacion propiedad urbana de Cavite”, Ibid.

[714] Gaceta de Manila Año XX, No. 231, p. 1575, 20 August 1880, Decreto sobre construcciones aseismicas, EAR S1 015, Earthquake Data Records, Manila Observatory Library and Archives.

[715] Gaceta de Manila Año XX, No. 235, p. 1603, Aplicacion de la reglas para la construcción aseismica de edificios, EAR S1 004, Earthquake Data Records, Manila Observatory Library and Archives.

[716] Ibid.

[717] Gaceta de Manila Año XX, No. 238, p. 1627, 27 August 1880, Cumplimiento de las reglas de construccion siesmica de edificios, EAR S1 014, Earthquake Data Records, Manila Observatory Library and Archives.

[718] Gaceta de Manila Año XX, No. 233, p. 1591, 22 August 1880, Conservancia de las reglas sobre construcciín aseismica y reparación de edificios, EAR S1 053, Earthquake Data Records, Manila Observatory Library and Archives.

[719] Gaceta de Manila Año XX, No. 210, p. 1419, 30 July 1880, Dispensa ecclesiastica para trabajar en días festivos, EAR S1 019, EAR S1 004, Earthquake Data Records, Manila Observatory Library and Archives.

[720] La Iglesia de Paco y los temblores de 1880, EAR S1 036, EAR S1 004, Earthquake Data Records, Manila Observatory Library and Archives.

Manuel Ramirez, with associates Manuel Lopez Bayo and Antonio de la Camara, to study the technical conditions that the buildings should comply.[721] Changes in edifice construction were immediately observed, particularly on the materials used primarily in reference to hydraulic concrete and brick, galvanized iron and flat tiles (instead of cane and *nipa*), and on other elements such as foundations, walls, floors, balconies, trusses, bridge pillars, and building locations.[722] The proactive actions of the government hastened its campaign against inferior practices in construction; thus, regulation on masonry structures and making it more resistant to earthquakes became more probable.[723] It is essential to take note that Cortes's idea of affinity in combining anti-seismic and anti-cyclonic methods of building construction influenced succeeding colonial endeavors; this idea was having clear pattern indication with what Italian seismologist Michelle Stefano de Rossi's endogenous-exogenous meteorology categorization on seismic and cyclonic phenomena.[724]

The government specified the rules in the construction of aseismic buildings in a separate circular published in the Gaceta de Manila. The report titled "Reglas mas principals a que deberan sujetarse los edificios publicos y particulares que se construyan o reparen en las Islas Filipinas"[725] It contains 47 rules and regulations formulated by the Junta Facultativa de Obras Publicas, a special committee created to oversee the planning of the rehabilitation of towns affected by the earthquake. It is a summary of the study of terrains and landscapes, focusing on construction feasibilities, sedimentation, altitude, longitude, wall thickness, appropriate construction materials, masonry forms, structure frames, armory, roofs, and balconies.[726] The civil government was serious in checking on houses in the succeeding months if they followed the approved structure. More than five months after the earthquake, the Corregidor de Manila ordered town chiefs to ask homeowners to paint their properties white or blank/bland, to identify the damaged houses after the earthquake.[727] This action was, for them to monitor and identify restored houses previously destroyed in the period, and if they followed the aseismic plan approved by the government.

Aside from the gradual rehabilitation of towns and provinces, the civil government needed to secure its armed capability by immediately reconstructing its military and economic ports. As stated, the earthquake severely damaged the Aduana de Manila and the Fuerza San Felipe Neri in Cavite. There was a quick initial plan for the reconstruction of certain parts, but it took the civil government until the start of the following year, to finalize and implement the comprehensive rehabilitation of these port facilities. The civil government immediately sent to Madrid a plan to repair the Aduana de Manila, for their

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[721] Aitor Anduaga, "Earthquake Building Overseas: Military Engineers, Cyclonic-Seismic Affinity and the Spanish Dominion in the Philippines, 1860-1898", *Engineering Studies*, Volume 6, No. 1 (2014), pp. 7-8.
[722] Ibid., p. 9.
[723] Ibid., pp. 9-10.
[724] Ibid., p. 12.
[725] Gaceta de Manila Año XX, No. 205, p. 1387, 25 July 1880, Reglas para la construccion aseismica de edificios, EAR S1 069, Earthquake Data Records, Manila Observatory Library and Archives. An international journal on seismology published an English translation of this work, with the title "Construction in Earthquake Countries". *Transactions of the Seismological Society of Japan* 15 (Tokyo: Government Printing Office, 1890).
[726] Ibid.
[727] Gaceta de Manila Año XXI, No. 12, p. 76, 12 January 1881, Buen aspecto de la casa, EAR S1 008, Earthquake Data Records, Manila Observatory Library and Archives.

approval and comments. The response was to let the IGOP and the Junta Consultativa de Obras Publicas finalized the plan and budget. The Junta set a budget of 1350 pesos, and was approved by the Overseas Ministry and Dirección General de Administración; the authorities officially adopted the plan by January of 1881.[728] The plan indicated that the rehabilitation would primarily focus on buildings used for commerce, trade and, military. Luis Céspedes of the IGOP adhered to this overall need and proposed a practical and economical solution to the damages incurred by several buildings. Céspedes used in his plan the "sistema pampango": the use of molave and banaba tablets, and a mix of materials, both wood and galvanized iron, and will focus on durability and strength and presence of partitions of a structure.[729] The Hacienda Publica, part of the Aduana complex, was added to the plan a few months after.[730] From this point, it is observably clear the several aspects of the "aseismic" building construction: use of mixed materials – stone and wood, and the use of local materials and systems of construction. Merino (1987) made a study of the process of planning and implementation of the rehabilitation of the Aduana de Manila, and the roles played by state architect Céspedes in promoting modifications and reforms the construction of this vital state edifice in Manila.[731]

The new construction system not only entails implementation of the new perspectives on construction but also of the hiring of the new professional workforce. Therefore this necessitates a significant item in the budget and expenses to be taken into consideration. But the civil government, with the support of the Overseas Ministry, did not bat an eye in investing to these professional workers. The hiring of professionals was part of the "Servicio Extraordinario de Construcciones Urbanas, which aimed at implementing the desired earthquake resistant public structures in towns. "For the rest of the fiscal year 1880-1881, after the July 1880 earthquake, and the first two quarters of the following fiscal year, the civil government released 10,317.14 pesos for the payment of salaries, office rental, and office supplies for this project of innovating the construction system in Manila and in towns affected by the earthquake.[732] Bulk of the budget, around 88%, was used as salaries for professional workers. The workers hired included a chief engineer engineers, consultants (4), draftsman (1), scribes (4), paginantes (2), carpenters (6), *albañiles* (6), and a *portero* (1).[733]

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[728] "Expediente interior relativo a la reparacion de los desperfectos occasionados por los terremotos de Julio de 1880, en el edificio Antigua Aduana, ocupado por las dependencias Centrales de Hacienda" and Expediente principal relativo a la reparacion de los desperfectos occasionados por los terremotos de Julio de 1880, en el edificio Antigua Aduana, ocupado por las dependencias Centrales de Hacienda, Rollo 7420 Legajos 8-10, 1880, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).

[729] Proyecto de reparación de los pequenos deterioros causados en el edificio Antigua Aduana por los terremotos de Julio de 1880, ULTRAMAR 521 Exp. 04, Archivo Histórico Nacional (AHN).

[730] Ibid.

[731] Luis Merino, OSA, *Arquitectura y Urbanismo en el siglo XIX: Introducción general y Monografias* (Manila: Centro Cultural de España and The Intramuros Administration, 1987), pp. 179-314.

[732] Sobre autorizacion de los gastos que por un ano origina el Servicio Extraordinario de construccion urbana, creado al consecuencia de los terremotos de Julio del pasado ano, 1880, ULTRAMAR 521 Exp. 9, Archivo Histórico Nacional (AHN).

[733] Ibid.

The experience of July 1880 – the immediate actions, and the project to establish a policy of hazard-resilient construction system came to fruition, I argue, several years after. Even though Manila had somehow recovered, structurally and economically from the devastation brought about by the July 1880 earthquake, the Spanish bureaucracy in the case of the Philippines somehow always prevents an immediate implementation of valuable, innovative governance programs and approaches. But this was not due to archaic perspective.

The period between 1882 and 1890 was a period of rigorous scientific knowledge production in the fields of sciences that have direct impact or benefits correspondingly, the economy and politics of the archipelago. "Progressive" policies, such as in urban construction, were concretely manifested at the end of the decade of 1880s. One example was the implementation of a comprehensive public works system in September 1880, based on royal orders crafted between 1866 and 1868. The new *pliego de condiciones* (implementing rules and regulations) on public works and construction contain six chapters dealing with the type of structures, the economics of public works, as well as innovative and evolving measures the authorities iterated in 66 detailed provisions explaining the program implementation.[734] This comprehensive new set of new rules was published in English at the *Transactions of the Seismological Society of Japan* in 1889.[735] Moreover, it is interesting to note as well that even other countries viewed the post-July 1880 reconstruction projects as a model or template for post-disaster rehabilitation. In December 1894, the Republic of Argentina communicated with the Madrid government, wanting to learn the measures applied and used in reconstructing building in the Philippines, especially after the July 1880 earthquake.[736]

c.5 Interpretations of the July 1880 earthquake

Residents had to cope with safety personally at the immediate times after the earthquakes.[737] But the social climate immediately changed; the spirit of the public have gone up, and a collective tranquil sentiment was felt, several days after the earthquake, probably a manifestation of satisfaction to the fast response of the authorities.[738] Different sectors interpreted the quick action of the authority as a manifestation of the powerful and natural support of the monarchy.[739] The address of Governor-General Primo de Rivera to the people of Manila on 22 July 1880 published in a Gaceta Estraordinaria reflects the religious and scientific treatment of the earthquake. He asked the people to pray for God's mercy, but at the same time, encouraged people to help in

[734] Pliego de Condiciones generales para la construcción de las obras publicas, Rollo 7421 Legajo 10_1863-1870, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).
[735] "Building Regulations for Manila", *Transactions of the Seismological Society of Japan* 14 (Tokyo: Government Printing Office, 1889): 95-126.
[736] La Legación de la Republica Argentina por conducto del Ministerio de Estado solicita conocer la leyes, reglamentos y ordenanzas que sobre edificacion rigen en Filipinas, para precaren los danos que ocasionan los terremotos, ULTRAMAR 520 Exp. 21, Archivo Histórico Nacional (AHN).
[737] Document No. 21, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[738] Document No. 27, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471 Expediente 1.
[739] Ibid.

the scientific inquiry of this “fenomeno geological”.[740]Historical sources indicate that the July 1880 earthquake was both natural-religious and scientific-geological. Different sectors of the areas affected by the grand tremor of mid-July of that month of 1880 had varying views about the disaster. On the one hand, the religious viewed it product of divine frustration, a repetition of the Almighty's punishment to the people. On the other hand, it was considered a natural, geological phenomenon that needed a more informed, and scientifically grounded approach for the city not to be destroyed again by the same hazardous event. These descriptions comprehensively depict the way the government and the people considered the earthquake as a disaster, and thus reflected their responses to it. If the June 1863 earthquake caught the Manila off guard – both it its strength and the way the Spanish bureaucracy response to the crisis, the 1880 earthquake revealed a more strategic, less loose, and proactive approach of the sectors affected when it comes to immediate response, rehabilitation, scientific treatment of the problem, and cultural valuation of the natural hazard.

c.5.1 The Natural-Religious: Interpretation of and responses on the earthquake from the point of view of the religious

Religious response is a reactive, yet constant and culturally lingering approach in dealing with disasters. As this kind is the most common amongst societies that experience wide-scale calamities, associating disasters with as a result of a benevolent or powerful being's scourge to the believer is a typical and expected response. Bankoff (2004) argues that in the case of the Philippines, the clash and interaction of the indigenous perspective and the influence of the Judeo-Christian tradition in looking at forces of nature shapes the dominant norms and makes things complicated for disaster response and recovery.[741] He furthers that there is an apparent duality in viewing the "Nature" as both fatal and makes humans powerless, and divine as a loving being.[742] People manifested this binary of benevolence-malevolence in how the ordinary and religious sectors of the 19th century Luzon communities viewed and reacted to the wrath brought by the trembling earth.

The Manila Archbishop Payo y Piñiero led a series of religious activities as a response to the disaster that again struck the city of Manila. On 22 July 1880, a day after the Manila felt the strong aftershocks, he celebrated a mass in the open field of Bagumbayan outside Intramuros, dedicated to the Santa Maria Magdalena, the patron of repentant sinners, where he encouraged believers to pray and sacrifice for the city and the victims of the earthquakes.[743] On 12 September 1880, the Gaceta de Manila published a circular of the archbishop dated 09 September 1880 declaring 12 December 1880 as a special day to remember the disastrous earthquake.[744] The *Te Deum* was sang on that day for

[740] “Alocucion del Gobernador General”, EAR S1 003, Earthquake Data Records, Manila Observatory Library and Archives.
[741] Greg Bankoff, “In the Eye of Storm: The Social Construction of Forces of Nature and the Climatic and Seismic Construction of God in the Philippines”, *Journal of Southeast Asian Studies* 35 (1), National University of Singapore, 2004, pp. 92-93.
[742] Ibid., p. 95.
[743] “Rogativa en el campo de Bagumbayan por razon de los terremotos”, cited from “Los terremotos en Filipinas en Julio de 1880”, EAR S11 058, Earthquake Data Records, Manila Observatory Library and Archives.
[744] Gaceta de Manila, Año 20, No. 254, p. 1744, “Solemne Te Deum por haber cesado los terremotos”, EAR S1 075, Earthquake Data Records, Manila Observatory Library and Archives.

the victims of the earthquake, and the resurrection of the city; the Governor General ordered the officials of the Army and the Compania de Artlleria to assist in the mass by sending the troop band, playing music and parading the official flags of the troops.[745]

A week after the earthquake, the Augustinian friars celebrated a holy mass in honor of the La Santissima Virgen de la Consolación for keeping the religious safe from the quake, their church and the convent. [746] Later on, they sang a solemn "Salve" and conducted a procession of the statue of the patron around Manila for the blessing and recovery of all the people affected by the earthquake.[747] On 02 July 1880, a group of religious celebrated at the Colegio de Santa Isabel, for the victims of the earthquake, and the miracle that God saved their convent from being destroyed by the earthquake.[748]

The anniversary of St. Vincent de Paul, celebrated every 19th of July, coincided with the days of the major tremors and aftershocks of the July 1880 Manila earthquake. The Paulinian institutions in Manila, in their letter of reports to their superior in France, namely the letter of Superior of the Philippine Province of St. Paul, as well as Sister Tiburcia Ayanz's to the Superior General of the Hermanas de la Caridad, stated the experience of the congregation during the days of the calamity, and their decision to celebrate their founder's anniversary turned out to be a solemn remembrance for the victims of the earthquake.[749]

These examples were observed during the immediate days and weeks after the earthquakes struck Manila in July 1880. The religious institutions in Manila did their piece of spiritual activities as a manifestation of their adherence to the providential nature of the disaster, and the message it tried to relay regarding faith and devotion of the people.

In the Roman Catholic pantheon, one particular saint is prayed for the salvation of people from earthquakes. In Italy, Spain, Mexico, and Cuba, Sam Emigdio, (279-303/309 CE) is recognized as the patron or abogado (defender) against earthquakes, the roots of his veneration originates from Italy, in Ascoli Piceno, where he served as a Christian bishop and is credited for "saving" the said Italian city from an earthquake in 1703.[750] His feast day is every 5th of August of the Catholic year.[751] Prayers and orations dedicated to San Emigdio are being used to ask for protection from the said natural hazards. For example, a novena stamp from Valencia in Spain (1829/1879-1900), contains the following parts of the prayer-oration:

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[745] Ibid.

[746] "La comunidad de Padres Agustínos y los terremotos de 1880", EAR S1 034, Earthquake Data Records, Manila Observatory Library and Archives.

[747] Ibid.

[748] "El Colegio de Santa Isabel y los terremotos de 1880", EAR S1 025, Earthquake Data Records, Manila Observatory Library and Archives.

[749] "Carta del P. Superior de los Paules sobre los teremotos de 1880" and "Carta del Sor Tiburcia Ayanz a la Superior General de la Hermanas de la Caridad", cited from "Breve Resena de la labor realizada en estas islas por la doble familia de San Vicente de Paul", *Annales de la Congregation de la Mission*, Tomo XLV, pp. 601-603, EAR S1 010 and 012, Earthquake Data Records, Manila Observatory Library and Archives.

[750] "San Emigdio, obispo martir", <https://bit.ly/2QbbYdi>.

[751] Vicente Torres, *Gozos al glorioso San Emigdio, Obispo y Martir: abogado contra terremotos, su fiesta celebra la Iglesia el dia 5 de Agosto* (Gracia, Barcelona: Imp. De Torras, 1879-1900). Biblioteca Digital Hispánica, Biblioteca Nacional de España (BNE).

A San Emigdio Obispo
Abogado especial contra los temblores de tierra,
Para que la Divina Misericordia
Nos libres del azote del terremoto
Por la intercession del Santo

Oracion

Dios Nuestro Señor nos bendiga y nos defienda +: nos dé su ausilio, y tenga misericordia de nosotros +: vuelva á nosotros su piadoso rostro, y nos dé paz y serenidad +: Dios nuestro Señor bendiga esta casa+ y á todos los que en ella estamos y habiamos: y á ella y á nosotros libre del ímpetu del terremoto, en virtud del dulcísimo nombre de Jesus. Amen.

Jesus Nazareno Rey de los Judios
Cristo Señor nuestro está con nosotros. Amen.

O bienaventurado San Emigdio! Ruega por nosotros, y defíendenos del ímpetu del terremoto, en el nombre de Jesus Nazareno. Amen.[752]

Translation

To San Emigdio Obispo
Chosen protector against earthquake

So as the Divine Mercy
May it save us from the scourge of the earthquake
By the intercession of the Saint

Prayer

Our Lord God bless us and defend us +: Give us help, and have mercy on us +: Bring back to us his pious face, and give us peace and serenity +: God our Lord bless this house + and all who in it, we are and we had: and to her and to us free from the impetus of the earthquake, by virtue of the Blessed name of Jesus. Amen.

Jesus Nazarene, King of the Jews Christ Our Lord is with us. Amen.

Oh blessed Saint Emigdio! Pray for us, and defend us from the impetus of the earthquake, in the name of Jesus Nazarene. Amen.

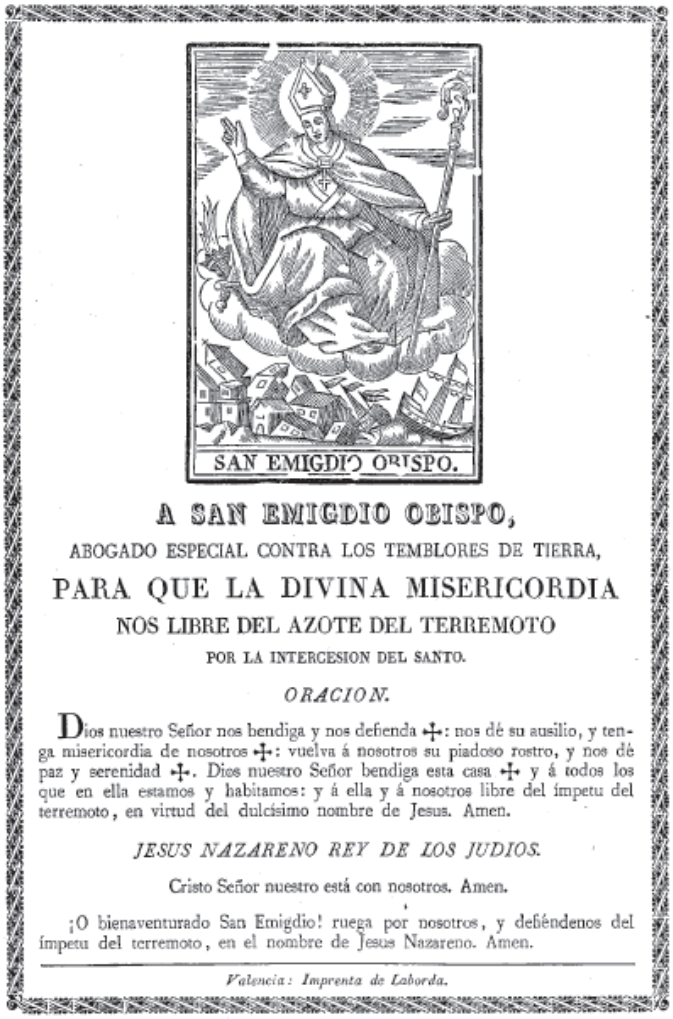
Different versions of this oration, as well as a song one, are also found in some prayer stamps in Aldorado in Alicante province of Spain.[753]In Mexico, a 1765 prayer handbook in Mexico suggests that people pray for the Nuestra Señora de la Soterraña for

[752] Religious stamp containing a novena/prayer for San Emigdio. Biblioteca Digital Hispánica, Biblioteca Nacional de España (BNE).
[753] "Novena a San Emigdio, Obispo y Martir, Abogado especial contra los temblored de tierra", <https://bit.ly/2E83I7m>.

protection from earthquakes, together with other hazards such as tempests ands thunder and lightning.[754] Moreover, a prayer handbook in Cuba published in 1906 provides us a general type of novena to protect the people from calamities such as earthquakes.[755]There are no available documentary sources providing information that people venerated these patrons in the Philippines, or if there are other patrons or saints specifically dedicated to earthquakes.

Photo No. 5

Sketches of San Emigdio, Obispo y Martir, Patron contra los Terremotos[756]



SAN EMIGDIO OBISPO.

A SAN EMIGDIO OBISPO,

ABOGADO ESPECIAL CONTRA LOS TEMBLORES DE TIERRA,

PARA QUE LA DIVINA MISERICORDIA

NOS LIBRE DEL AZOTE DEL TERREMOTO

POR LA INTERCESION DEL SANTO.

ORACION.

Dios nuestro Señor nos bendiga y nos defienda ✣: nos dé su ausilio, y tenga misericordia de nosotros ✣: vuelva á nosotros su piadoso rostro, y nos dé paz y serenidad ✣. Dios nuestro Señor bendiga esta casa ✣ y á todos los que en ella estamos y habitamos: y á ella y á nosotros libre del ímpetu del terremoto, en virtud del dulcísimo nombre de Jesus. Amen.

JESUS NAZARENO REY DE LOS JUDIOS.

Cristo Señor nuestro está con nosotros. Amen.

¡O bienaventurado San Emigdio! ruega por nosotros, y defiéndenos del ímpetu del terremoto, en el nombre de Jesus Nazareno. Amen.

Valencia: Imprenta de Laborda.

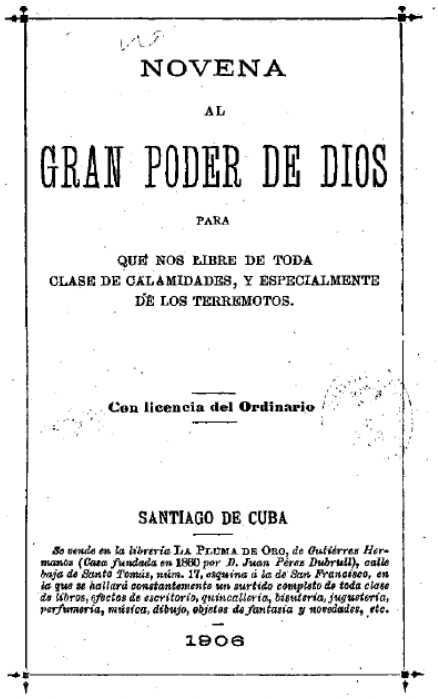
[754] Joseph Cabezas, *Novena de Nuestra Señora de la Soterraña de Nieva, Defensora especial de Tempestades, Rayos, Centellas, Truenos, y Terremotos* (Mexico, 1765)

[755] Novena al Gran Poder de Dios para que nos libre de toda clase de calamidades, y especialmente de los terremotos (Santiago de Cuba: La Plume de Oro 1906).

[756] Religious stamp containing a novena/prayer for San Emigdio. Biblioteca Digital Hispánica, Biblioteca Nacional de España (BNE); Vicente Torres, *Gozos al glorioso San Emigdio, Obispo y Martir: abogado contra terremotos, su fiesta celebra la Iglesia el dia 5 de Agosto* (Gracia, Barcelona: Imp. De Torras, 1879-1900). Biblioteca Digital Hispánica, Biblioteca Nacional de España (BNE).

Photo No. 6

Prayer handbook for earthquakes in Mexico (1765)[757] and Cuba (1906)[758]



NOVENA

AL

GRAN PODER DE DIOS

PARA

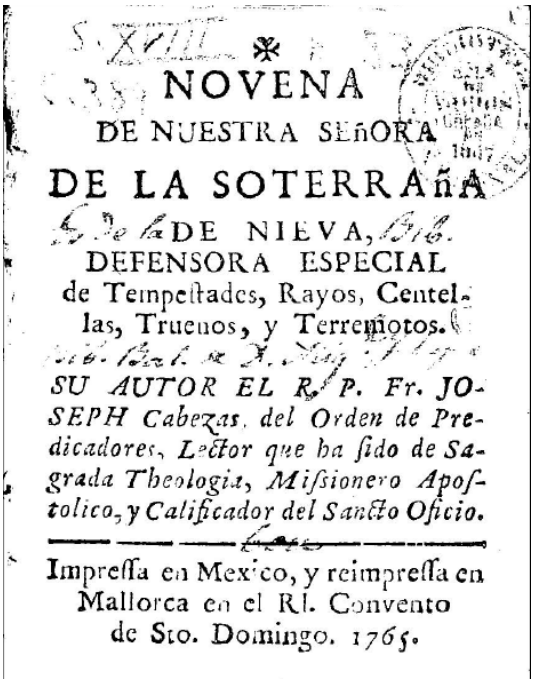
QUE NOS LIBRE DE TODA
CLASE DE CALAMIDADES, Y ESPECIALMENTE
DE LOS TERREMOTOS.

Con licencia del Ordinario

SANTIAGO DE CUBA

Se vende en la librería LA PLUMA DE ORO, *de Gutiérrez Hermanos (Casa fundada en 1860 por D. Juan Pérez Dubrull), calle baja de Santo Tomás, núm. 17, esquina á la de San Francisco, en la que se hallará constantemente un surtido completo de toda clase de libros, efectos de escritorio, quincallería, bisutería, juguetería, perfumería, música, dibujo, objetos de fantasía y novedades, etc.*

1906



NOVENA
DE NUESTRA SEñORA
DE LA SOTERRAñA
DE NIEVA,
DEFENSORA ESPECIAL
de Tempeſtades, Rayos, Centellas, Truenos, y Terremotos.
SU AUTOR EL R. P. Fr. JOSEPH Cabezas, del Orden de Predicadores, Lector que ha ſido de Sagrada Theologia, Miſsionero Apoſtolico, y Calificador del Sancto Oficio.
Impreſſa en Mexico, y reimpreſſa en Mallorca en el Rl. Convento de Sto. Domingo. 1765.

[757] Joseph Cabezas, *Novena de Nuestra Señora de la Soterraña de Nieva, Defensora especial de Tempestades, Rayos, Centellas, Truenos, y Terremotos* (Mexico, 1765)

[758] Novena al Gran Poder de Dios para que nos libre de toda clase de calamidades, y especialmente de los terremotos (Santiago de Cuba: La Plume de Oro 1906).

c.5.2 The Scientific-Geological: Commissioned studies

The period between the two major earthquakes paved the way for the colonial state to assess its knowledge on earthquakes, and readiness and preparedness in responding to crises caused by natural hazards. There was a collective thought that earthquake experiences of 1863 and 1880 were to be understood using scientific norms, despite the relatively backward status, compared to Europe, of modern science in the archipelago. Production of knowledge was an informal movement; two groups of professionals advanced the scientific research and studies about earthquakes: first were the Jesuits of the Observatorio Meteórologico de Manila, and the second was the Spanish colonial engineers – both from the military (ingenieros militares), civil (ingenieros coloniales) and of the mines *(i*ngenieros de minas*).* One concrete manifestation of the Jesuits' commitment to science was through the establishment of scientific agencies in different parts of the world. The establishment of the *Observatorio de Manila* in 1865, and the creation of its seismic department afterwards brought about new mechanisms to understand earthquake occurrences. One of the first seismologists in the country was Federico Faura (1840-1897), the first director of the observatory. In June 1866, he arrived in Manila to teach at the Ateneo Municipal de Manila, to continue the studies made by the early Manila Jesuit scientists.[759] He was specializing in mathematics and physics in Rome, Italy before his assignment as director of the Jesuit observatory in Manila. His fellow Jesuits Fathers Juan Ricart (1838-1915), Miguel Saderra Masó (1865-1939), José Coronas (1871-1938), and William Repetti (1925-2014) were also active in pursuing researches in seismology in the late 19th and early 20th centuries.

One question to be dealt first is, are the earthquakes of the 19th century, which this chapter argues to be the blossoming of a more bureaucratic and institutional response from different sectors of the colonial society, were limited only in the archipelago? The answer is probably no. In other countries like Japan, seismology was also a growing field of knowledge and a scientific support discipline for policymaking. Moreover, the Meiji Era in Japan in the 19th century aggressively promoted the establishment of scientific institutions for the goal of economic modernization, through national industrialization. Clancey (2006) argues that the Great Nōbi earthquake in Honshu Island, Japan in 1891 "generated risks and opportunities for the Meiji nation-building project."[760] This argument corresponds to one effect of the Meiji Restoration Era programs – opening Japan to the rest of the world after several centuries of closure and isolation due to the Sakoku policy of the ruling Shoguns. Clancey (2006) furthers that the Japanese experience, especially "generation who lived through the Nōbi earthquake now took on the task of adapting foreign knowledge to Japanese nature and marrying the knowledge of the present to the knowledge discovered by their countrymen long ago."[761] The emergence of modern seismology from the mixture of traditional knowledge and Western seismological thoughts produced seismologists and architects that contributed to the framing of the contemporary national mindset in public construction and disaster response. Indeed, in the second half of the 19th century, Japan, together with Manila, was the leading producers of seismological knowledge in the Pacific. The establishment of the Tokyo

[759] William Repetti, "The Manila Observatory, Manila, Philippine Islands", The Woodstock Letters, Volume 57, No. 1 (1948), p. 8.
[760] Gregory Clancey, "The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe", *Modern Asian Studies* 40(4), 2006, p. 910;
[761] Gregory Clancey, *Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930* (California: University of California Press, 2006), p. 2.

Meteorological Observatory in 1875, and the founding of the Seismological Society of Japan in 1880 by leading foreign seismologists teaching at the Imperial College of Tokyo, as well as the presence of an active scientific journal, the *Transactions of the Seismological Society of Japan*[762], later as Seismological Journal of Japan, proves this argument. Indeed, the Meiji and Taishō eras laid down the foundation of modern and institutional seismology in Japan, and indeed contributed to the crafting of national narrative from disasters.[763] Furthermore, the interest of the situation of earthquakes and the rehabilitation of the city did not remain as an interest. The *Transactions of the Seismological Society of Japan* published the studies on earthquakes and volcanoes in the Philippines, made by the state engineers of the Spanish colonial government. These include the translation of Enrique Abella's work, *The Earthquakes of Nueva Vizcaya (Philippine Islands) in 1881* (1882)[764] and the *Monografía Geológica del Volcan de Albay ó el Mayón* (1883)[765], the translation to English of José Centeno's work on the July 1800 earthquake, *Abstract of a Memoir on the Earthquakes in the Island of Luzon in 1880* (1883)[766], and a translation to English of the building code passed in Manila after the July 1880 earthquake titled *Building Regulations in Manila* (1889).[767]

In the 19th century, one sector of professionally trained military officials played an active role in colonial development. The arrival of military engineers marked the advancing of modern anti-seismic engineering in the Philippines.[768] Though the Madrid government paid little attention to the proactive scientific development, given the fact to the limited number of scientists and technologists who can be sent or were willing to be assigned in the Philippines[769], military engineers did establish their presence as "modern architects" of colonial infrastructure development. The arrival of military engineers marked the advancing of modern anti-seismic engineering in the Philippines.[770] Though the Madrid government paid little attention to this proactive scientific development, given the limited number of scientists and technologists who can be sent or were willing to be assigned in the Philippines[771], these scientists served as the "modern architects" of colonial infrastructures resistant to earthquakes. In the case of state engineers, not only did they help develop seismology as a discipline, but they also institutionalized it through the inclusion of scientific knowledge in policies pertaining to building regulations. In the

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[762] See *Transactions of the Seismological Society of Japan,* Volumes 1-16, (Tokyo: Government Printing Office, 1880-1892).

[763] Clancey, *Earthquake Nation*, pp. 4-5.

[764] Enrique Abella y Casariego, "The Earthquakes of Nueva Vizcaya (Philippine Islands) in 1881", *Transactions of the Seismological Society of Japan* 4 (Tokyo: Government Printing Office, 1883): 38-60.

[765] Enrique Abella y Casariego, "Monografía Geológica del Volcan de Albay ó el Mayón", *Transactions of the Seismological Society of Japan* 5 (Tokyo: Government Printing Office 1883): 19-42.

[766] José Centeno y Garcia, "Abstract of a Memoir on the Earthquakes in the Island of Luzon in 1880", *Transactions of the Seismological Society of Japan* 5 (Tokyo: Government Printing Office, 1883): 43-88

[767] "Building Regulations for Manila", *Transactions of the Seismological Society of Japan* 14 (Tokyo: Government Printing Office, 1889): 95-126.

[768] Aitor Anduaga, "Earthquake Building Overseas: Military Engineers, Cyclonic-Seismic Affinity and the Spanish Dominion in the Philippines, 1860-1898", *Engineering Studies*, Volume 6 (1), p. 2.

[769] Albert Elena and Javier Ordoñez, "Science, Technology and the Spanish Colonial Experience in the Nineteenth Century", *Osiris* (15), 2nd Series, p. 75.

[770] Anduaga, "Earthquake Building Overseas", p. 2.

[771] Elena and Ordoñez, "Science, Technology and the Spanish Colonial Experience" p. 75.

Philippines, state engineers like Rafael Cerero Sáenz (1831-1906), José Centeno García (1841-?), Manuel Cortés (1839-1915), Antonio García del Canto (1823-1886), and Enrique Abella Casariego (?-1913) led the production of scientific knowledge. With this, the contributions of Cortés and Cerero on earthquakes, earthquake engineering, and anti-seismic construction methods need to be pointed out. Other government engineers such as Abella, García del Canto, and Centeno also contributed significantly to the production of scientific literature on seismology and geology. The case of Cerero and Cortés is notable because they combined with their structural studies and calculations of resistances using rational mechanics the estimation of the joint effects of both seismic and cyclonic forces.[772]

In the 1880s, the entrance of professional civil engineers as well as Jesuit seismologists who were commissioned somehow posed a challenged to the aggressive nature of the military engineers' proposal and involvement in seismic studies supported by the colonial government.[773] On the one hand, the joint efforts of the military, mining, and civil engineers paved way in unshackling the restraints of earthquake science by reconstituting the limits of their fields;[774] and on the other hand, the Jesuit scientists contributed to this scientific scheme by presenting up-to-date scientific studies on the nature of terrestrial movements, giving light to some issues regarding earthquakes and volcanic eruptions. Engineers and the Jesuit scientists of the observatory were commissioned to conduct their separate studies, thus manifesting a united effort and approach in assessing the scale and nature of damage of the recent earthquake.[775] On the part of the colonial government, the engineering sector was tapped to deal with the challenges and opportunities they can maximize, and the effects of frequent earth movements can be estimated and lessened. The role of military and mining engineers was a key point of applying Spanish science in making the goal feasible. The works of these professionals, as I argue, is the start of the emergence of modern and synergize seismology in the Philippines, manifested through scientific studies, commissioned works, and public scientific materials.

c.5.2.1 The Jesuits and the July 1880 earthquake

How science contributed to the crafting new knowledge about environmental phenomena reflects an understanding of people's responses to natural hazards can. Towards the second half of the 19th century, the world recognized science as a primary epistemological framework in human development.[776] This discourse brought a new light in enriching the status of science as substantial for reforms, not just a prerequisite to divinity and salvation. Also, Spain at these times accepted new means in administering colonies, social punishments, and even their views on the cause of the disasters.[777] With Spain's failure to develop her own scientific foundation during the period of *La Ilustracion*, the Madrid government only had the opportunity to push for modernization in

[772] Ibid.
[773] Ibid., p. 7.
[774] Anduaga, "Earthquake Building Overseas", p. 17.
[775] Ibid., pp. 7-8.
[776] Alvin Jason Camba, "Diskurso ng Siyensiya: Kolonyal na Diskurso sa mga Sakuna mula sa Panahon ng Instrumentasyon tungo sa Panahon ng mga Amerikano", *Daluyan: Jornal sa Wikang Filipino*, Vol. 16 (Quezon City: UP Sentro ng Wikang Filipino, 2010), p. 120.
[777] Ibid.

the second half of the 19th century. They did this, through the *rentier* mentality influenced by her well-developed Western European neighbors, such as France and Germany.[778]

The work of the Jesuits was highly regarded not only locally, but also internationally, as scientific communities abroad got impressed with their work on earthquake research.[779] Using his Italian training in physics and mathematics, he made improvised materials to record seismic activities in the vicinity of Manila, using only a simple pendulum to record horizontal motions, and a spiral spring and weight for vertical ones.[780] Since its inception as a scientific agency in 1865, the observatory conducted its initiatives to understand natural phenomena in modern scientific means. Led by its founding director Federico Faura, it developed seismic, magnetic, and astronomical sections in their laboratory. Faura made improvised seismic materials to record seismic activities in the vicinity of Manila, using only a simple pendulum to document horizontal motions and a spiral spring and weight for vertical ones.[781] The seismic section of the observatory initially started in 1869, when the Jesuits installed pendulum and spiral spring devices to their actual seismological instruments obtained abroad.[782] In the 1870s, the observatory successfully obtained more instruments abroad, as his research on seismic activities in the archipelago had attracted attention, particularly from seismic observatories in Italy and Japan.[783]

The July 1880 earthquake tested Faura's scientific theories about earthquakes, as well as the initial work and studies made by the observatory as a scientific institution. The government called on Faura to inform civil engineers and local authorities of his observations, laying the foundation of his reputation and the observatory as a trustworthy institution.[784] He served as the official informador of the Governor-General Primo de Rivera for the following ten days after 20 July 1880[785], the latter putting to the former telegraph and other essential communication systems at his disposal. In a report submitted to the civil government by the Director of the Ateneo observatory, Faura, it reported the necessary information and initial scientific analyses about the tremor: (1) it lasted for 1 minute and 10 seconds, and (2) unlike the previous earthquakes they studied, which was mainly horizontal and vertical, the movements and trepidations of the 18 July earthquake were in different directions.[786] In a separate report published in Gaceta Extraordinaria de Manila on 22 July 1880, they stated that as early as April and May 1880, and in the days before 18 July, they were able to record various movements in northern provinces of Luzon.[787] The observatory also published an expanded study of

[778] Elena and Ordoñez, "Science, Technology and the Spanish Colonial Experience", p. 75.
[779] Aitor Anduaga, "Spanish Jesuits in the Philippines: Geophysical Research and Synergies between Science, Education and Trade, 1865-1898", *Annals of Science* Volume 71 Number 4 (2014), p. 514.
[780] William Repetti, *The Manila Observatory, Manila, Philippines* (Washington Dc, 1948), p. 7.
[781] Ibid.
[782] Ibid.
[783] Ibid., p. 13.
[784] Anduaga, "Earthquake Building Overseas", p. 8.
[785] Miguel Saderra Masó, *La Seismologia en Filipinas: Datos para el studio de terromotos del Archipiélago Filipino* (Manila: Observatorio Meteorologico de Manila, 1895), p. 46-48.
[786] Document No. 21, *Terremotos que han tenido lugar en la isla de Luzon en los días 18 y 20 de Julio de 1880*, ULTRAMAR 471, Expediente 1, Expediente 3, Archivo Histórico Nacional (AHN).
[787] Resumen del observaciones siesmometricas verificadas en el observatorio del Ateneo Municipal en los diversos temblores que tuvieron lugar desde el dia 14 hasta el 25 de Julio de 1880, ULTRAMAR 5425 Expediente 26, Nos. 35 1-15, Archivo Histórico Nacional (AHN).

their records in the annual report they published.[788] Their work did not stop in communication with the government officials in the Philippines. They also relayed their studies with various scientific organizations abroad, especially with their fellow Jesuits in Europe, specializing in seismology. These include the Seismological Society of Japan and Ufficio Centrale di Meteorologia e Geodinamica in Italy. An international journal titled *La Ocenia Española published their work.*[789] Published international studies on earthquakes used Faura's scientific report as one source of information. For example, the work of the British Consul in Manila, Commander W. B. Pauli, titled "Notes on the earthquake of July 1880" used Faura's scientific notes, for he considers him as "particular fit person for his present post", as director of the observatory in Manila.[790] On November 1880, the Sociedad Economica del Amigos del Pais recognized Faura's work and awarded him a citation *Sócio de Mérito*.[791]

Resounding was Faura's work that colonial authorities and fellow scientists abroad were impressed.[792] The civil authorities and the public received his observations as well; as an expression of the city's appreciation, the Manila council conferred upon him the title "Hijo Adoptivo de Manila".[793] The observatory's work was highly regarded not only locally, but also internationally, as scientific communities abroad, impressing other seismologists in some relatively advanced countries when it comes to earthquake research.[794] Running the journal *Boletin Seismico* placed them in the map of progressive seismological research, as they follow the Italian system in earthquake studies.[795] But Faura and the observatorio impressed not all. Although many have commended the studies made by the observatory, some official had shown cold treatment to the work of the Jesuits.

Saderra Masó (1915) told that there was an unpleasant incident between Faura and Centeno.[796] The latter criticized the former for his apparent lack of involvement in the scientific interpretation of data, and the observatory's limited scope of work in the Manila area, which he thought was not enough to determine essential components of the Luzon-wide July 1880 earthquake, such as (specific epicenter location, isoseismic curves.[797] Between the two competing professionals – government engineers and Jesuits scientists, a form of "bureaucratic competition" emerged. The observatory's prominence somehow threated one of Centeno's visions. He had an intention to establish a *Servicio Seismológico de Filipinas*, same as with those in Italy, Japan, Switzerland, Portugal, and Germany, by purchasing equipment abroad.[798] Moreover, his apparent animosity towards Faura was probably beyond science. Centeno, together with other officials of the civil government in the Philippines, was a mason. He was said to be

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[788] *Resumen de las Observaciones sismometricas verificadas en el Observatorio del Ateneo Municipal en los diversos temblores que tuvieron lugar desde el dia 14 hastra el 25 de Julio de 1880*, Legajo 84, Rollo 4760, Archivo de Filipinas, Centro de Ciencias Humanas y Sociales-Consejo Superior de Investigacionas Científicas (CCHS-CSIC).
[789] Saderra Masó, *Historia del Observatorio de Manila,* p. 48.
[790] W.B. Pauli, "Notes on the earthquake of July 1880", *Proceedings of the Royal Society of London 31*, 01 January 1881, London, 1881.
[791] Ibid.
[792] Anduaga, "Earthquake Building Overseas", p. 8.
[793] Saderra Masó, *Historia del Observatorio de Manila*, Repetti, *The Manila Observatory*, p. 7.
[794] Aitor Anduaga, "Spanish Jesuits in the Philippines, p. 514.
[795] Ibid.
[796] Saderra Masó, *Historia del Observatorio de Manila*, p. 49.
[797] Anduaga, "Earthquake Building Overseas", p. 8.
[798] Saderra Masó, *Historia del Observatorio de Manila,* p. 50.

a life-long Republican and head of the Spanish Masons in the Philippines.[799] One may suspect that their politics coincided with how they treat each other's scientific ideas and studies.

The work of the observatory about the July 1880 earthquake, as well as in other environmental projects it started, propelled the realization for government officials to recommend it to become an official scientific agency under the civil government in the Philippines. In the same year, a commission was formed and recommended the creation of a state meteorological and seismological service.[800] After almost four years of submitting to the taxing bureaucratic structure in the Philippines and Spain, on 28 April 1884, the King of Spain issued a royal decree making the observatory the official meteorological and seismological service in the archipelago.[801] The initiative to purchase instruments from Europe to help the Jesuits improve their work first came from the merchants in Manila. Since the end of the 1860s, businessmen and traders donated a certain amount of money to buy modern apparatus for the Jesuits to expand their scientific work and help them in making the environment friendlier to the economic sector. The observatory obtained instruments like the Bertilli tromometer (1881), a Secchi seismograph and seismoscope (1881), an improved pendulum from the first one installed in 1869, two geophones (1886), a duplex-pendulum seismoscope (1888) obtained from renowned seismologist John Milne, a Secch microseismograph (1888), and a Gray-Milne three-component seismograph (1888).[802] In the decade of 1880, Faura obtained these instruments abroad, as his research on seismic activities in the archipelago had attracted attention, particularly from seismic observatories in Italy and Japan.[803] Other Jesuit fathers who were aside in the Philippine province until the end of the 19th century also specialized in seismology. These include Selga, Saderra Masó, Juan Vives, Marcial Sola, and Repetti.[804] From 1880 to 1800, the observatory produced 13 scientific studies on earthquakes and seismology, published in their bulletin, as well as in scientific journals abroad.[805]

The succeeding photos show the following: Photo No. 7 show the paotion of the report made by the Jesuits about the July 1880 earthquake, which was submitted to the Spanish civil government in Manila; and Photo No. 8 are sketches illustrating the Seismic Division of the Observatorio Meteorológico de Manila, as well as the seismological instruments it obtained and bought from abroad, to broaden its work on studying earthquakes in the archipelago.

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[799] Leon Ma. Guerro, *The First Filipino: A Biography of José Rizal* (Manila, National Historical Commission, 1974), p. 178

[800] Saderra Masó, *Historia del Observatorio de Manila*, p. 74.

[801] Ibid., pp. 73-80.

[802] William Repetti, "Seismology in the Manila Observatory, Manila, P.I., 1865-1934", INS S2 029, Institutional Data Records, Manila Observatory Library and Archives.

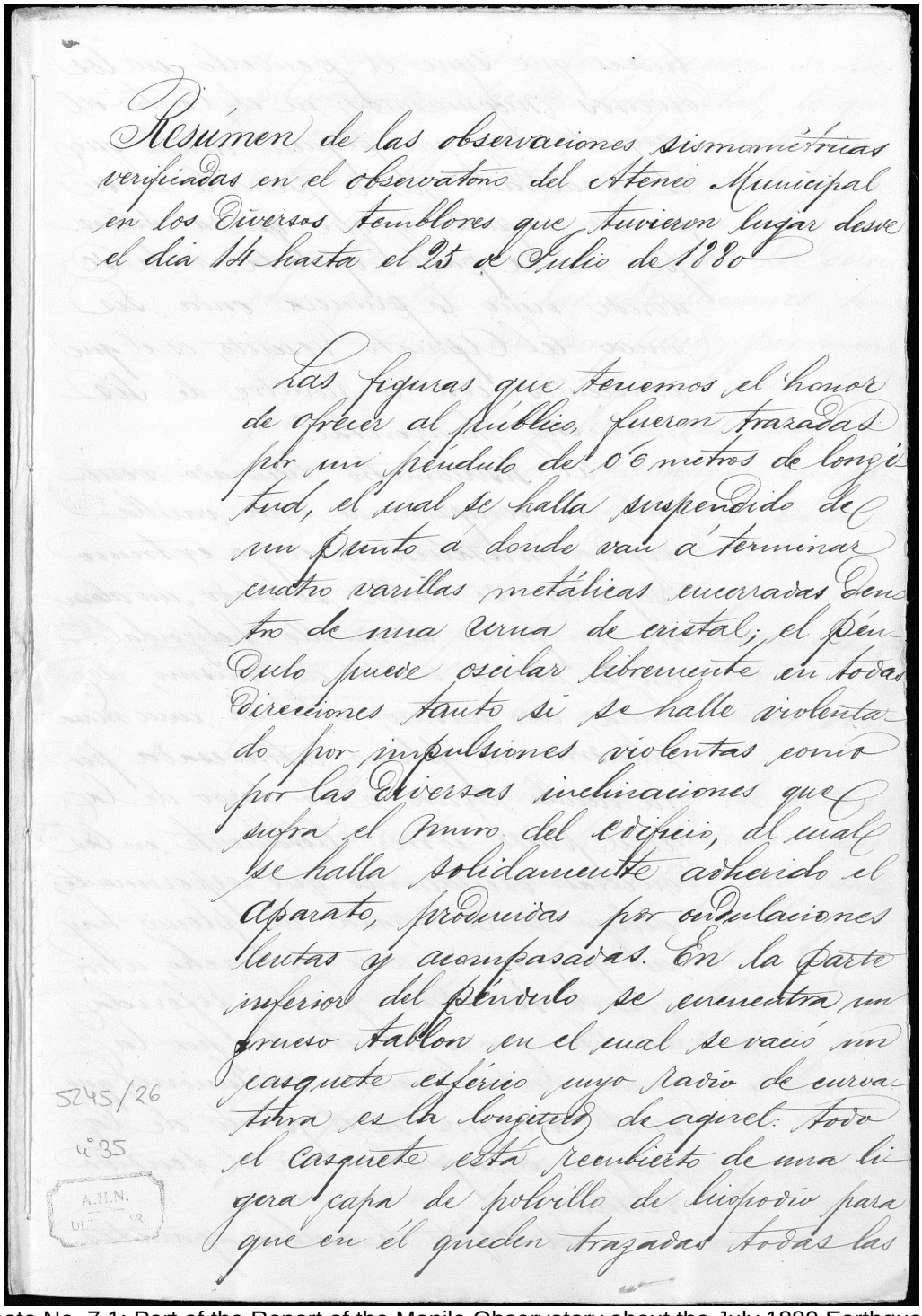
[803] Ibid.

[804] Agustín Udías, *Searching the Heavens and the Earth: The History of Jesuit Observatories* (Dordrecht, 2003).

[805] Repetti, "Seismology in the Manila Observatory, Manila, P.I., 1865-1934", p. 21.

Photo No. 7

Reports and studies made by the Manila Observatory about the July 1880 Earthquake[806]



Resúmen de las observaciones sismométricas verificadas en el observatorio del Ateneo Municipal en los diversos temblores que tuvieron lugar desde el dia 14 hasta el 25 de Julio de 1880

Las figuras que tenemos el honor de ofrecer al público, fueron trazadas por un péndulo de 0'6 metros de longitud, el cual se halla suspendido de un punto a donde van á terminar cuatro varillas metálicas encerradas dentro de una urna de cristal; el péndulo puede oscilar libremente en todas direcciones tanto si se halle violentado por impulsiones violentas como por las diversas inclinaciones que sufra el suelo del edificio, al cual se halla solidamente adherido el aparato, producidas por ondulaciones lentas y acompasadas. En la parte inferior del péndulo se encuentra un grueso tablon en el cual se vació un casquete esférico cuyo radio de curvatura es la longitud de aquel: todo el casquete está recubierto de una ligera capa de polvillo de licopodio para que en él queden trazadas todas las

5245/26

4°35

A.H.N. ULTRAMAR

Photo No. 7.1: Part of the Report of the Manila Observatory about the July 1880 Earthquake

[806] ULTRAMAR,5245,Exp.26

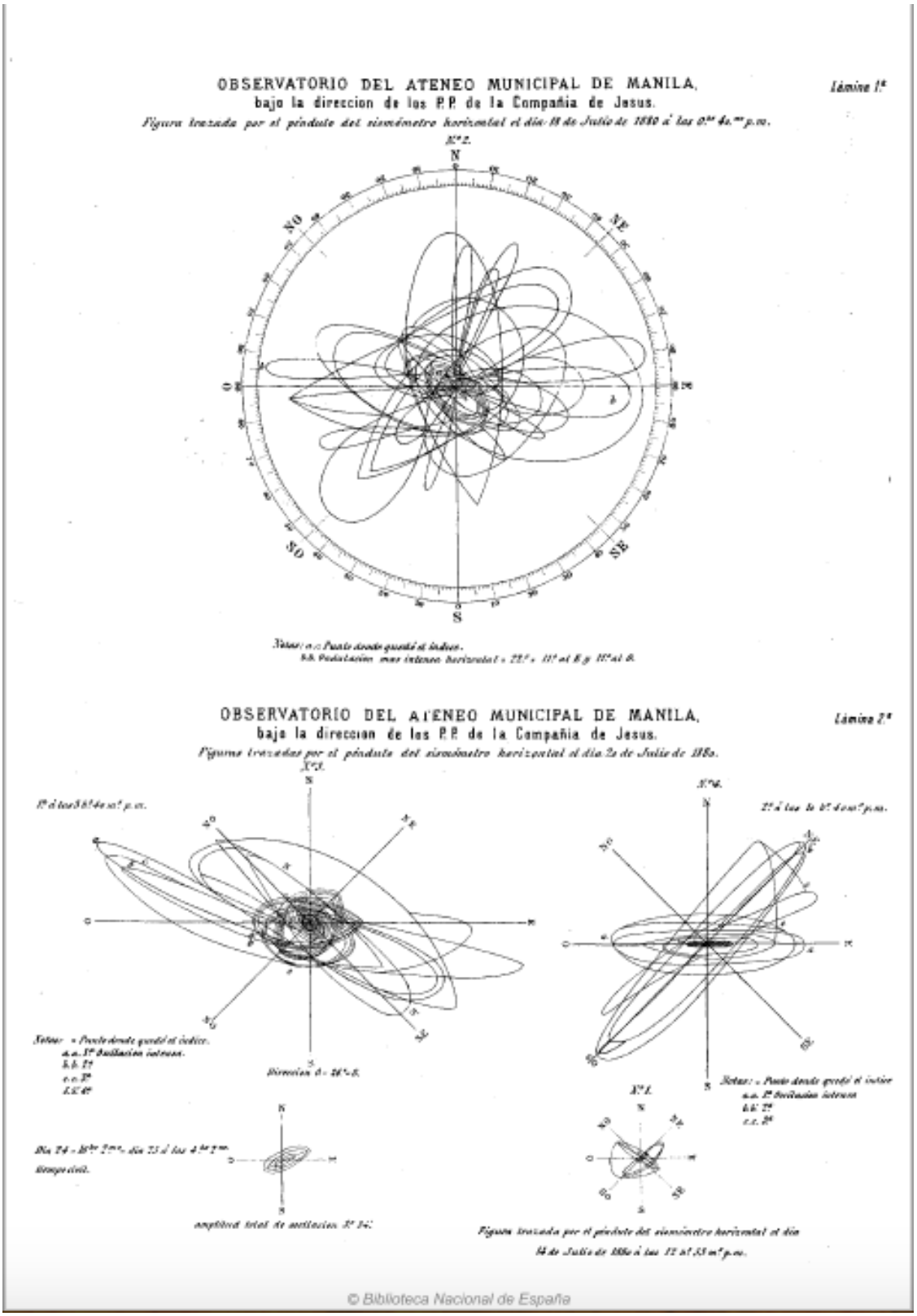


Photo No. 7.2: A diagram showing the movement and direction of the July 1880 earthquake

Photo No. 8

The Seismic Section of the Observatorio Meteorológico de Manila and its instruments[807]

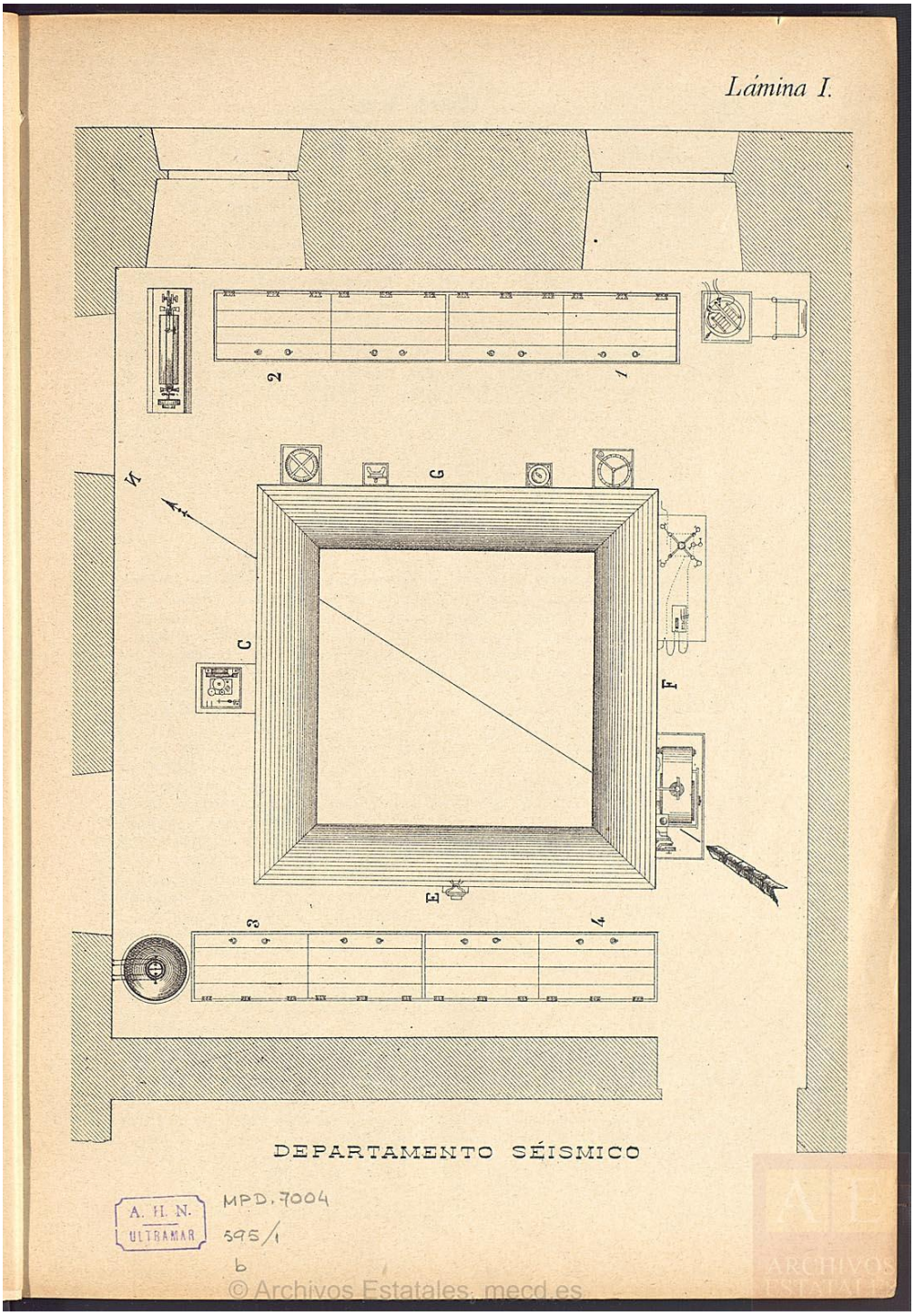


Photo No. 9.1: A blueprint of the Seismic Division of the Observatory

[807] Saderra Masó, *La Seismologia en Filipinas,*

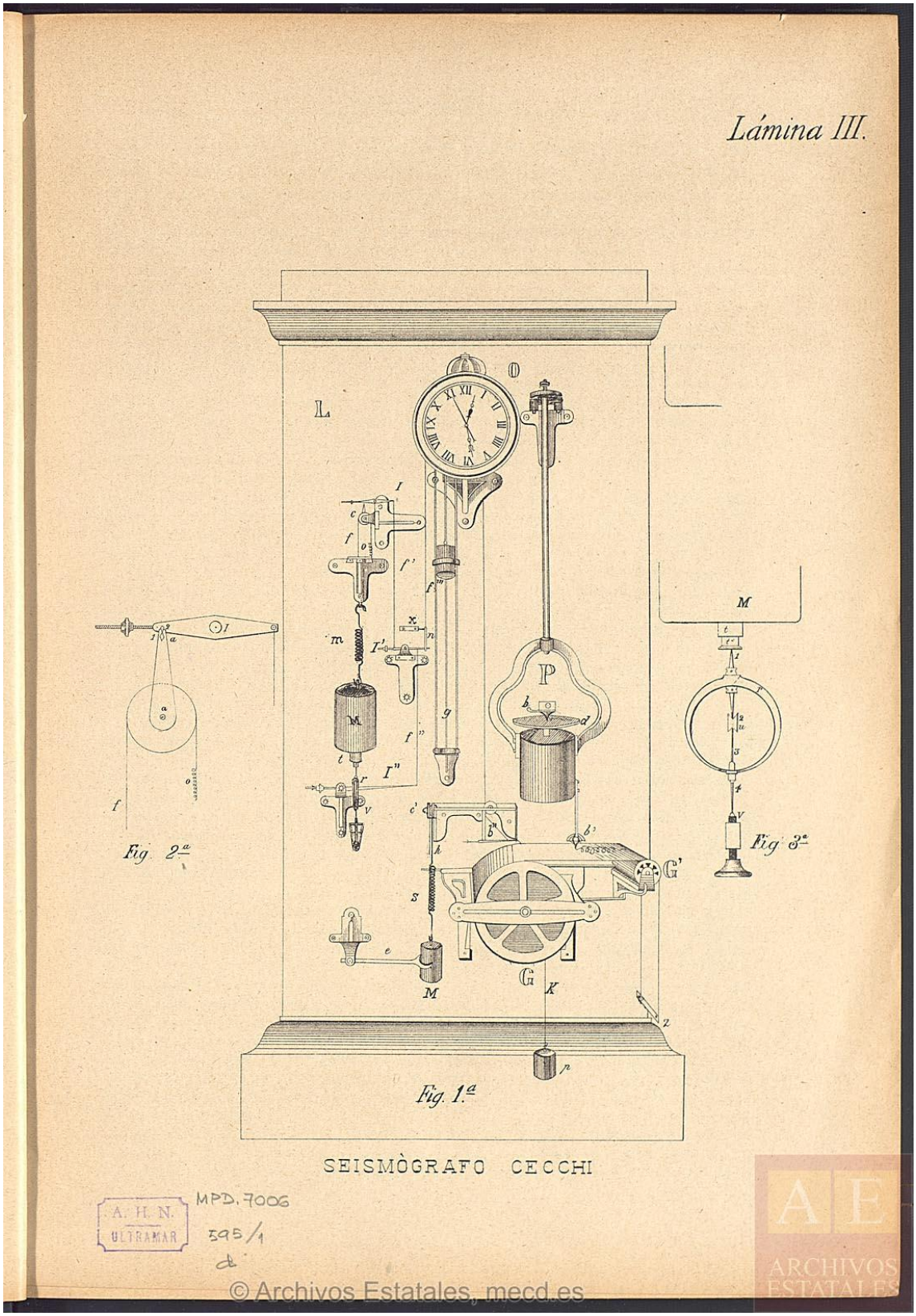


Photo No. 9.2: A sketch of the Secchi Microseismograph of the Observatory

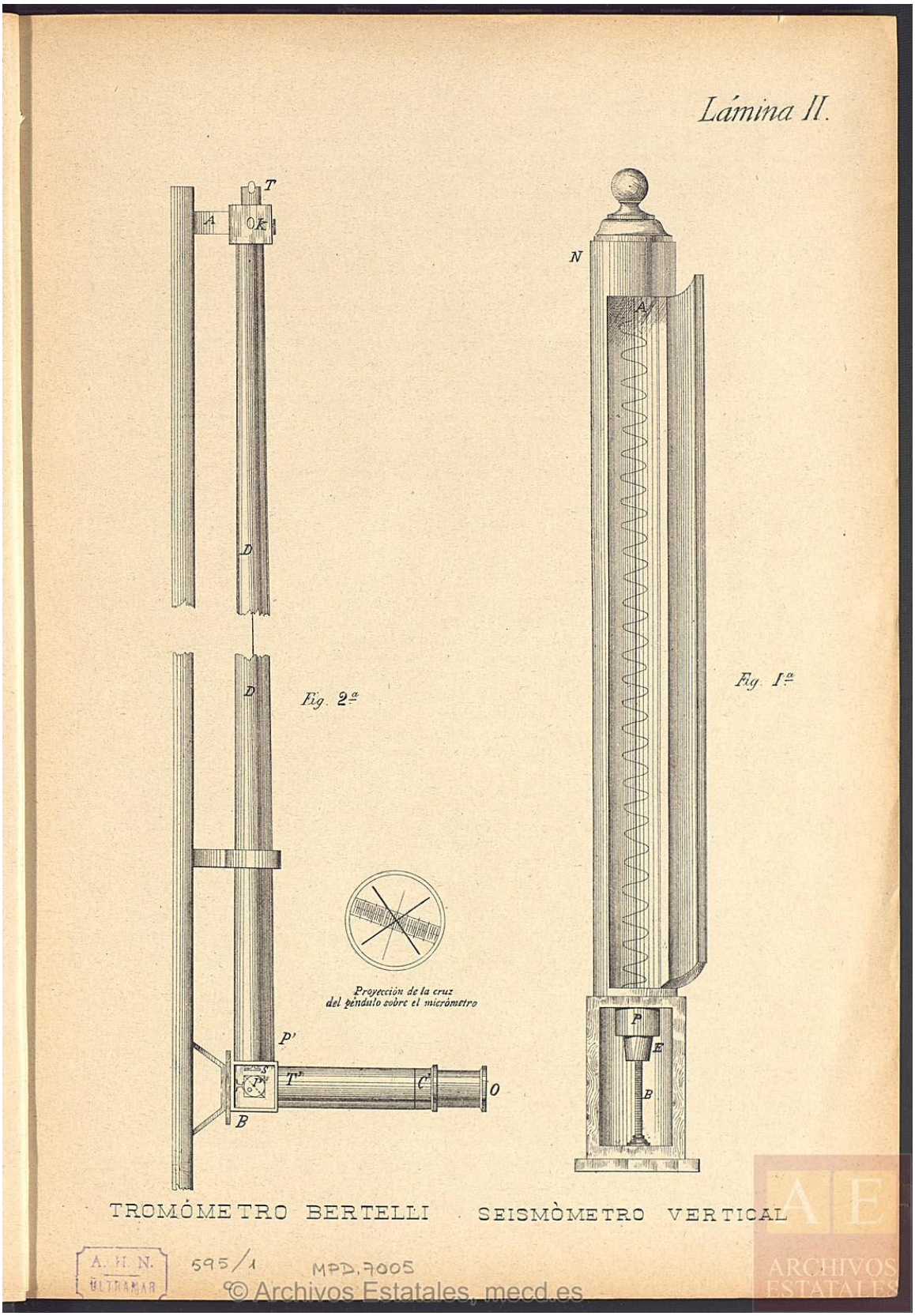


Photo No. 9.3: Sketches of the Bertelli Tromometer and Vertical Seismometer

Lamina IV.

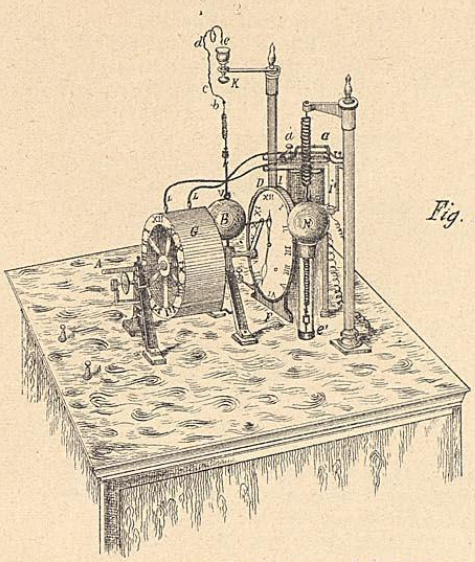


Fig. 2.ª

MICROSEISMÓGRAFO CECCHI

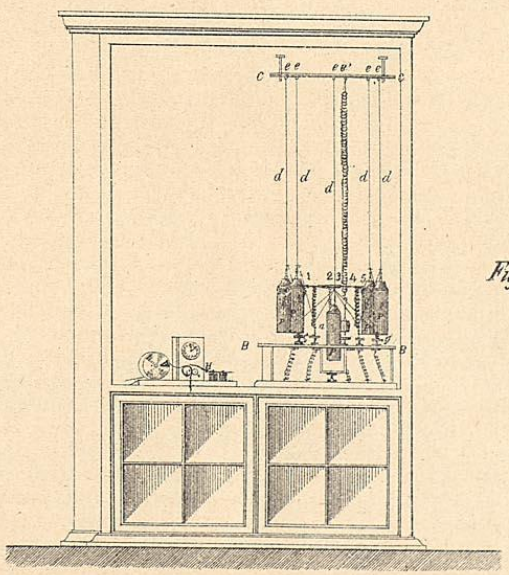


Fig. 1.ª

PROTOSEISMÓGRAFO ROSSI

Photo No. 9.4: Sketches of the Secchi Microseismographs and Rossi Protoseismograph

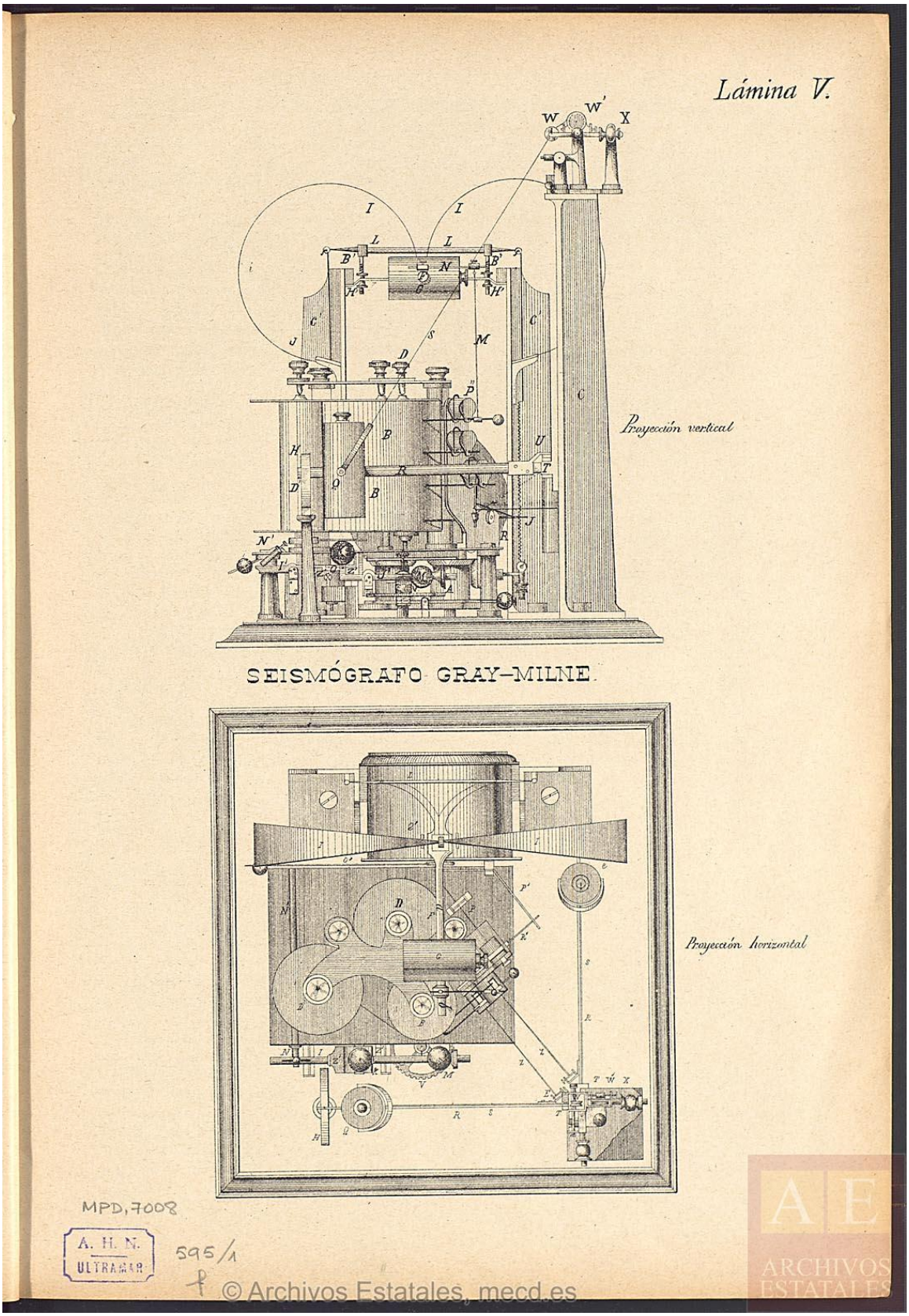


Photo No. 9.5: Sketches of the Gray-Milne Seismograph

c.5.2.2 The Engineers and the July 1880 earthquake

Between the decades 1860 and 1880, Spanish colonial authorities faced two sets of problems on infrastructures and the use of its military intelligentsia – the threats of natural hazards and the challenge of the Muslim sultanates in the southern Philippines.[808] The military engineers had a prime role in this endeavor. Aside from launching military campaigns to clamp down and crush the remaining vestiges of the Mindanao sultanates, the state trusted them to take charge of inspecting, studying, planning, and executing plans for the reconstruction of buildings and edifices destroyed by the earthquakes.[809] The 1863 Luzon earthquake saw the central role of military engineers.[810]

Military engineers strengthened colonial fortifications in the archipelago and designed plans for constructing earthquake- and cyclone-resistant buildings and structures. Lieutenant Coronel Gregorio Verdú, an engineer who arrived in the Philippines in 1855 to lead the naval command, a post he held until 1864, spearheaded a notable contemporary construction system.[811] Verdú focused on applying one of his specializations – earthquake-resistant construction. In his assessment of Manila's situation after the 1863 event, as published in the report *Nuevo sistema de construcción de edficios para preservarlos de los terremotos*, was that the government failed to provide sufficient stability to public buildings.[812] He advocated lightweight-type construction, through the use of materials such as iron, for it is "perfectly resistant and light, long-lasting and easy to erect", compared to timber, which is more expensive.[813]

Politico-military successes of the Spaniards in the late 19th century, specifically the weakening of the Muslim sultanates in mainland Mindanao and Jolo, reinforced a new wave of infrastructure building in the Philippines. The basis of building codes in the archipelago in the second half of the 19th century lies in the quantitative construction tradition cultivated within military culture.[814] The case of earthquake engineering in the Philippines reflects a new and broader world of parallels between military and natural forces in which military engineers participated.[815] The Spanish colonial authorities categorically identified stability in linking the work on strengthening military presence in the southern Philippines and colonial responses on natural hazards such as earthquakes and typhoons.[816] It seemed that guaranteeing military security is connected with reconstruction efforts after natural hazards hamper the colony.[817] Thus, studies and proposals made and implemented by some military engineering assigned in the Philippines, such as Cerero y Sáenz and Cortés, contained simultaneous and combined designs of military and seismic-cyclonic components and factors.[818]

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[808] Anduaga, "Earthquake Building Overseas", p. 3.
[809] Ibid., p. 4.
[810] Ibid., p. 7.
[811] Ibid., p. 5.
[812] Ibid., p. 6
[813] Ibid., p. 6.
[814] Anduaga, "Earthquake Engineering Overseas", p. 2.
[815] Ibid., p. 3.
[816] Ibid.
[817] Ibid.
[818] Ibid.

Earthquake engineering programs under the management of the government's military engineers were tested not only in rebuilding Manila after 1863, but also after subsequent earthquakes, especially the July 1880 event.[819] But another set of engineers was tapped to help in holistically understanding earthquake as a geological phenomenon. These were the mining engineers. This group of engineers was institutionalized much earlier, in the year 1838. Ordaz (1997) argues that the mining engineers formed part of the second (1841-1870) and third (1870-1898) stages of 19th-century geological knowledge production in the Philippines.[820] These periods were an opportune time to establish a better mining science and engineering tradition and projects in the Philippines. But as due to the social and political problems the archipelago faced in the last decade of the 19th century, the efforts were halted and were shelved as mere scientific literature of the period.[821]

On 29 July 1880, Governor-General Primo de Rivera instructed the *Inspección General de Minas* to conduct a study about the earthquake, from the point of view of geology.[822] It has two main objectives: (1) to recommend a system of building houses, by identifying geological unstable and risky areas, and (2) to recommend possible modes of adaptation in towns and provinces affected by the earthquake.[823] The study was aimed at both surveying the effects of the July 1880 earthquake, and to comprehensively understand, in a scientific manner, the phenomenon of earthquake in the whole archipelago. The engineers sent reports about this experimental study to Madrid, particularly to the Comision de Mapa Geologica de España. It allotted parts of in their scientific bulletin for the report of Centeno.[824] From 1883 to 1884, the Comision made Centeno's report a book published as a scientific output, and it produced and distributed copies of the study to different offices in Spain and Manila, as well as in Cuba and Puerto Rico.[825]

[819] Ibid., p. 7.
[820] Jorge Ordaz, “Datos acerca de los estudios geologicos realizados en filipinas en la epoca colonial”, *LLUL* 20 (1997), pp. 177-180.
[821] Ibid., p. 184.
[822] Document No. 1, Comision del Ynspector de Minas para estudiar los temblores de tierra en los días 18 y 20 de Julio de 1880, ULTRAMAR 460, Expediente 44, Archivo Histórico Nacional (AHN).
[823] Documents Nos. 2 and 4, Ibid.
[824] Document No. 4, Ibid.
[825] Documents Nos. 12-1, Ibid.

Photo No. 9
The July 1880 Earthquake in José Centeno's 1881 *Memoria*[826]

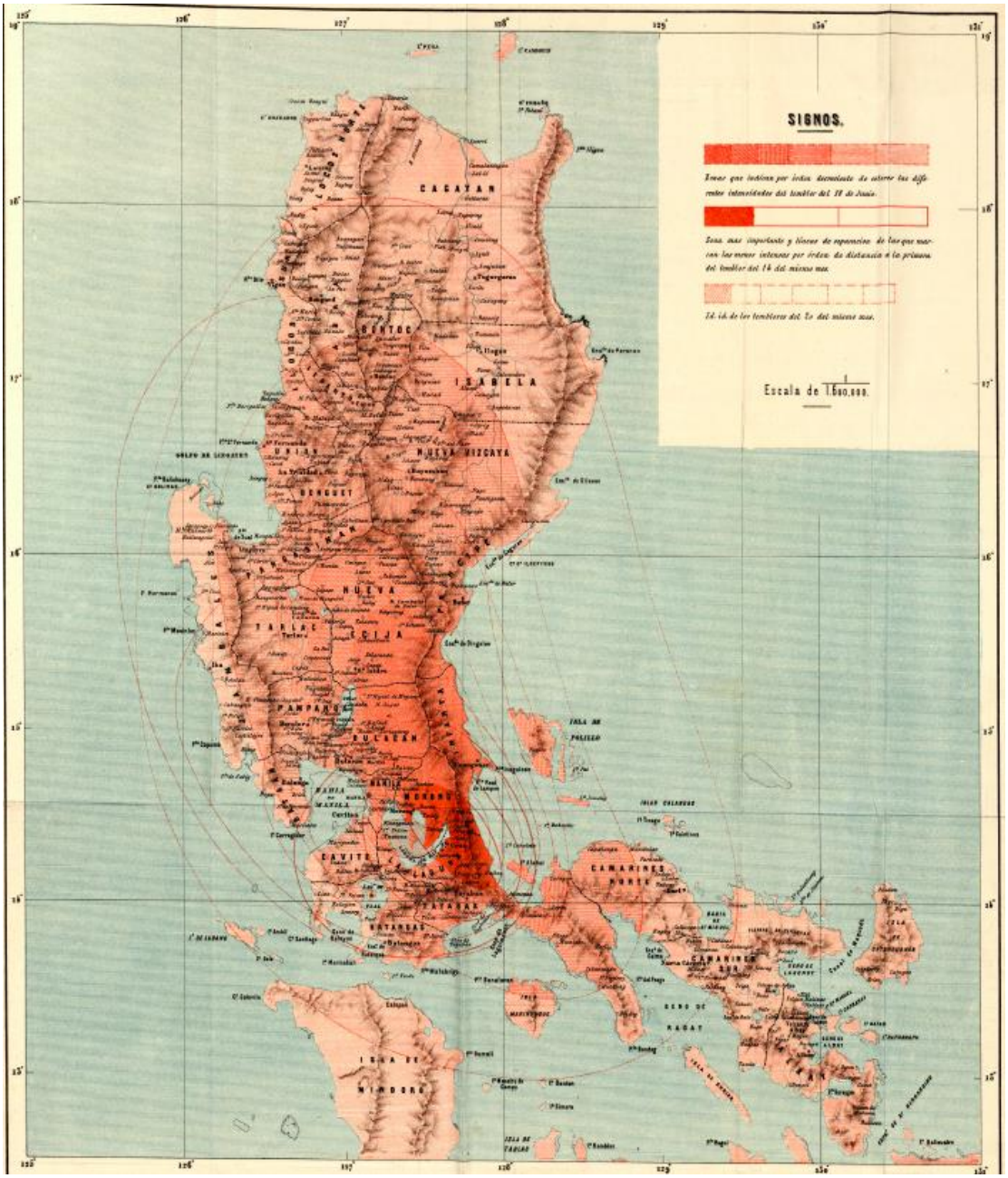

Photo No. 8.1: A map showing the intensity and strength of the July 1880 earthquake

[826] José Centeno, *Memoria sobre lost temblores de tierra occuridos en Julio de 1880 en la Isla de Luzon* (Madrid: Imprenta y litografia de la Guirnalda, 1881).

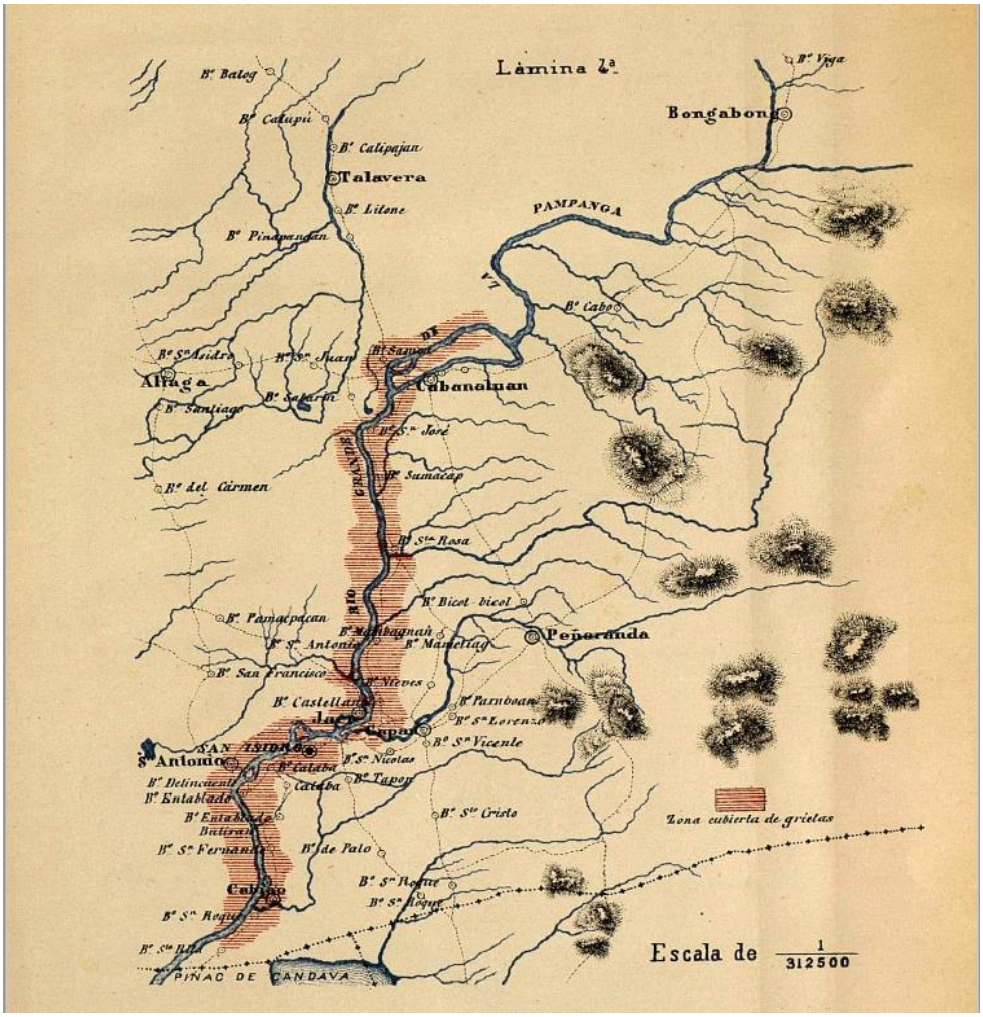

Photo No. 8.1: A diagram showing the large land cracks in Central Luzon caused by the July 1880 earthquake

The Dirección General de Administración commissioned a separate study wherein it authorized the colonial engineers to study the effects of earthquakes and edifices, and in rebuilding them and making them earthquake proof. A military engineer, Cortés, was commissioned to provide a broader perspective to the aspect of earthquake-resistant buildings and structures. Titled *Los terremotos, sus efectos en las edificaciones y medios practices para evitarlos en lo possible*[827], Cortés' study is a useful introduction to this field in civil engineering. It had two goals: (1) studying the nature of earthquakes, and (2) proposing corrections to defects in constructing buildings.[828] He argues that the coinciding influence of climatic conditions and hazards in the country – temperature and humidity, and hurricanes and tremors, lead to defects and destruction of buildings.[829] He dedicated the first two chapters of the book discussing types, causes, and perceived calculated speed and intensities of earthquakes.[830] On discussing the effects of ground

[827] Manuel Cortés, *Los terremotos, sus efectos en las edificaciones y medios practices para evitarlos en lo possible* (Manila: Ramírez y Giraudier, 1881); ULTRAMAR 5425 Exp. 26 N.36 1-102, Archivo Historico Nacional (AHN).
[828] Ibid., p. 3.
[829] Ibid., pp. 75-94.
[830] Ibid., pp. 5-19.

movements to buildings, he specified the experience of Manila after the 1863 and 1880 earthquakes. He narrated the impact of tremors to buildings and presented some mechanical ideas to explain the phenomenon.[831] Cortés also pointed out the defects he saw in some of the buildings. By examining the dynamic equilibrium conditions in relation to construction, he recommended a new method of constructing walls, floors, covers, and roofs, as well as *harigues*, and *balconajes*.[832] Considered an extension of this seminal work is his 1912 publication *Apuntes para unproyecto de edificaciones con destino a familias obreras, estables, higiénicas y económicas en lo posible.* In this book, he iterated the need to have earthquake-resistant structures, especially relatively cheap houses.[833] This concept was also a response to the erroneous ideas propagated by some professionals regarding earthquakes and buildings.[834] This work includes plates and sketches of houses and buildings, applying the theories and hypotheses on seismic movements they developed.

Studies and interests from engineers, architects, and urban planners, emanating from the July 1880 case did not stop in the first years since the disaster happened. Valuable to note that in 1892, Abelado Lafuente y Almeda submitted a proposal to the Overseas Ministry regarding the reedification and construction of houses in Manila.[835] The proposal aimed to bring life and culture to the city, as the earthquake claimed not only structure, but also its vibrancy as a city, through a combination of vibrant structures, strength, and safety, use of modern materials, and planning that takes into account the threat posed by other hazards such as typhoons and fire.[836]

There seemed to be a co-existence of two sets of view – local-popular, and the scientific-institutional, concerning how people and sectors of the society understand such environmental phenomena. Modern scientific knowledge from abroad became an important component in colonial educational systems prevalent during the nineteenth century. Some secondary and tertiary educational institutions included the natural sciences in their curricula. Foremost among these institutions were the Universidad de Santo Tomás of the Dominicans and the Ateneo Municipal of the Jesuits. The themes of divinity, searching God in nature, and the focus on *vita contemplativa* (contemplative life) became central to theological learning.[837] Schools introduced new approaches in mathematics and physics to their curricula and taught applied and practical scientific ideas and concepts. The Jesuits used science as stimulus to propagate Catholic teachings.[838] Filipinos who entered universities were introduced to scientific concepts and ideas that later proved to be helpful in their critical analysis of social problems as

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[831] Ibid., pp. 19-25.
[832] Ibid., pp. 25-75.
[833] Cortés, *Apuntes para un proyecto de edificaciones con destino a familias obreras, estables, higiénicas y económicas en lo possible,* p. 3.
[834] Ibid., p. 4.
[835] Copia del Expediente promovido por D. Abelado Lafuente y Almeda, en solicitud de que los proyector de obras particulares vayan autorizados por arquitectos a maestros de obras, ULTRAMAR 541 Exp. 1, Archivo Histórico Nacional (AHN).
[836] Ibid.
[837] Warwick Anderson, "Science in the Philippines", *Philippine Studies* Volume 55 Number 3 (2007), p. 291.
[838] Ibid., and Aitor Anduaga, "Spanish Jesuits in the Philippines: Geophysical Research and Synergies between Science, Education, and Trade, 1865-1898", *Annals of Science* 71 (4), 2014, p. 520.

well as in developing Enlightenment ideas such as nationalism, political reforms, and anti-friar sentiments.[839]

A contemporary of Rizal, Trinidad H. Pardo de Tavera also had the same observations as his, but much more robust on arguing about its effects of the Filipino mind. Promoting science as a tool for enlightenment, he was one of the pioneers of modernity in Philippine science.[840] He is well known in the field of botany and plant medicine, and language and racial studies.[841] He attacked the extreme Catholic fanaticism of Filipinos, resulting in their unfounded behavior and hesitation towards anything related to science and on learning about it. He described this attitude as both *ignoratismo* (ignorance) and *oscuridad* (obscurantism). Pardo de Tavera furthers that what the Philippines needed is scientific education; learning through the proliferation of reason and logic.[842] He criticized the novenas, the "pasyong mahal"; even the *corridos* the friars kept on insisting the Filipinos to use. He argues that the apparent access to these materials and the insistence of the priests on basing all life events' explanations to these only breed superstitious beliefs, which leads to ignorance.[843] Novenas control the way Filipinos think, he states:

> The result, without any doubt, the consequence of the accounts contained in that literature (novenas) that constitutes the only reading matter of the people, is the fostering of ignorance, propagating in a very effective manner all the aforesaid superstitions and with then augmenting the stock of errors that unfortunately controls the mentality of the mass of the people.[844]

For Pardo de Tavera, the Spaniards failed in education the Filipinos, proof which is then blatant ignorance on facts and matters of life. He argued that having an education system that is founded on science, reason – a secular or lay education: "The lay education is wholly democratic and will not be capable of committing the same fault of those persons who, by not following their education, seek to employ in the affairs of life those means recommended in the novenas in order to obtain what is desired through the help of the powerful, secured by means of requests, protestations of love, and promise of eternal devotion."[845]

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[839] Anderson, p. 297.
[840] Resil Mojares, *Brains of the Nation: Pedro Paterno, T.H. Pardo de Tavera, Isabelo de los Reyes and the Production of Modern Knowledge* (Quezon City: Ateneo de Manila University Press, 2006), p. 121.
[841] Ibid.
[842] Ibid., p. 186.
[843] Trinidad H. Pardo de Tavera, "The Heritage of Ignorance", Renato Constantino. Ed., *Filipiniana Reprint Series* (Mandaluyong: Cacho Hermanos, Inc., 1985), p. 10.
[844] Trinidad H. Pardo de Tavera, "The Legacy of Obscurantism" in *The Character of Rizal and the Legacy of Obscurantism*, Encarnacion Alzona, trans. (n.d.), p. 94.
[845] Ibid., p. 18.

d. Writing 19th Century Tremors: Scientific Studies and Post-disaster Reconstruction Policy Recommendations

Since after the June 1863 earthquake, the government in Madrid and the civil government in Manila were looking for enhanced means of dealing with hazards and reconstruction. The destruction caused by hazards such as typhoons and earthquakes to buildings and edifices in the colonies were insurmountable and posed a heavy financial burden to the state. They were able to mobilize the professional scientists and civil and military engineers to make thorough studies about the relationship of natural hazards and human structures and recommended approaches and mechanisms, and policies on how to efficiently address the problem and lay down the foundations of earthquake-resistant buildings in an earthquake-prone colony. These professionals played important roles the knowledge production and on implementing programs on how to reconstruct the colony, and how to mitigate the effects of hazards on public infrastructures. The studies they made were published and were available not only to the governments in Madrid at Manila but to aspiring engineers and practicing professionals in the field. Their works deal with aspects such as materials and methods in the construction of buildings.

At this point, historiographical discussion of some of the scientific works and endeavors made about earthquakes, during the second half of the 19th century up to the early decades of the century that followed. By looking at these works, we can further our understanding on how the earthquake, as a natural and social phenomenon, was studied and appreciated, and how the scientific minds of the era considered it as a subject matter of academic knowledge production and governance and policy framing. We can have views on how hazards were described, examined, and presented, and what were some of the professional recommendations made by these experts, given the "phenomenological" nature of hazards and the scientific call of the time in understanding environment related urban and rural disasters. In a recent study, Anduaga (2017) shows the development of earthquake studies, a product of the attempts to combine military and public needs. This study on seismology was anchored on the idea of cyclonic-seismic affinity, and the elaboration of "unity of action" of cyclonic and seismic forces. This approach tended to give premium to meteorology, even by the state engineers who pursued seismology as work and passion.[846]

The two earliest published scientific materials about Luzon earthquakes are state engineer García del Canto's *Los terremotos de Manila* (1863) and Centeno's *Memoria sobre los temblores de tierra ocurridos en julio de 1880 en la isla de Luzón* (1881). García del Canto's book is a comprehensive account of the notable earthquakes, and volcanic eruption in the archipelago, contrary to one may perceive from its title. He dedicated the first five chapters in summarizing information about the notable hazards that hampered the archipelago. The kind of narration he presented somehow reflects his training and skill as a Spanish novelist. He started his narrative by detailing the 16th-century expeditions, from Fernando Magallanes up to Miguel Lopez de Legazpi.[847] One can sense that through their respective works, up until the 19th century, some government officials were trying to justify the Spanish conquest of the archipelago. The

[846] Aitor Anduaga, *Cyclones and Earthquakes: the Jesuits, Prediction, Trade, & Spanish Dominion in Cuba & the Philippines, 1850-1898 (*Quezon City: Ateneo de Manila University Press, 2017), p. 56.
[847] García del Canto, *Los terremotos de Manila*, pp. 7-16.

"scientific" part of his work starts in the fifth chapter. García del Canto used physics to describe earthquakes as violent inflammations of underground caves distant from the surface of the earth: “son producidos por inflamaciones violentas de algunas exhalaciones sulfúreas y betuminosasque se hallan en las grutas subterráneas pocodistantes de la superficie de la tierra.”[848] He furthered expanded his hypothesis by relating the geographic and cultural location of the archipelago in relation to its neighboring countries in Southeast Asia.[849] His descriptions of notable eruptions of Taal volcano in the 18th century[850] are somehow a capsule of other or contemporaries of his work. He ended this chapter by presenting argumentative thoughts on, given the context of a dangerous environment, the status of construction the archipelago in the 19th century.[851] The next three chapters give the readers his insights about the history of great 1863 Manila earthquake.[852]He highlighted in these parts that indeed, Manila's primary concern after the incident was the rebuilding its edifices – churches and government buildings in particular, and the challenge of rethinking the city's building code. His suggestions appeared in the last two parts, wherein he made recommendations on policy formulations regarding constructing and rehabilitating edifices, how to expedite the process of acquiring materials abroad, and also on intensifying workforce to fasten the construction.[853]He concluded his work through a subtle appeal to the authorities not only from the Philippines but also from Spain. He showed that by mere extending moral support to the affected population was not enough; people should realize mercy through sending a significant amount of financial aid to the archipelago.[854] Centeno’s work focused on the second most notable earthquake in the 19th century that left Manila and nearby provinces in Luzon in confusion – the 1880 Manila earthquake. The Governor-General commissioned his study; aside from Manila, he also toured nineteen affected provinces, from the northernmost, Ilocos Norte, to the southeastern most, Albay.[855] In the first chapters, Centeno narrated scientific explanations about earthquakes, based on basic geological knowledge, and the data from the observatory in Manila.[856] In his work, he also wrote a summary of the compiled observations and effects of local townspeople whom he gathered.[857] In the third section of his study, he analyzed the data he collected, and related and corroborated in with the existing ancient and modern theories in earthquakes.[858] He described earthquakes and volcanic eruptions as “*son manifestaciones exteriores de las fuerzas subterráneas, que alteran más ó menos profundamente la estructura de la superficie terrestre…*”[859] [are manifestations of external forces of the underground, which alter, more or less, the profoundly structures of the earth's surface]. This profound hypothesis was backed up by his understanding of the said hazard’s old explanations such that of Humboldt, Darwin, de Boscowitz, Lyell,

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[848] Ibid., p. 17.
[849] Ibid., pp. 18-20.
[850] Ibid., p. 21.
[851] Ibid.
[852] Ibid., pp. 22-39. A more recent study of this earthquake is Ramírez Martín’s *El terremoto de Manila de 1863.*
[853] Ibid., pp. 40-43.
[854] Ibid., pp. 44-46.
[855] Centeno, *Memoria sobre los temblores de tierra ocurridos en julio de 1880 en la isla de Luzón,* pp. 7-9.
[856] Ibid., pp. 5-20.
[857] Ibid., pp. 29-78.
[858] Ibid., pp. 80-90.
[859] Ibid., p. 82-83.

and Polet-Scrope.[860] He ended his work by explaining his types of seismic phenomena, which are plutonic, chemical, and electromagnetic.[861]

The two major earthquakes that hit and devastated the western and eastern frontiers of Northern Luzon became the subject of Abella y Casariego's scientific expeditions in the late 19th century. His study and notes became the published *Terremotos de Nueva Vizcaya* (1884) *and Terremotos experimentados en la Isla de Luzon* (1893). In 1881, he made a visit to the province of Nueva Vizcaya and conducted a physical and geological analysis of the province's landscape, as well as an analysis of the effects of the July to September 1881 *temblores de tierra* (earth tremors), which affected towns of the province, along the Caraballo mountain range, such as Dupax, Bambang, and Bayombong.[862] After surveying the towns, the information he got from the head missionary of Dupax, Fray Antonio Xabert y Roquer, specifically the on-site and post-event situation from the start of the series of tremors in July 1881, substantiated his report.[863] He corroborated it with the data available from the seismic observations of the *Observatorio de Manila*.[864] He further explained the phenomenon using some theories and hypotheses on the relationship of different tectonic movements, and as well as volcanic activities in Luzon.[865] On his way back to Manila, he made a geographic and geologic discussion using his notes. He described the landscape of Nueva Vizcaya and Nueva Ecija, and the mountain systems in Eastern Luzon, which includes Caraballo, the Aritao, and the Sierra Madre.[866] Abella claims that due to this report, the Director General of the *Administracion Civil de Filipinas* recommended the establishment of a seismic observation system in the archipelago, based on an 1882 decree, and realized in 1884.[867] In 1892, Abella made another expedition in Northern Luzon, this time, on the western side. He made a study about the great earthquake that devastated the provinces of Pangasinan and (La) Unión, and the Distrito de Benguet on 16 March and of that year.[868] Together with this assistant, Enrique d'Almonte, they surveyed the geologic profile of the region, documented the extent of the earthquake, as well as its effects on towns.[869] The published report is divided into seven parts[870], and an appendix of local government reports and accounts.[871] Abella explained the earthquake phenomenon and its effects using geological ideas; he combined his analysis of the geology of the region and the extent of devastation observed in the area. On the introductory part, he presented theoretical and practical concepts about earthquake, most of which he borrowed from pioneer scholars.[872] From the second to the fifth chapters, Abella described the topography, hydrography, geologic, and rock formation profile in the region.[873] He dedicated the last two chapters to make a detailed scientific narrative about the earthquakes. He gathered information from the parish priest and

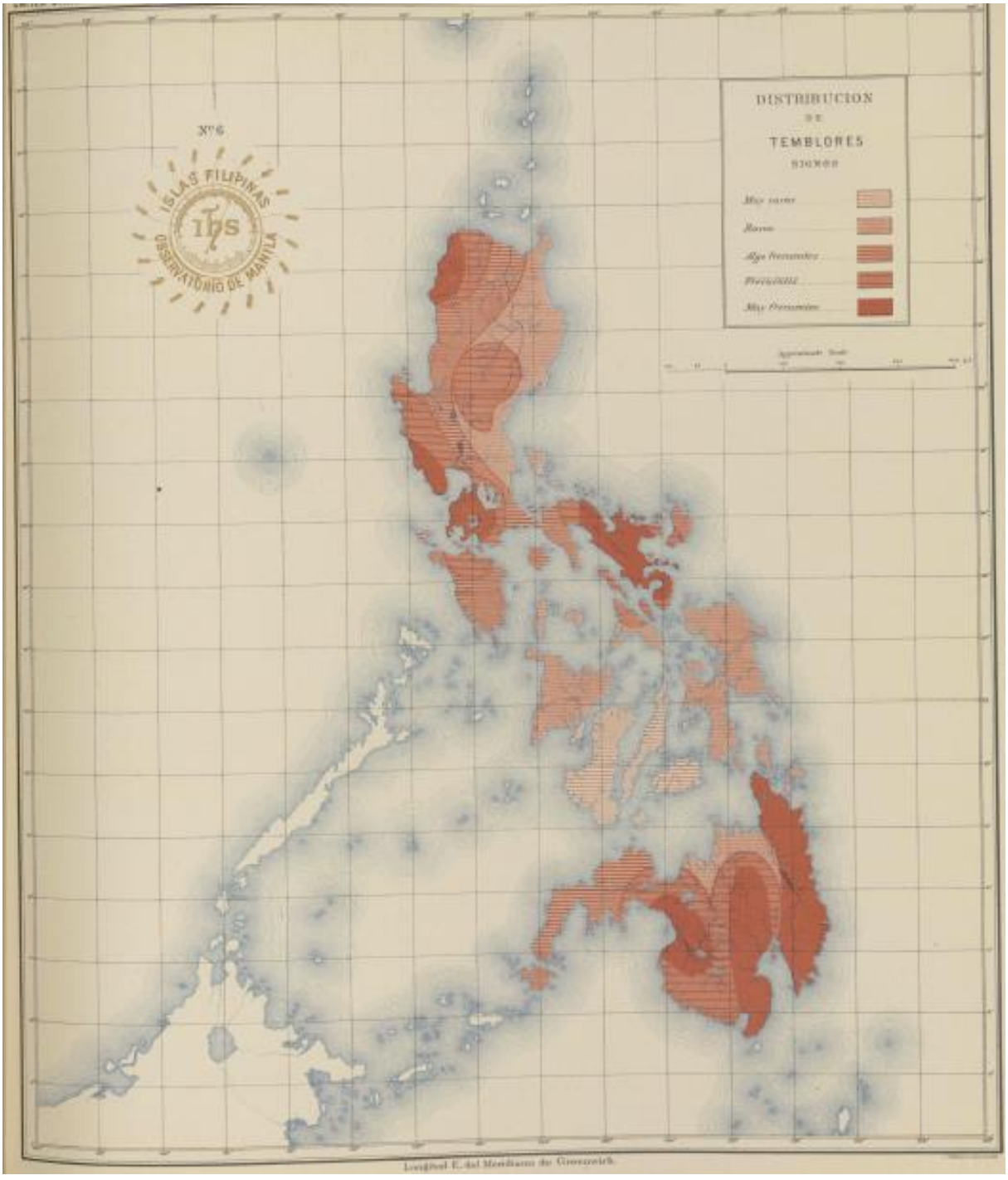
[860] Ibid., 83-90.
[861] Ibid., p. 91.
[862] Abella, *Terremotos de Nueva Vizcaya*, pp. 5-9.
[863] Ibid., pp. 5-6 and 16-18.
[864] Ibis., pp. 19-23.
[865] Ibid., pp. 9-14.
[866] Ibid., pp. 24-31.
[867] Ibid., p. 3.
[868] Abella, *Terremotos experimentados en la Isla de Luzon*.
[869] Ibid.
[870] Ibid., pp. 1-104
[871] Ibid., pp. 105-110.
[872] Ibid., pp. 1-9.
[873] Ibid., pp. 12-56.

parishioners; hourly and daily accounts were presented, which included the time, direction, areas, and towns affected.[874] Fifteen Pangasinan towns, six in (La) Union, and three in Distrito de Benguet were affected by the March and April 1892 earthquakes.[875] In Abella's narrative, most of the affected edifices in towns were the *tribunale*s (town halls), the *Iglesias* (churches), and the *convents* (seminaries, convents, priest houses).

The resident seismologist and historian of the weather service of the archipelago at the time made extensive and continuous research endeavors about earthquakes. Saderra Masó's seminal work *La Seismologia de Filipinas* (1895) is a broad attempt to historicize and to create a modern understanding of earthquake and volcanic eruption. In this work, Saderra Masó narrated the history of the seismological phenomenon, experience, and service in the Philippines, specifically in the 19th century. He used the data he gathered from the *Observatorio de Manila* and certain newspapers such as *El Comercio* and *El Diario*.[876]The first two parts of the book are on the history of seismological service of the observatory, and on describing the seismic instruments acquired by the observatory, and were used to undertake seismological studies.[877] Seismometers, seismographs, and accessory equipment, in various kinds, compose the observatory's collection.[878] Saderra Masó also explained the scales used by the observatory in relation to the widely used Rossi-Forel Scale in earthquake research. The observatory used six scales with corresponding word expression and Rossi-Forel equivalence: I (*Percetibl*e, II and III), II (*Ligero*, IV), III (*Regular*, V), IV (*Fuerte*, VI and VII), V (*Violente*, VIII), and V (*Destructor*, IX and X).[879] Saderra Masó then turned to present a history of earthquake occurrences in the archipelago, from the "earliest" recorded in 1599 until 1889. He offered detailed statistical data about tremors, scientific observation, and interpretation, and visualized it using maps.[880] He furthered elaborated his observation by making an exhaustive study on the nature of Philippine earthquakes. He explained the nature and kinds of tremors and presence of volcanoes, time and geographic distribution, and the intensity and frequency of earthquakes.[881] He also made a case on relating Philippine earthquakes to local and celestial phenomena, such storms and turbulence, as well as "lunisolar" positions and tremors.[882] In Algué's Atlas de Filipinas, the observatory used a different sign legend, a 5-intensity level scheme: muy raros, raros, algo frecientes, frecuentes, and muy frecuentes.[883]

[874] Ibid., pp. 57-84.
[875] Ibid., pp. 85-103.
[876] Saderra Masó, *La Seismologia en Filipinas,* Prologo.
[877] Ibid., pp. 1-16, and pp. 100-108.
[878] Ibid., pp. 4-16.
[879] Ibid., p. 21.
[880] Ibid., pp. 23-99.
[881] Ibid., pp. 109-119.
[882] Ibid., pp. 120-122.
[883] Map. No. 6, Jose Alguè, *Atlas de Filipinas: Coleccion de 30 mapas* (Manila: Observatorio de Manila, 1899).

Map No. 4
Distribucion de Temblores, Atlas de Filipinas, 1899[884]



[884] Ibid.

Upon the acquisition of the Philippines by the United States of America in 1898, they subjected all existing institutions to either direct abolishment or reorganization. The observatoryunderwent the latter; it was reorganized and was named the Philippine Weather Bureau (PWB). The observatory attained expansion with the new focus of work laid down by the new colonial masters. The Jesuit scientists remained in the PWB. They continued their work and research, this time with additional funding and support from the colonial civil government. Saderra Masó during this time produced a lot of new studies published in English. His first comprehensive study about earthquakes and volcanoes during this period was the *Volcanoes and Seismic Centers of the Philippine Archipelago,* published in 1904. This work is a compilation of his notes, and studies made by previous geologists and seismologists. In his discussion of earthquakes, Saderra Masó borrowed Wallace's, and John Milne's classification[885], and on his elaboration of the idea of "microseismic movements".[886]The latter, he explains: *[F]irst, the greater part of these movements in Manila are due to endogenous causes; second, when the movements of the atmosphere cause the microseismic movements they do so indirectly, now by the movement produced on the sea, at other times by the pressure on the mountains.*[887] Saderra Masó identified eighteen (18) volcanic, seismic, and volcanic-seismic centers in the archipelago, from Luzon, Mindanao, and the Visayan islands.[888] This list, though accompanied by an extensive description, is quite limited. Saderra Masó noted that this was based on the extent of operating seismic service in the archipelago, and on the instruments used to study the phenomenon thoroughly.[889]His explanation reflected this observation: *[T]he scarcity of data from some provinces has obliged us in some cases to calculate the frequency of the shocks by that of the neighboring provinces, and thus the value of the result is but approximate*.[890] Nevertheless, he came up with a relatively good estimate on the frequency of earthquakes in the archipelago, which is 53.4 earthquake days per year, or 4.5 earthquake months.[891] One can assume that based on this estimation, we experience tremors almost 1/3 of a year.

Saderra Masó continued to collaborate with John Milne on studying Philippine earthquakes. In 1910, he published *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909*, which was furnished in response to the request of the latter, as an inclusion to the *General Earthquake Catalogue* by the British Association for the Advancement of Science.[892] This 1910 publication can be considered the most extensive catalog of earthquakes in the archipelago at that time. Contrary to early-published materials that are catalog on nature, Saderra Masó's compendium contains complete details of towns affected and destroyed by earthquakes. He states, "*I]n the present catalogue our aim is to present all that is known of the various violent and destructive earthquake on record."*[893] The table is divided into four sections; the list contains an assigned number, the date of the earthquake, including the hour and minute of the tremor, the intensity based in the De Rossi-Forel scale, and the description of the

[885] Saderra Masó elaborated this classification in his 1910 publication, *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909, p. 3.*
[886] Saderra Masó, *Volcanoes and seismic centers of the Philippine Archipelago*, pp. 21-23.
[887] Ibid., 23.
[888] Ibid., pp. 24-78.
[889] Ibid., pp. 24-25.
[890] Ibid., p. 78.
[891] Ibid., pp. 79.
[892] Saderra Masó, *Catalogue of Violent and Destructive Earthquakes in the Philippines, 1599-1909,* p. 3.
[893] Ibid., p. 4.

earthquake's epicenter and the effects of the quake to towns and people. His work is a subtle criticism to historians and researchers, who, as he stated, who dwelt only on the mere listing of events and copying their contemporaries and did not attempt to describe scientific details in its appropriate scientific context precisely.[894] Saderra Masó also pointed out a critical historiographical issue, which his work somehow addressed. This is the convergence of what is a memorable earthquake to people, and what is memorable that is written: *[T]his is beyond doubt one of the reasons why prior to the beginning of the nineteenth century hardly any data can be found concerning the numerous earthquakes which during the preceding two centuries must have occurred in the Visayas and above all on the vast Island of Mindanao.*"[895]In the ample list that composes the bulk of the book, the archipelago experienced an estimated 203 earthquakes from 1599 to 1899.[896] An appended list of earthquakes in the Marianas Islands, a colony of Spain in the Pacific, was included.[897] This work, together with *La Seismologia*, was considered valuable catalogs of historical earthquakes compared to studies made by the different government and professional seismologists.[898]

Saderra Masó in 1913 collaborated with a geologist, Warren Smith, in working and publishing a study about the correlation of seismic movements in the Philippines to the archipelago's geologic profile. Their work titled "The Relation of Seismic Disturbance in the Philippines to the Geologic Structure", introduces new principles on seismic disturbances, specifically its main thesis, *"major earthquakes and the majority of earthquakes in the Philippines are not due to volcanism."*[899] The study made outlined of the physiography and geomorphology of the archipelago, to scientifically discuss the rock formation in different island regions, to show the origin of significant seismic disturbances, and to draw some practical conclusions vis-à-vis policy recommendation for certain local authorities and the government.[900] The authors surveyed the works of seismicity and geology, like those of the scientists of the observatory, of military engineer Cortés, mining engineers Centeno and Abella, and geologist George Becker.[901] One can consider as a continuation, framed as applied research, of his 1904 book. Deconstructing the work, the authors made a discussion of the Philippine physiography, by looking at the connection of Philippine plates with nearby Pacific plates, as manifested in the type of mountains and mountain systems and the types of rocks formed in the archipelago.[902] In reference to this, they came up with a typology of seismic disturbances: volcanic, tectonic, and rockfall.[903] And these disturbances were distributed in the archipelago, in the regions such that of Luzon, Mindanao, and Visayas, and along the 16 "seismotectonic lines" (labeled A-P).[904] Historically, the authors identified thirty-one (31) major geologic-seismic disturbances from the late 17th to the

[894] Ibid., p. 3.
[895] Ibid., p. 4.
[896] Ibid., pp. 7-25.
[897] Ibid., pp. 26-27.
[898] Mentioned by Bautista and Oike (2000), cited from Gealogo, p. 384.
[899] Miguel Saderra Masó and Warren Smith, "The Relation of Seismic Disturbance in the Philippines to the Geologic Structure", *The Philippine Journal of Science* Volume 8 Number 4 (Manila: Bureau of Printing, 1913), pp. 199-200.
[900] Ibid., p. 201.
[901] Ibid., pp. 202-206.
[902] Ibid., pp. 206-212.
[903] Ibid., pp. 212-216.
[904] Ibid., pp. 216-224.

early 20th century (1645-1902).[905] Saderra Masó and Smith concluded their work by presenting some applied scientific advice for fellow scientists and civil administrators. Two of their main conclusions include (1) earthquakes happen along weak crust areas, and (2) *"*volcanoes are only incidental phenomena, and are results rather than causes*",* (3) the close relationship between seismic disturbances and geologic structure, and (4) the association between orographic and geomorphic lines and the lines connecting earthquakes epicenters.[906] They urged the people to be aware of the "points of danger" in the archipelago, which includes the Taal rift line, all "made islands", alluvium areas, Agusan valley, Straits of San Juanico, Northeast district of Manila and northwest of Polilio Island, and parts of the Batangas peninsula.[907] They also suggest the geologic examination of dams, pipelines, and bridge sites.[908] An on a more practical note, they listed down types of structures best suited in Philippine conditions, like the use of bamboos for houses, use of local woods, and the use of steel reinforcement in stone and concrete structures.[909]

Concerning materials, Valdés and Cerero made studies on this matter. On one hand, Valdés' *Descripción y resistencia de las maderas de construcción de las islas Filipinas* is a compilation of descriptions of resistance and strength that can be used in construction of houses and edifices.[910] The list contains 48 specimens of wood[911], most of which were part of the Philippine collection in the 1851 London Exhibition. The table shows the species, ideal weight, resistance, elasticity, ideal weight on specific uses, and which wood to use in a particular work.[912] Valdés' background as a military engineer made him make a list, as he argues that this profession requires a good knowledge of the types of materials used in building forts and garrisons.[913] One can see in this work that applying familiarity and experience in maintaining military installations will help in the construction of public infrastructures. One can see Valdés' expertise on this subject matter in the manual he made for engineers and architects. The *Manual del ingeniero y arquitecto* is a good handbook for practitioners; it contains information, formulas, and plates that are useful for professionals. The 1000-page book contains seven chapters and is full of mathematical formulas, models, and calculation about a multitude of engineering concepts and theories. On the other hand, Cerrero's *Memoria sobre las Armaduras destinada a sostener las cubiertas de los edificios* focuses on materials to strengthen roofs for houses and buildings, to adapt with the climatic conditions of the archipelago, as well as environmental hazards such as typhoons and earthquakes. [914]

Institutional developments in science created a scientific discourse, which catered the needs of select sectors of the colonial society. On the one hand, at the advent of colonial institutional science, the local population was integrated into the waves of scientific ventures to transform the archipelago into scientifically suited colonies. Although their roles were not in the mainstream of contemporary historiography, it is important to note

[905] Ibid., pp. 224-231.
[906] Ibid., pp. 231-232.
[907] Ibid.
[908] Ibid., p. 232.
[909] Ibid.
[910] Valdés, *Descripción y resistencia de las maderas de construcción de las Islas Filipinas,* p. 5.
[911] Ibid., pp. 7-28.
[912] Ibid., pp. 29-30.
[913] Ibid., pp. 5-6.
[914] Cerrero, *Memorias obre las Armaduras destinada a sostener las cubiertas de los edificios,* pp. 5-6.

that aside from the Jesuits, they became part of the project to improve the colonial economy through the support of institutionally driven “public science”. On the other hand, I think, these discourses were part of the colonies' means of negotiating spaces for scientific learning; it is not a linear process of top-down dissemination of ideas, but rather, a struggle to reconcile cultural contexts and modern scientific concepts. At surface level, we can see that colonies became receivers of knowledge and apprentices of experts, as these were common scenarios to portray a metaphor of colonial state relations. But within the confines of conventional expert-apprentice ties, there were unnoticed instances of claiming and reclaiming knowledge spaces where Filipinos managed to argue to the colonial state their capacities for modern scientific learning.

Though not directly stated in the works summarized, another layer of the narrative of late 19th century hazards are the impacts or effects on social structures of society.[915] What emanates clearly from the studies was the need for immediate and sustainable earthquake resistant public edifices. Highly seen was the government's persistence and active engagement in this endeavor.[916] Military engineers applied principles to establish components that will serve as guides in designing buildings; they have exhausted their knowledge in constructing forts and defense structures in urban facilities and edifices.[917] The responses of governments to catastrophes produce strange results – veering away from the plan of rehabilitation and reconstruction of neighborhoods and town. As a generalization, the earthquakes made the complicated zoning system in Manila that gentrified the city based on colonial class structure (Huertz de Lemps)[918], literally shook and shattered the founded and compounded space allocation in the city. The earthquakes caused the "widening" of Manila due to the need to decongest the city; and make way for better structures, as well as implement the decades-long plan of "ethnicizing" the city's landscape based on social class. The earthquakes also made the members of the working class more vulnerable; the destruction of houses "helped" the government in demolishing the unwanted structured in the city, a project Huertz de Lemps (1998) argues as long been planned by the Ayuntamiento de Manila to further impose colonial control over the movement of people in the capital city.[919]

Quite far, but still related to, from the scope of discussion of disaster events are floating theoretical concepts such as nationalism. Despite its probable vagueness and disconnect to the actual situation in the ground, nationalistic sentiment of belongingness and inclusion reinforced the notion of helping the disaster-stricken communities, and making a safer society through modern science, a patriotic duty for several sectors of the Spain’s colonial entities. In Various instances that people in the Iberian Peninsula regarded their concern and support to the Philippines as a manifestation of “espiritu patriotico”[920] (patriotic spirit), and their "love" to their insular brothers - "hermanos de ultramar"[921] and "hermanos tagalos"[922], to mention some. Indeed, disasters build broken

[915] Gealogo, “Historical Seismology”, p. 370.
[916] Ibid., p. 374.
[917] Anduaga, “Earthquake Building Overseas”, p. 16.
[918] Huertz de Lemps, “Materiales Ligeros vs. Materiales Fuertes: The Conflict between Nipa Huts and Stone Buildings in the 19th-century Manila”, pp. 162/165.
[919] Ibid., pp. 166-168.
[920] Letter from Fernando de Aguirre, 20 August 1863, ULTRAMAR 5196 Expediente 15.
[921] Ramirez Martín, *El terremoto de Manila de 1863*, p. 96.
[922] Miguel Selga, El terremoto de Manila del 3 de junio de 1863 en el Arzobispado de Manila, revista de la Sociedad Astronomica de España y America, tomo XV, p. 76, cited in Selga, *Índice y breve resulmen de documentos relativos al temblor de Manila del 03 de Junio de 1863*, p. 7.

notions of camaraderie and distant sentiments of inclusivity. But this Philippine experience was an ephemeral one. It did not last as in the decades until the end of the 19th century, people saw another form for a battle for nationalist inclusion, led by the reformist students from the Philippines, and they brought the struggle from Manila to Madrid.[923]

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Sum Up

This chapter presents a historical analysis of the response of government and the people after the June 1863 and July 1880 earthquakes. This part provided a narrative of how the devastated communities were severely affected and tried to rehabilitate from the ravage of the tremors, to bring back the normal state of affairs in affected communities. It details the post-disaster rehabilitation projects implemented by the Spanish civil government in Manila, as well as the responses of the Madrid government to help the devastated colony in the Pacific. It also tackles how different sectors of the colonial society responded to their specific needs, and how they interpreted the calamities. Moreover, the two earthquakes also prompted the civil government to initiate the reorganization of bureaus and institutionalization of specific scientific endeavors pertaining to hazards and disasters, mainly, to make analytical and up-to-date studies about earthquakes as geological phenomena. Given the complicated nature of the Spanish bureaucracy at that time, a linear developmental trajectory from disaster experience to reformed disaster response wasn't seen as an immediate output of bureaucratic reshuffling or proactive administrative reform fruition. Instead, the actions of the state, as well as other sectors of the society, further revealed the long-standing problems in organizational governance, as well the urgent need to put science and engineering into the forefront of colonial reforms – on urban planning and city maintenance, for the colony to be more resistant to such kinds of disasters.

The June 1863 and July 1880 earthquakes had lasting effects regarding effects and damages caused to public utilities and infrastructures, policy reviews and changes, as well as a reiteration to the people's mindset of the harmful effects of natural hazards to communities. The two earthquakes, on the one hand, challenged the colonial government to implement a modern urban planning and engineering, and its bureaucratic capabilities in responding to calamities. On the other hand, the earthquake disasters served as catalysts to seriously commission and institutionalize scientific research to understand earthquakes and their effects to towns and communities.

[923] See John Schumacher, *The Propaganda Movement, 1880-1895: The Creation of Filipino Consciousness, the Making of a Revolution* (Quezon City: Ateneo de Manila University, 1997).

CHAPTER 4

Earthquakes in Luzon in the 20th Century: National Disasters and National Responses

"The Institute of Vulcanology and Seismology warned of big quakes since last year. We only heard political talks."

- Jose Guevara, *Manila Bulletin*, 27 July 1990[924]

There are plenty of major earthquakes that shook the island of Luzon in the Philippines throughout the long twentieth century. This chapter discusses a history of four earthquakes: the August 1937 Luzon earthquake, the August 1968 Manila earthquake, the August 1983 Ilocos Luzon earthquake, and the July 1990 north-central Luzon earthquake. These earthquakes are considered the most "historical" in the period, not only due to their intensity, but also to the subsequent political, economic, and social effects they caused to the country in a national scale. The story of these earthquake disasters essentially shows how an endless cycle of inept and repetitive, less proactive responses to calamities trapped governments and people in uneasy and helpless situations.

a. 20th century earthquakes: An Overview

The turn of the 20th century marked significant changes and turnabouts in the political and economic, and social and cultural institutions and dynamics in the Philippines. The politico-revolutionary events from 1896 up to the second decade of the United States of America's colonization of the Philippines in the Philippines signified massive transformations in the archipelago, brought about by a grand and expletive manifestation of American's "benevolent assimilation" of the Philippines.

The late nineteenth-century world witnessed significant developments in science; metropoles and colonial territories acquired scientific knowledge and technologies from leading countries, like those in Europe. As Adas argues, the introduction of such key instruments made it possible for Europeans to imagine and explore the natural world of their colonial territories.[925]The colonial state's application of scientific knowledge to production, communications, and military technology in their respective colonial entities manifested these ideas. In the case of Spanish Philippines, colonizers implemented modern scientific knowledge to agriculture as the platform for testing their colonial projects.

As what the studies made by Legarda (1999)[926], and Fast and Richardson (1987) [927] point out, Anglo-American institutions controlled external domains and affairs, where the

[924] Jose L. Guevara, "After quakes, the floods". *Manila Bulletin* 211.27 (27 July 1990): 6.
[925] Michael Adas, *Machines as Measure of Men: Science, Technology, and the Ideologies of Western Dominance* (New York: Cornell University Press, 1989), p. 263.
[926] Benito J. Legarda, *After the Galleons: Foreign Trade, Economic Change, and Entrepreneurship in the nineteenth-century Philippines* (Quezon City: AdMU Press, 1999).

19th-century Philippine political and economic situation was highly dependent. Three interloping wars changed the landscape of the Philippines during the waning years if the 19th century, The Philippine revolution that erupted in August 1896, led to the establishment of a revolutionary government in June 1898, and the founding of a sovereign republic in January 1899. Coincided with this was the Spanish-American War of 1898, wherein after its defeat, Spain was "seceded" the Philippines to the United States, sealed by the formal peace agreement, the Treaty of Paris of December 1, whereas the Americans subjected all existing institutions to either direct abolition or reorganization. By the start 1899, there exists two governing bodies in the Philippines, the Philippine Republic headed by Gen. Emilio Aguinaldo, and the United States Military Government in the Philippines headed by a succession of military officials until they established a formal civil government in 1902.[928] On February 1899, skirmishes between Filipino and American forces escalated into a three-year battle and guerilla warfare, known as the Philippine-American War.

These wars indeed revealed the social grammar not only of Philippine society at that time but of other social sectors engaged in this new era of colonial construction in the archipelago. The entrance of the United States in the game of imperialism, through the annexation of the Philippines, changed not only the way laws and politics, and economic plans and policies were crafted and implemented, it also ushered in new or improved ways how people and the state responded to the challenges of the environment. This innovation in responding to those challenges, namely the threats of nature, was seen to be helpful and efficient, but at the same time inconsistent and unreliable throughout the 20th century, as the Philippine society, as I argue, hardly learn from the lessons of the catastrophic events caused by natural hazards.

The rest of the twentieth century in the Philippines saw the much-proliferated use of science and scientific institutions as a means of coping with the threats of the natural environment. The science of seismology evolved into a far greater science specifically dealing with earthquakes, and volcanology, as experts in geology and geophysics recognized it as an essential subfield. Institutions, through the form of laboratories, universities, and state agencies were established and developed as sources of information and scientific studies about these natural phenomena, and their effects of towns and people's lives. Moreover, the political and social dynamics of the Philippine state and society, from the era of American regime to the period of Philippine Commonwealth government, and up to the postwar Philippine republics, show varying local and national contexts and shape, influence, and affected how the people perceive, victimized, responded, and rehabilitated by a lot of disasters brought about by natural hazards and the human failure to adapt to it.

b. The 1937 earthquake: The Commonwealth Government's response, and the documentation of a "cultural" understanding of earthquakes

The decade of the 1930s is a period of political opportunities for the Philippines. The years of the campaign for independence starting from 1913 became fruitful as the United

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[927] Jonathan Fast and Jim Richardson, *Roots of Dependency: Political and Economic Revolution in the 19th Century Philippines* (Quezon City: Foundation for Nationalist Studies, 1987).

[928] Jely A. Galang, "Ang Pamahalaang Militar ng mga Amerikano sa Pilipinas bago ang Digmaang-Pilipino-Amerikano", *Philippine Social Sciences Review* 62(1), 2010: 197-229.

States Congress pressured to address the economic dilemma of the 1930s, decide to "give up" their Pacific colony from direct colonial administration. Stipulated in the Philippine Independence Act of 1934, or popularly known as the Tydings-McDuffie Act of 1934, the Philippines is being placed under a transitional government that will implement the necessary preparations for ten years. During the Commonwealth era, Filipinos were administrative duties to major government departments and offices.

b.1 American colonial perspectives, projects, and institutions related to science and environmental hazards

To have a grasp of the response of the Filipino government and the people to hazards during this period, having a general understanding of the discursive and structural composition of the Philippine bureaucracy, as well as the attitude of people when it comes to institutions is important. How institutions related to the environment and hazards worked, and how people appreciated their work coincide with an understanding of the prevailing political and social discourses of the era. As early as the first years of American rule, people in power have considered the colonization of the Philippines, and the natural hazards they "encountered" in the archipelago, as intertwined to the end goal of pacification and civilizing mission. Reflected in how institutions responded and looked were the ways the hazards were understood and interpreted. During the incipience of the American colonial era in the Philippines, though there was an advance scientific inclination to geophysical sciences such as meteorology and seismology, there was a clear tendency to associate hazards with several social agenda and objectives.

Writing for the North American Review, Stephen Bonsal, American diplomat, and war correspondent, stated critical and relatively scandalous opinion about the war in the Philippines, and to the Filipino "insurrects", after his three-month visit in the islands in 1902. According to Bonsal, his short report is not to add up to the various official dispatches to Washington, but to state a few facts about the archipelago.[929] Bonsal[930] related the 1902 earthquake he felt when he was in Manila to the political situation of Philippine-American War, specifically to its supposed connection with the attempt to eradicate the *insurrectos* who gave the military forces a hard time in their pacification campaign. Though the article was not about the earthquake, it is quite interesting how it depicts the "earthquake" as a turning point or springboard in its discussion about the wartime political climate, from an imperialist perspective. He furthers: “if a tidal wave had to follow upon the earthquake, he hoped it would sweep with overwhelming force over a certain district where, despite frequent announcements of peace, the rebellion rages. We might drown them out, but this rubbing-out process is proving too expensive.”[931]The "after an earthquake" metaphor corresponds to the "achievement" they did in 1902 – the supposed or nearing the end of the "insurrection" and the establishment of civil institutions in pacified territories. Bonsal concludes by asserting that the American government must implement a clear colonial policy in the Philippines: What is needed in the Philippines is a policy, to be steadfastly adhered to and carried out without fear or favor? A policy based, not on the discordant views, which are proclaimed on every side, especially by those who have never visited the islands, but inspired by a statesmanlike

[929] Stephen Bonsal, *The Philippines - After an Earthquake*. The North American Review 174 (544), 1902, p. 409
[930] Ibid.
[931] Ibid., p. 410.

survey of the situation.[932]He adds that the government must establish political and economic institutions, for the "exceptional" rule to march on. Moreover, they considered the "earthquake" as an representation of the insurrection/war had ended quickly; though, in reality, it took them more them more than three years to obtain control over the islands. Another journalist who visited the islands in 1899, Alden March, observed the types of buildings and structures in Manila and quickly related it to the hazard experiences of the islands. According to him, there was a little apparent encouragement to construct fine edifices because of the danger from earthquakes and typhoons.[933] He noticed "there are very few buildings to be found more than two-story high, and the heavy tile roofs formerly in use have, for the most part, been replaced by lighter coverings of galvanized iron."[934]

Another way the American colonial government in the Philippine thought of the environment was through its economic worth. The Americans considered the Philippine Islands as a wilderness – literally and figuratively, as the first tasks they need to execute were to appease the Philippine Republic soldiers and to get an as good grasp of how the Philippine archipelago is concerning geography and its maritime resources. At the beginning of the 20th century, the Americans faced the economic challenges, which haunted the Philippines in the previous century. As a new imperialist country, the United States laid down policies linked to a grand economic project – to establish a stiff competition with Western Europeans in the game of profit-making and commercial empire building in Asia. The United States needed a territory that will serve as viable transship colony and station. David Abernethy's once pointed out the idea of "Triple Assault"*:* wherein environmental science is considered an imperialist tool; an apparatus to control nature and the inhabitants of a territory.[935] The Americans utilized the natural sciences that have strong roots in the West to study and lay down colonial foundations for their objective of civilizing and modernizing colonies. The use of science as a colonial mechanism ushered in the establishment of institutions geared to promote scientific research for the metropole's benefit.[936] A pattern in all colonial societies suggests agricultural situation reinforced the implementation of a plethora of environmental policies for commercial profit. The Americans saw the potential of the Observatorio de Manila as an advanced scientific institution that can be used as a tool to implement their colonial projects in the Philippines. Agriculture was one of the economic priorities of the Americans in the Philippines. They saw the potential of Philippine agriculture in the world market, only if it can cope with or situate its use with the varying natural contexts. In the 19th century, an estimated 90% of exported products were from the agriculture sector, mainly sugar, coconut products, *abaca*, and tobacco.[937] Therefore, another "pacification" was responded with institutional and bureaucratic capacities – establishment and reorganization of institutions dealing with it.

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[932] Ibid., p. 421.
[933] Alden March, *The History and Conquest of the Philippines and our other Island Possessions: Embracing our War with Filipinos in 1899* (Philadelphia, P.A.: White Bible House, 1899), p. 35.
[934] Ibid.
[935] Cited in J. R. McNeil, 'Introduction: Environmental and Economic Management' Alfred Mccoy and Francisco Scarrano (ed.), *Colonial Crucible: Empire in the Making of Modern American State* (Madison, Wisconsin: The University of Wisconsin Press, 2010), p. 475.
[936] Ibid., p. 476.
[937] Rene E. Ofreneo, *Capitalism in Philippine Agriculture [Updated Edition]* (Quezon City: Foundation for Nationalist Studies, 1980), p. 7.

In 1899, the US Department of War and Department of Agriculture pointed out climatic phenomena such as typhoons, floods, drought, earthquakes, and volcanic eruptions to have a significant effect on prices and transport of commercial agricultural products.[938] With this, the Americans established the Bureau of Agriculture in the Philippines, and its duty was to be the pioneer agency in research and development of the agriculture in the archipelago. The bureau's tasks involved research on new crop species that will fit the tropical climate and natural hazards in the colony, combatting animal diseases, and expansion of modern farming methods and techniques through *agricultural schools*.[939] Through the Philippine Commission Act No. 131, the Americal civil government in the Philippines reorganized the Observatorio de Manila into a larger agency, the Philippine Weather Bureau (PWB).[940]They placed the PWB under the *Department of Interior.*[941] Accumulation of instruments from the United States was done, and the PWB undertook the establishment of additional stations throughout the archipelago. From fifty-five (55) secondary stations, rain stations were instituted to expand the network of weather data collection in the archipelago.[942] Also, American Jesuits became part of the administration of the bureau.[943] In modernizing agriculture, the Philippine Weather Bureau, through the reorganized observatory, was tasked to support the sector through the release of regular weather reports, typhoon and flood warnings and scientific endeavors that will benefit agriculture. In the aim to enhance Philippine agriculture and turn it into a full-scale *cash crop system* fit for external trade, the Americans believed it is vital to protect the agricultural lands from the havoc of typhoons or flood destructions. And though the weather bureau's meteorological work, it will be done and they can lessen the damages caused by such hazards. One core task of the reorganized Weather Bureau as directed by PC Act 131 was to collect and assess the status of farming and agriculture in areas where they will erect meteorological stations.[944] The stations regularly sent information and data collected daily from different locations to local governments and the central station in Manila. The PWB spearheaded this program and later called as the crop service (servicio de cosechas). Crop reporting service from the provinces became part of the Monthly Bulletin of the bureau starting 1902.[945] Local newspapers in Spanish and in English also published reports to expand the scope of information dissemination.[946] Based on the original reorganization plan made by Algué, which was approved by the Philippine Commission, he divided the Philippine archipelago into four meteorological zones, taking into account temperature and rain data.[947] Algué made two zones in the north, and two in the southern region.[948] Algué also considered the dynamic nature of service the bureau can implement, and the major agricultural products the archipelago produces like rice, sugar, tobacco, coconut, and abaca. Distribution of produce will be based on the determined seasonal distribution scale the bureau will make from the data

[938] Warren, "Scientific Superman", *Colonial Crucible*, p. 510.
[939] Lewis E. Gleeck Jr., *American Institutions in the Philippines (1898-1941)* (Manila: Historical Conservation Society, 1976), p. 229-231.
[940]. *Weather Bureau Centennial, 1865-1965*, p. 7; Warren, 'Scientific Superman', Colonial Crucible, p. 509.
[941] *Weather Bureau Centennial, 1865-1965*, p. 7.
[942] *Report of the Philippine Commission to the Secretary of War*, p. 51
[943] Warren, p. 509.
[944] Section 4, PC Act 131, p. 277.
[945] Repetti, p. 32.
[946] *Report of the Philippine Commission, 1903, Part 2*, p. 756.
[947] Warren, pp. 512-513.
[948] Ibid., p. 513.

they have or will collect. [949] Until the years before the Pacific War in the Philippines in 1941, the mindset was the American civil government treated the observatory as an essential arm in its economic policies on agriculture; that the weather bureau network in the Philippines was for agricultural development.[950]

The ways the colonial state considered the environment as vital in its programs can be understood by how the institutions they established and improved on acted on based on the larger imperialist agenda. Documentary sources suggest that the Americans viewed typhoon as more 'problematic than" earthquakes and volcanic eruptions. Accounts and studies further point out this observation. Sir John Bowring, from his same observations, gave a quite simple yet complete description of how atmospheric disturbances affect the islands: "Violent hurricanes produce fearful devastations; typhoons cover the coasts with wrecks, inundations of rivers and excessive rains destroy the earth's produce*"*.[951] This observation is same with what scholars agree about the destructions brought by typhoons in the Philippines. Bankoff (2007) argues that "the loss of life and property caused by tropical cyclones and their epiphenomena such as landslides, storm surges, and floods are greater than any natural hazard in the Philippines."[952] The occurrence of typhoons can be attributed primarily to geographic location and atmospheric patterns of the archipelago. Typhoons do not only bring damages to life and property, but it also gives people fear that eventually became a counter-factor in negating any unexpected event. Despite the presence of scientific institutions, people were only given way how to understand and how to recover, and yet, it does not *directly* prevent them from the extremities of an actual typhoon. Invulnerability to typhoons did not exist as an idea in practice, yet specific responses manifest a form of it.

b.2 The August 1937 earthquake

The work of the PWB on monitoring seismic and tectonic geological activities had identified several major and minor seismic events from the late 19th century to the 1930s. From 1890 up to 1909, there were recorded 21 destructive earthquakes in Luzon; most of them are in the Ilocos provinces and Southern Luzon provinces like Batangas where the active Taal Volcano is located. From 1901 until 1915, the PWB expanded its seismic stations by obtaining more equipment to detect and study earthquakes. One improvement was the establishment of a seismological station of Ambulong in Lake Taal in the purpose of giving warnings to inhabitants of nearby towns in case of an eruption of the Taal Volcano.[953] Subsequently, a seismological station was also established in Legazpi in Albay to conduct observations to the Mayon Volcano. Available seismographic records and notes of the Manila Observatory using the Vicentinni and Wiechert seismographs from 06 January 1914 to 21 November 1928 reveal the usual occurrence of microseismic activities in the archipelago. A total of 64 earthquake

[949] Ibid., p. 512.
[950] Kerby Alvarez, *"*Ang Observatorio Meteorologico de Manila, ang Philippine Weather Bureau, at ang Sektor ng Agrikultura sa Pilipinas, 1865-1937: Isang Panimulang Kasaysayan ng Institusyunal na Agrometeorolohiya sa Pilipinas*"*, *SALIKSIK E-Journal* 5 (1) (May 2016), pp. 1-50.
[951] John Bowring, *A Visit to the Philippine Islands,* p. 44.
[952] Greg Bankoff, "Storms of History: Water, hazard and society in the Philippines, 1565-1930", in ed. Peter Boomgaard, *A World of Water: Rain, rivers and seas in Southeast Asian histories* (Singapore: National University of Singapore Press, 2007), p. 157.
[953] John Schumacher, "One Hundred Years of Jesuit Scientists: The Manila Observatory, 1865-1965", Philippine Studies 13(2), 1965, p. 271.

recordings were noted and described: 1914 (4), 1915 (3), 1916 (2), 1917 (4), 1918 (3), 1919 (4), 1920 (4), 1921 (5), 1922 (4), 1923 (5), 1924 (4), 1925 (2), 1926 (6), 1927 (7), and 1928 (7).[954]

b.2.1 The earthquake and the extent of destruction

On a busy Friday night of 20 August 1937, a strong earthquake hit Manila and the nearby provinces of Laguna and Tayabas. The first tremor lasted for almost three minutes and was followed by two aftershocks with the following hour after 8pm main quake.[955] An eyewitness described the event as a "national disaster"; he said "everywhere scenes of confusion and terror. In a few hours, the city went uneasily to slip."[956] The first combined report of injuries state there was one death, and 62 injuries.[957]

The seismological stations of the PWB used the reports gathered in their stations in Manila, Baguio, and Butuan, as well as reports from Hong Kong, Phu-lien, Zikawei in Shanghai, and Riverview College in Sydney to validate their initial finding on the intensity of the earthquake, as well as the location of the tremor's epicenter.[958] The 20 August earthquake had its epicenter east of Alabat Island in the eastern coast of Tayabas province, and seismographic instruments detected the movements emanated from the epicenter 12 kilometers from it.[959]Initial reports, like that of Father Charles Deppermann, a seismologist at the PWB, however, indicate that the earthquake had its epicenter 6 kilometers away from Manila, in a fault line that runs through Montalban Gorge, making it a tectonic type of tremor.[960] The large section of the Luzon Island experienced the quake, crossing the Dagupan to Batangas landmass corridor.[961]A Harvard seismologist described the event as the "worst one of the year"' seismological movements were detected and reached Cambridge, Massachusetts before Manila recorded the first shock.[962]

Initial reports published in daily broadsheets days after the event reveal developing information relayed to the public. But the common thread of those reports show that the city of Manila was the hardest hit by the quake, as public buildings and structures were severely damaged, and most of the casualties were in the city. The first reports only indicate injuries and damages to public edifices. The 20 August earthquake caused crumbling to walls, big buildings, damages probably to millions of pesos, short power cut-off, plunging Manila into darkness, bursting of water mains which affected the entire

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954 "An Investigation of the seismograph records of earthquakes felt in Manila", EAR S 002, Earthquake Data Records, Manila Observatory Library and Archives.

955 William Repetti, "Instrumental study of the earthquake of August 20, 1937", *National Research Council of the Philippine Islands, Bulletin No. 14* (Dec 1937): 55-56; "Towers knocked off churches; Big Buildings Sway", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.

956 "Worst Quake since 1880 Shakes Manila, Provinces." *Graphic* (26 August 1937): 5, 6.

957 Ibid.

958 Ibid., pp. 56-58.

959 Ibid., p. 55.

960 "Center 6 kilometers from Manila; Wide Area is Affected", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.

961 Ibid.; "Observatory Instruments Destroyed", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.

962 "Worst Quake of Year Says Scientist", "Observatory Instruments Destroyed", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.

south side if the city for at least 24 hours.[963]

The Escolta business district suffered massive damage, worst in the vicinity of the Heacock Building, which was twisted and broken, but did not fall; the quake smashed all windows on the ground floor.[964] Marge cracks smashed were also seen in the Insular Life Building, and the foundation of Great Eastern Hotel located in the other area of the city.[965] The premier hotel district of Manila was not spared from the tremor, though only minor damages were port. Reports indicate minor cracks in the buildings of Manila Hotel, the Bayview Manila, the Army and Navy Club, the American European branch of the Young Men's Christian Association (Y.M.C.A), the University Club, the Luneta Hotel, the University Apartments, and the Far Eastern Hotel, that sank a few inches below its original foundation.[966] No hotel guests were reported injured after the quake. In greater Metro Manila, authorities initially said that the municipal building and church of Caloocan was damaged, wherein wide cracks appear in the building's wall.[967] In the following days, authorities identified more buildings to have been damaged by the quake. Other buildings in Manila include the Ateneo de Manila, the National City Bank Building, the Intendencia in Intramuros, the Manila City Hall, the Bureau of Science Building, the main buildings of Arellano and Mapa High Schools, the State, Grand, and Belleuve movie houses, and a score of private homes.[968] Amongst the ecclesiastical structures in Manila, the Pandacan Church Belfry was completely demolished; in Intramuros, the second floor of the Intramuros building of University of Santo Tomas had cracks, stones from the Recoletos church tower fell, while other old concrete churches in Intramuros, such as the San Agustín Church and San Francisco Church, which date back as far as the 1600s, survived, and only had small cracks on its walls.[969]

Two days after the quake, the Manila City Engineering Department declared the Heacock Building in Escolta condemned and in danger of collapsing.[970] The tenants were notified to vacate the building immediately, and the office of the company that owns the building, H.E Heacock Company, was temporarily transferred to the Port Area.[971] In a statement, S. F. Gaches, president and general manager of the company, lamented that the 7-year-old building is nearly “a total loss, even though insurance got it covered fully.”[972] Among the buildings in the Escolta business district, only Heacock Building was condemned. The estimated amount of destruction in this building was million pesos.[973]

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963 “Towers knocked off churches; Big Buildings Sway”, *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
964 Ibid.
965 Ibid.
966 Ibid.; “Earthquake Damage in Provinces Mounts; Two Deaths Reported.” *Manila Daily Bulletin* 107.46 (23 Aug 1937): 1 and back page.
967 Ibid.
968 Ibid.
969 Ibid.
970 Ibid.
971 Ibid.
972 Ibid.
973 Ibid.

Photo No. 10
The damaged Heacock Building in Escolta district, Manila[974]

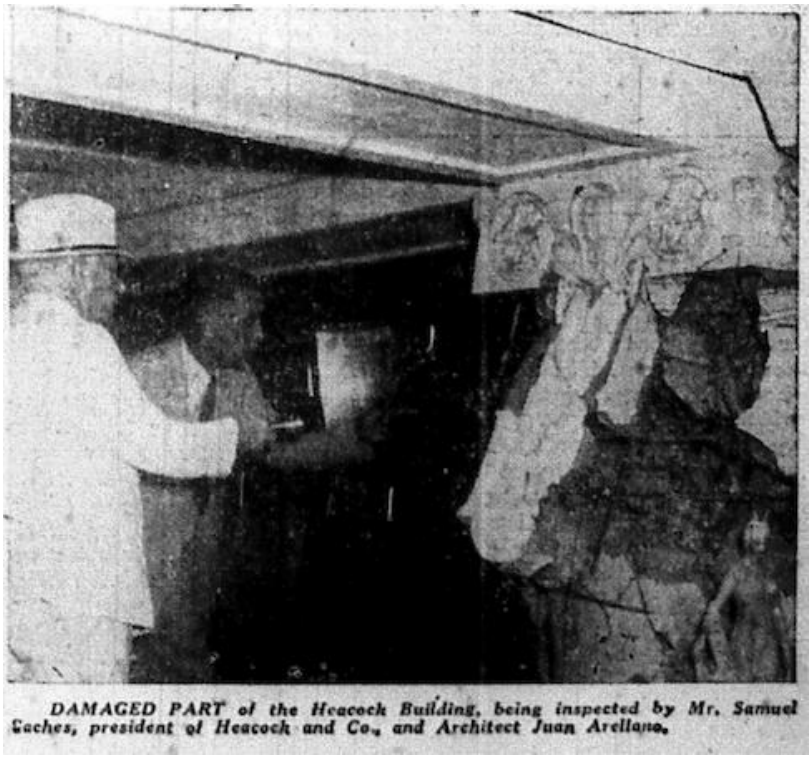
DAMAGED PART of the Heacock Building, being inspected by Mr. Samuel Seches, president of Heacock and Co., and Architect Juan Arellano.

Photo No. 10.1: Damaged part of the Heacovk Building as inspected by Mr. Samuel Seches, president of Heacock and Co., and Architect Juan Arellano

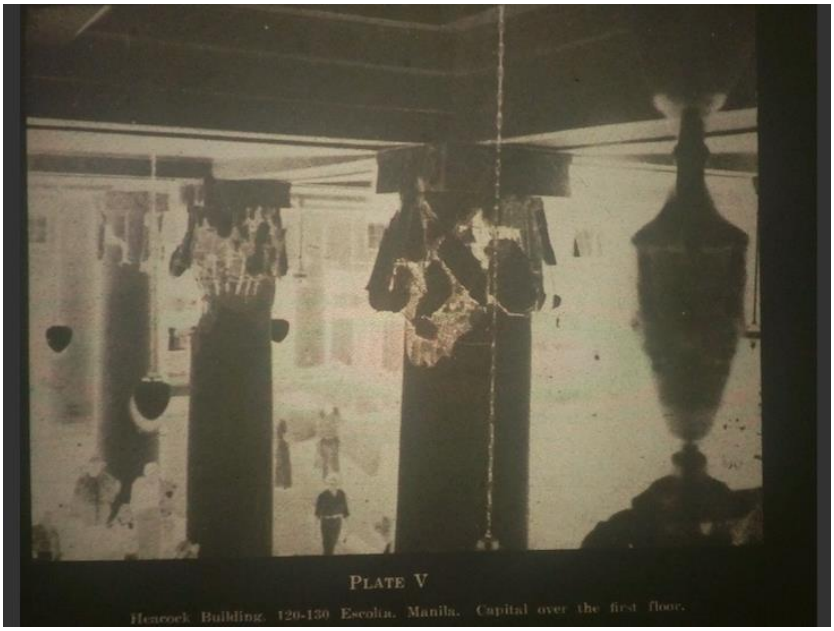
PLATE V
Heacock Building, 120-130 Escolta, Manila. Capital over the first floor.

Photo No. 10.2: Photo of damaged pillars of the Heacock Building

[974] Ambrosio Magsaysay and Jose M. Feliciano. "Preliminary study of the earthquake of August 20, 1937." *National Research Council of the Philippine Islands, Bulletin No. 14* (Dec 1937): 3-54; "Worst Quake since 1880 Shakes Manila, Provinces." *Graphic* (26 August 1937): 5, 6.

The water supply in Manila was severely affected after the city's water line was damaged by the tremor. The districts of Ermita, Paco, Malate, Pandacan, Sta. Ana, Pasay, and San Pedro Makati were short of water for almost two days. The quake broke the 36-inch water main pipeline on Calle Suter, Sta. Ana, that was supplying northern districts of Manila.[975] The street was waist-high flooded due to water sprout from the broken main.[976] Two more mains were affected: the 16-inch main on Ayala Bridge was disjointed but responding water companies immediately repaired it; the 8-inch pipe at Pier 3 and 5 was also broken, causing flooding and damaging cargos estimated at several thousand pesos.[977] The Metropolitan Water District immediately acted on the engineering and repair needs of the city, and alternative water sources were identified and rerouted to meet the water needs of the Metro Manila area. After almost 22 hours, by 6pm of 21 August, the water supply in Manila went back to normal.[978] They clarified that the city's water supply was not affected by the slight damage in the Montalban Aqueduct, as it was in the vicinity of the earthquake's epicenter.[979] The authorities cleared that the water is safe to drink, amidst the dear of being polluted after the quake and during the repair. They added that the water is free of germs; they closed the valves during the reconstruction, and after it, the lines were filled with hyperchloride of lime to clean the flow of water, and it was let to flow until the whole tube has a new supply of water.[980] The Bureau of Science even tested 20 different sections, and zero bacteria were detected, and the Manila chief engineer claimed that the quality of water Manila is as same as the city of Buffalo in New York state, one of the well-designed cities in the United States.[981] The damage to waterworks estimated at 10,000; does not include the loss of revenue due to the suspension of service in districts in the southern portion of Manila.[982]

After the tremors ran out, firefighters were helpless as a lot of fire alarms in the city went on simultaneously after. People saw electrical sparks in Sanitary Steam Laundry in Arlegui street, and in the corner of Rizal Avenue and Azacarraga; other alarms were in A. Mabini corner Dakota, and España and M. Earnshaw, and after several hours, in Quiapo Church and Calle Regidor. Marion Lewis of the Manila Electric Company (Meralco) explained that their lines and wires suffered slight damages throughout the city.[983] On the night of the earthquake, the President of the Philippine Commonwealth, Manuel L. Quezon, was supposed to attend a big banquet dedicated in his honor, at the Rizal Memorial Stadium.[984] But due to the tremor, the electricity in Malacañang went off, causing some delays in the President's preparation, and the travel to the venue was postponed for several minutes to ensure the safety of the presidential entourage.

Panic followed the shaking of the earth and the rocking of buildings most of the reported

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[975] "City Water Mains Broken", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2; "Worst Quake since 1880 Shakes Manila, Provinces." *Graphic* (26 August 1937): 5, 6.
[976] Ibid.
[977] Ibid.
[978] "Earthquake Damage in Provinces Mounts; Two Deaths Reported." *Manila Daily Bulletin* 107.46 (23 Aug 1937): 1 and back page.
[979] Ibid.
[980] Ibid.
[981] Ibid.
[982] Ibid.
[983] Ibid.
[984] "Quake delays appearance of Quezon at Fete", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.

casualties were in downtown Manila area, many due to trampling in crowds, especially in jammed Manila theaters and hotel, where the public was gathered the thickest. Many people got injured due to fallen debris, posts, and commotions in prime theaters and movie houses, as well as in main thoroughfares in the city's business and commercial areas.

The scene of a busy downtown, an organized chaos, turned out to be a disastrous one. Stall displays in score trembled down, people in cinemas got into stampede to go out of theaters, many women screaming, fainted in the streets, girls in dormitories "prayed", and all of a sudden after the tremors passed, people came rushing in the open part of streets of Quiapo, Sta, Cruz, and Intramuros, bringing out their pillows, blankets, and clothes.[985] Dozens were brought to hospitals, and people started crowding drugstores for first aid medicine.[986] The open areas of Manila became an instant camping site for the people in the affected districts. Estimated 200 persons sleeping in Luneta; 1000 on the Sunken Gardens, 300 on San Agustín Church, 400 on Plaza Sampaloc, 300 on Plaza McKinley, 250 on the Manila Cathedral yard, and 100 on Plaza Sto. Tomas.[987] Philippine Bar candidates were preparing for the bar examinations studied by candlelight placed on boxes used as improvised tables.[988] The police placed trucks in front of houses and did not allow people to return to their homes, as safety is not yet secured.[989]

An estimated 33 injured people were rushed to several hospitals in Metro Manila, such as the Philippine General Hospital (PGH), St. Luke's Hospital, San Juan de Dios Hospital, and Mary Johnston Hospital. The first reports indicated that only one human life was spared from the tremor, as of the late hour of 20 August. Initial reports say Manila registered 41 injured individuals.[990]

Table No. 15

List of reported injured residents of Manila, rushed to the Philippine General Hospital (PGH), St. Luke's Hospital, San Juan de Dios Hospital, and Mary Johnston Hospital[991]

Name	Age	Residence	Injury Description
Bernaldito Valdez	22	Sta. Potenciana	Wounded
Valente Areola	26	378 Vista, Paco	Accidental fall
Co Eng	50	8 Sta. Potenciana	Hit by falling ceiling
Domulada de Guzman	31	Dart, Paco	Hit by falling iron railing
Celestino Chavez		865 Canonigo	Cut
Tomas Sopnet	53	1543 Oroquieta	Bumped by an automobile
Gerardo Jocson		433 Legarda	Bumped against the seat in the State Theater

985 "Worst Quake since 1880 Shakes Manila, Provinces." *Graphic* (26 August 1937): 5, 6.
986 Ibid.
987 "Thousands Spend Night Outdoors", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
988 Ibid.
989 Ibid.
990 "Earthquake Damage in Provinces Mounts; Two Deaths Reported." *Manila Daily Bulletin* 107.46 (23 Aug 1937): 1 and back page
991 "Towers knocked off churches; Big Buildings Sway", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.

Emerenciana Mercurio	55	818 Eleaño	Hit by falling stone
Angela Tolentino	25	132 Moriones	Bumped by an automobile
Jose Gosapus	29	2022 Azcarraga	Accidental fall
Lucio Alvarez	55	Balintawak	Struck by falling stone
Elena Herrera			Crushed in a commotion at the Savot Theater; her knee and back badly injured
Francisca Ordua			Fainted at her home
Ciriaca Ariola			Was eating in a refreshment parlor near Cine Pax in Paco; ran outside when the quake started, collided with a horse; skull fractured, her chin, face, arms, and limbs bruised
Juan Coroñas			a high school student of NU Intramuros was electrocuted in front of Washington Shirt factory in Juan Luna, Binondo; he was running away from a building when he stepped on a live wire; Agapinto Concho, a lawyer, saved him
4 unnamed patients in San Juan de Dios Hospital			It was reported that when the earthquake happened, even patiesnts who were newly operated run upon the garden
9 unnamed patients in St. Luke's Hospital			
4 unnamed patients in Mary Johnston Hospital			

Another scenario happened in one hospital that somehow contrasts with the stories of injuries and casualties of the 20 August earthquake. Two babies were born at the PGH on the night of the quake. The *Manila Daily Bulletin* reports:

> "LINDOLA - child of the earthquake, was the name given to a baby girl born to Mrs. Francisca Macario at the Philippine General Hospital at exactly 8 o´clock last night, the hour of the temblor.
>
> The next quake, which came 20 minutes afterward, brought another life to the maternity ward, in the hospital when a patient registered as V. Leonarda brought forth a baby girl. She refused to name her LINDOLA II. She said she was still looking for another name. The nurses, who were attending the patients when the quake was rocking the city, stated that

> they were glad that the two girls come into the world at such perilous time. Their responsibilities made them forget the peril."[992]

This naming of newborn children after an event has some cultural roots in the Philippines. Naming a child based on personal, family, or collective societal experience has been a common practice or tradition, as parents see their children as part of personal and societal narratives, era, or history.

Aside from the residents of Manila and nearby provinces, the 20 August 1937 earthquake also had an unlikely "victims". The said earthquake welcomed the 435 refugees, mostly Americans families, professionals, and missionaries, from war-torn Shanghai, that arrived in Manila to escape the Japanese bombing of the said city in China.[993] The fear of bombings and food shortage pushed the refugees to leave Shanghai eventually, and upon their disembarkation from S.S. President Jefferson that docked in the Manila, they thought that the sudden tremor was Japanese planes following them and bombing Manila.[994] After the major tremor, some of the refugees went towards open areas such as in Luneta, the Sunken Garden, and Intramuros.[995] The day after the earthquake, several private companies handed over to the government their donation to refugees. The International Stock Exchange gave 1,000 pesos to the fund for the relief of Shanghai refugees, in addition to the 1,000 provided by Manila Rotary Club, and a 50 pesos check sent to the Bulletin by Eduardo Co Seteng, a local businessman.[996] The Manila Elks started a voluntary subscription drive to help American nationals who evacuated from Shanghai.[997]

One effect of the earthquake that lingered forever was on the precision of time recordings on the archipelago. The PWB also suffered major losses after the earthquake. Many instruments at the weather bureau's central station in Manila got broken: telegraphs, barograph, and the master clock and other clocks of the bureau.[998] The weather bureau's "Father Time", Father Edmund Nattal, chief of the Astronomical Division, said that after the earthquake, no timepiece in the archipelago might be said to be precisely accurate; radio announcers got lost in the exact time.[999] The pre-earthquake time recording of the PWB measure up to the tenth to the hundredth of a second, with three clocks operating, but after the tremor, this precision was gone.[1000]As adjustments in the pendulums were a meticulous job, an estimated six months are needed to bring the clocks to rerunning normal, based on the international standards the bureau was following.[1001] This type of time service in the Philippines started in the 1917, as the PWB, together with the Bureau of Posts and the US Naval Station in Cavite teamed up to

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[992] "Two babies born during quakes", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[993] 435 refugees in new panic as quake strikes", "Arrivals caught at Pier by shocks fear fresh bombardment", "Bring Sad Tales", "Pathetic Stories of Flight from War-Torn City are Recounted", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[994] Ibid.
[995] "Thousands Spend Night Outdoors", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[996] "2050 Given to Fund for Refugees Relief so far", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[997] Ibid.
[998] "Observatory Instruments Destroyed", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[999] Alfonso Denoga, "Temblors Tumble Timepieces Out of Kilter; 'Father Time' Out of Sorts", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[1000] Ibid.
[1001] Ibid.

establish a faster wireless time service in the archipelago, as they believe Manila has an enviable position in the Pacific in the interest of shipping, military activities, and typhoon warnings network.[1002]

b.2.2 Responses of the Commonwealth Government after the 1937 Earthquake

b.2.2.1 Collecting reports from the provinces

The Commonwealth Government, through one of its communication agencies, the Bureau of Posts, sent reports to its stations across the archipelago and asked several local officials, municipal presidents, tow secretaries, police chiefs, and church people, to survey their localities and report back to the bureau their findings. [1003] Letters were sent back by local officials to Manila, furnishing copies the Director of Posts in Manila; as well as the Secretary of Public Works and Communication, Chairman of the National Relief Board, Philippine Army Chief of Staff, Weather Bureau Director, Philippine Red Cross Director, and Posts Bureau Superintendents of Administrative Division, Mail Transportation Division, Inspection Division, and Radio Division. Father Miguel Selga, director of the PWB, coordinated immediately with the Posts bureau for him to wire messages and initial reports to secondary stations of the weather bureau.[1004] In separate sets of telegraphic reports, he received reports from twelve weather bureau stations, particularly from areas where people felt the earthquake extremely, and the damages and devastations were highly observable. The includes the stations in Ambulong in Tanauan, Batangas, San Fernando, La Union, Laoag, Ilocos Norte, Santa Cruz, Laguna, Daet and Capalonga, Camarines Norte, Naga, Camarines Sur, Legaspi, and Virac, Albay, Alabat, and Infanta, Tayabas, and Sorsogon,[1005]The short reports contained specific details about how the people felt the earthquake in their respective municipalities: time of first and succeeding shocks, quantitative and qualitative aspects of the tremor, as well as short narratives about how the earthquake affected the people, injuries and casualties, and properties, both damages and destructions, in an area. Not only from weather station staff did Selga received telegrams, he also received some letters from private individuals, like from a certain G. H. Aberni from Dingalan Lumber Co., Inc., wherein the sender relayed to Selga how the earthquake was felt in his

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[1002] "Wireless Time Service in the Philippine Islands", *Science, New Series*, Vol. 46, No. 1198 (Dec. 14, 1917), p. 582, INS S1.1 061, Institutional Records, Manila Observatory Library and Archives.

[1003] "Additional reports received from the provinces about the effect of the earthquake on August 20, 1937: EAR S 001, Earthquake Data records, Manila Observatory Library and Archives.

[1004] "Observatory Instruments Destroyed", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.

[1005] "Letter from Pastor P. Vidal dated 20 August 1937", EAR S.1 005; "Letter from Eugenio B. Manalo dated 21 August 1937", EAR S2.1 006; "Letter from [O. Ontengco] dated 21 August 1937", EAR S2.1 007; "Letter from Mariano Urbanes dated 21 August 1937", EAR S2.1 008; "Letter from Juan B. Ablan dated 21 August 1937", EAR S2.1 009; "Letter from Juan B. Ablan dated 21 August 1937", EAR S2.1 010; "Letter from Jacinto S. Bantog dated 21 August 1937", EAR S2.1 011; "Letter from V. Alcantara dated 21 August 1937", EAR S2.1 012; "Letter from Juan Ruiz dated 21 August 1937", EAR S2.1 013; "Letter from Jose E. Desembrana dated 21 August 1937", EAR S2.1 014; "Letter from Nicanor Verdan dated 21 August 1937", EAR S2.1 015; "Letter from Tomas Mendoza dated 21 August 1937", EAR S2.1 016; "Letter from [Juan Conliosco] dated 22 August 1937", EAR S2.1 018; "Letter from [Juan Conliosco] dated 25 August 1937", EAR S2.1 019, Earthquake Data Records, Manila Observatory Library and Archives.

hometown, and correspondingly asked the weather bureau chief of additional information about the said earthquake.[1006]

From 20 to 26 August 1937, the Bureau of Posts received reports from 50 provinces and military outposts, which consists of 297 reports, wherein 36 or more than 12% contained information of damages in towns, both substantial and slight. The provinces of Tayabas (26), Cebu (26), and Pangasinan (20) received the most reports, but the Tayabas had the most number of towns affected at 18, almost 70% of the reports received from the said province.

Table No. 16
Summary of initial reports received by the Bureau of Posts from provinces and towns regarding the 20 August 1937 earthquake, for the period from 20 to 26 August 1937

Date of Telegraphic Report (August 1337)	Province/Region	No. of Towns/Areas that submitted report	No. of Towns/Areas that were damaged or slightly damaged
20 August	Benguet	1	0
20-21 August	Romblon	3	1
21-26 August	Tayabas	26	18
21 and 27 August	Zamboanga	1	0
21 August	Abra	1	0
21 August	Agusan	4	0
21 August	Aklan	4	0
21 August	Albay	1	1
21 August	Antique	3	0
21 August	Bataan	7	0
21 August	Basilan	1	0
21 August	Batangas	9	0
21 August	Bulacan	8	1
21 August	Bohol	6	0
21 August	Cagayan	7	0
21 August	Camarines Sur	1	1
21 August	Capiz	2	1
21 August	Cavite	4	2
21 August	Cebu	26	0
21 August	Cotabato	1	0
21 August	Davao	1	0
21 August	Davao Oriental	3	0
21 August	Fort McKinley*	1	0
21 August	FT Stotsenberg*	1	0
21 August	Ilocos Norte	5	0
21 August	Ilocos Sur	11	0
21 August	Isabela	8	0
21 August	Laguna	14	3
21 August	La Union	9	0

[1006] "Letter from [G. H. Aberni] dated 21 August 1937", EAR S2.1 017, Earthquake Data Records, Manila Observatory Library and Archives.

21 August	Leyte	2	0
21 August	Metro Manila	7	3
21 August	Mountain Province	2	0
21 August	Negros Occidental	12	1
21 August	Negros Oriental	7	0
21 August	Nueva Vizcaya	3	0
21 August	Palawan	2	0
21 August	Pampanga	8	1
21 August	Pangasinan	20	0
21 August	Sorsogon	2	1
21 August	Sulu	1	1
21 August	Surigao	5	0
21 August	Tarlac	9	1
21 August	Zambales	10	0
22 August	Lanao del Sur	3	0
22 August	Nueva Ecija	8	0
23 August	Camarines Norte	2	0
23 August	Mindoro	5	0
24 August	Iloilo	11	0
24 August	Misamis	8	0
26 August	Marinduque	1	0
TOTAL		**297**	**36**

*Not a town but a military fort in the Manila region

In the provinces, initial published reports indicate several unverified information. Provincial weather bureau personnel reported that in San Jose, Nueva Ecija, a house was buried by a landslide, trapping an entire family.[1007] The authorities closed San Jose-Bayombong Road connecting Nueva Ecija and Nueva Vizcaya to traffic for the safety of motorists.[1008] Several capital cities also reported different earthquake intensities in their area: Legaspi recorded Intensity 7, Dagupan, Intensity 5, and Lucena, Intensity 4.[1009] Churches in the provinces suffered heavily; many old stone towers and pillars were thrown in the ground, such as the churches in Pililia, Teresa, and Pasig in Rizal.[1010] Other churches that reported damages include the Pandacan in Manila, Baras in Rizal, Atimonan in Tayabas, San Miguel in Bulacan, Sta Maria. Sta. Cruz, Paete, Bay, Siniloan, Mabitac, Pangil, Longos, Pagsanjan, and Pakil in Laguna.[1011]

The provinces of Laguna and Tayabas reported the most damages in religious and public properties, and the number of deaths and injured outside the capital region. Churches and convents in these provinces said consequential damages, exceeding thousands of pesos per church property. Authorities reported massive losses in coconut

[1007] "House buried by landslide", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[1008] Ibid.
[1009] Ibid.
[1010] Towers knocked off churches; Big Buildings Sway", *Manila Daily Bulletin* 107.45 (21 Aug 1937): 1-2.
[1011] Churches Damaged by Last Friday's Temblors." *The Philippines Commonwealth* 7.35 (26 August 1937): 1, 4; "Worst Quake since 1880 Shakes Manila, Provinces." *Graphic* (26 August 1937): 5, 6; "Earthquake Damage in Provinces Mounts; Two Deaths Reported." *Manila Daily Bulletin* 107.46 (23 Aug 1937): 1 and back page

plantations as unripe fruits fell to the ground during the tremors.[1012] Two deaths were recorded outside Manila: Lucia Tiangco, 88 years old from Rizal, Eustaquio Cristobal from Cavite; while there were 38 injuries in Laguna, 22 in Tayabas, and 13 in Rizal, and several others from nearby provinces.[1013] Some of the latter include Sister Dionicia of Angel's Academy in Atimonan, Tayabas got severe injuries after jumping from a window of the building during the quake, and an unidentified woman in Boac, Marinduque was hit by a falling beam of her house.[1014]

b.2.2.2 Scientific studies about the 1937 earthquake: PWB, NRCP, and the recommendations for public engineering

The way the Philippine government responded to hazards brought about by earthquakes, during the American period and in the Commonwealth years, can be considered reactive. As reflected in the annual government reports, the scientific endeavors of the scientists were not put into reality by the mercurial nature of risk reduction approach of the government in general. Same as in previous devastating earthquakes, a new set of scientific studies was commissioned to determine the nature of the earthquake, and what scientists, seismologists, and geologist, can recommend improving the response and rehabilitation system of the country at the aftermath of earthquakes.

b.2.2.2.1 Philippine Weather Bureau's Work on Seismology

Throughout the decades from 1900 to 1940, the agency tasked to research seismology and volcanology was the Philippine Weather Bureau (PWB). Established on 1901 through the *Philippine Commission Act No.131*[1015], one of its main departments was the Seismological Section. Under the supervision of Father Miguel Saderra Masó, modern instruments from the United States arrived, and the bureau was able to publish a compendium of seismographic data about Philippine earthquakes the following year, titled *Report on the Seismic and Volcanic Centers of the Archipelago*.[1016] In 1910, this databook was expanded, adding information from the 16th century, and published as the *Catalogue of Violent and Destructive Earthquakes*.[1017] New instruments from abroad arrived in the bureau's central station, such as the updated version of *Vicentinni's*

[1012] "Earthquake Damage in Provinces Mounts; Two Deaths Reported." *Manila Daily Bulletin* 107.46 (23 Aug 1937): 1 and back page
[1013] Ibid.
[1014] Ibid.
[1015] Philippine Commission (PC) Act No. 131: An Act providing for the establishment of a weather bureau for the Philippine Islands and appropriating eight thousand and sixty-six dollars and fifty cents ($8,066.50), in money of the United States, for the purchase of instruments and apparatus and the installation of the same", *Annual Reports of the War Department for the Fiscal Year ended June 30, 1901*: Published Laws and Resolutions of the Philippine Commission (Washington: Government Printing Office, 1901), p. 276-279.
[1016] John H. Schumacher, "One Hundred Years of Jesuit Scientist: The Manila Obsevatory1865-1965", *Philippine Studies,* Volume 13, No. 1 (Manila: Society of Jesus in the Philippine Islands, 1965), p. 270; *Third Annual Report of the Philippine Commission, 1902* Part 1 (Bureau of Insular Affairs, War Department Washington: Government Printing Office, 1903), p. 306.
[1017] Ibid.

universal microseismograph, ceraunograph, statoscope, and electric chronograph.[1018] On the other hand, installed in the secondary stations were improvised pendulums to record tectonic or ground movements.[1019] The bureau also became active in observing volcanic activities. Volcanoes such as the Bulusan in Sorsogon, the Taal in Batangas, and the Mayon in Albay were some of the focus of the scientists of the bureau. They built ambulant seismic facilities in the vicinity of the volcanoes, observing, warning people, and assessing the damaging of lava and pyroclastic flows.[1020] The work of the PWB construed to be consistent: providing weather service to institutions, businesses, and local people. The officials strengthened the training of Filipino expert-scientists in key fields of meteorology and seismology, as it was one of the general goals of the Commonwealth government. PWB's relation with foreign scientific bodies and overseas meteorological agencies continued to flourish. All might have been considered well until the end of the fateful year 1941. At the advent of the Pacific War, the PWB became a target of military occupation by the Imperial Japanese Forces.

After the 1937 earthquake, despite being somehow handicapped to issue immediate, comprehensive scientific reports about the earthquake, the PWB was able to provide ample amount of information necessary to assess the situation and inform the government and stakeholders about the seismic details of the disaster. In his scientific reports about the earthquake William Repetti, PWB seismologist and head of the Seismological Section of the National Research Council (NRC), used the reports gathered in their stations in Manila, Baguio, and Butuan, as well as reports from foreign seismological stations, in Hong Kong, Phu-lien, Zikawei in Shanghai, and from Sydney, to validate their initial finding on the intensity of the earthquake, as well as the location of the tremor's epicenter.[1021] He focused his study on the P-waves and S-waves of the earthquake to determine the epicenter and the extent of the tremors. He states that the recent earthquake has similarities with previous massive tremors experienced in the islands but admitted that due to the scanty information they have, only theoretical explanations could be made, and comparative approach with other earthquakes is vital. He furthers that determining zones is tricky at challenging to be definitive because it depends on the epicenter, the extent of movements, and the unavailability of exact information from various locations.[1022] Repetti compared the 20 August 1937 earthquake to the elastic bound phenomenon postulated by scientists on the San Francisco earthquake of 1906, wherein a purely horizontal shift at the sea bottom would not set up a wave.[1023] He admitted that the perennial dilemma of making people believe in their

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[1018] *Fourth Annual Report of the Philippine Commission*, 1903 Part 2 (Bureau of Insular Affairs, War Department, Washington: Government Printing Office, 1904), p. 56.

[1019] *Annual Reports of the War Department for the Fiscal Year ended June 30, 1905, Volume XI: Report of the Philippine Commission, Part 2* (Washington: Government Printing Office, 1905), p. 393.

[1020] See *Report of the Governor General of the Philippine Islands to the Secretary of War 1919* (Washington: Government Printing Office, 1920), p. 182, and *Report of the Governor General of the Philippine Islands 1921* (Washington: Government Printing Office, 1922), p. 232.

[1021] Repetti, "Instrumental Study of the earthquake of August 20, 1937", pp. 56-58.

[1022] Ibid., p. 60.

[1023] Ibid., p. 59. The US Geological Survey considered the 1906 San Francisco Earthquake, and the studies about it, as "dawn of scientific revolution" in seismology and geology, due to its unique nature and how it furthered the knowledge of earthquakes, based on the behavior of the San Andres Fault. See the website of the United States Geodetic Survey <https://on.doi.gov/2GFLre8>.

apparent safety and that they are not in the seismic zones[1024], concerning location, and that the movement was due to the subsequent effects of the tremor to the geological and physiographical nature of their place, for example, Manila. In his report, he lamented that scarcity of information was due to the lack of a working network of seismological stations in the archipelago: "If we have a network of seismic stations covering the Islands, as there is in Japan, we would probably be able to learn something definite about the mechanism of the earthquake from the first motions. In the present case, with only two observations we can only suggest what possibly took place."[1025]Despite the existence of scientific literature produced by the PWB in the past years, such as Miguel Saderra Masó's Volcanoes and Seismic Centers of the Philippine Archipelago (1904)[1026], wherein he identified at least 18 important and active seismic, volcanic, and the government did not give volcanic-seismic centers in the whole archipelago, the establishment of stations to monitor these tremor sports priority, and the circumstances left the weather bureau with no choice but to put seismological monitoring in other stations, making secondary stations fully loaded with work on monitoring temperature, rainfall, and other weather elements and phenomena.

The PWB also tried to engage the public after the August 1937 earthquake through its support programs on agriculture. As indicated, the PWB, beyond its daily scientific activities on weather and geological monitoring, was mandated to relay scientific help to the agricultural sector. One of the hardest hit economic sectors by the August 1937 was the coconut sector, particularly in the provinces of Laguna and Tayabas.[1027] In his visit to Sariaya, Tayabas to do ocular inspection about the extent of effects of the earthquake, several people from Laguna informed Selga and Tayabas that the coconut crop would diminish because of the earthquake.[1028]On February 1938, he sent a letter to Mariano Barreto, a coconut plantation owner in Gumaca town in Tayabas, to ask for some information about the status of coconut harvest in the province. The questions he asked pertain to some s scientific investigation and validation of the "belief" he heard from the local people. One of the questions, in my opinion, posed to be an "elitist" stance, given the common perception on the binaries of knowledge between socio-economic groups, i.e., farmer and plantation owner:

> If there any decrease, do you think that the decline (crop harvest) is due mainly and principally to the earthquake, or do you think that the cause of the decrease is drought, or the high winds, or pests or insects? **I would like to be enlightened by your experience and that of other prominent and intelligent people of Sariaya.** I would appreciate your statistics and remarks.[1029][Emphasis mine]

[1024] Ibid., p. 60.
[1025] Ibid., p. 59.
[1026] Miguel Saderra Masó's, Volcanoes and Seismic Centers of the Philippine Archipelago (Manila: Department Commerce and Labor - Bureau of Census, 1904), pp. 24-78.
[1027] "Additional reports received from the provinces about the effect of the earthquake on August 20, 1937", EAR S1 001, Earthquake Data Records, Manila Observatory Library and Archives; "Earthquake Damage in Provinces Mounts; Two Deaths Reported." *Manila Daily Bulletin* 107.46 (23 Aug 1937): 1 and back page
[1028] "Letter from Miguel Selga to Mariano Barreto dated 21 February 1938", EAR S2.2 002, Earthquake Data Records, Manila Observatory Library and Archives.
[1029] Ibid.

Barreto sent a reply several days after and clarified that the probable fear of the people on the loss of crops due to the quake probably coincided with natural agricultural cycle of coconut harvest. He said that "during the months of December and February the productions have reduced, but such reduction could not have been caused by the earthquake, because it has always been that after August of every year the production decreases," and that strong winds might have affected the production, not the earthquake.[1030]He also contradicted a rumor from some local people mentioned by Selga that during the next fifteen days after the earthquake, contrary to the people's belief, there was not any extraordinary falling of small coconuts.[1031]

b.2.2.2.2 Structural and Public Engineering Studies and Recommendations after the August 1937 Earthquake

The National Research Council (NRC)[1032], acting based on its mandate as a support think-tank of the government for various social and economic programs, published on December 1937 in their scientific bulletin, a compilation of studies made by independent scientists and members institutions about the 20 August 1937 earthquake. The studies included in the journal the geological and seismological assessment of the said earthquake, with particular recommendations on how to deal with the devastation, specifically on building earthquake-proof edifices and the enhancement of structural engineering practices in public infrastructures.

In their preliminary study of the nature of the 20 August 1937 earthquake from the point of view of engineers, Magsaysay and Feliciano (1937) argue that the geographic nature of the archipelago, and the nature of the earthquake, revealed some inconsistencies on public edifice construction, as some areas are observed to have more destruction than others, despite being in the same geographic zone.[1033] They focus their assessment on the public construction in Manila, assessing the most damaged buildings, the Pandacan Church, Heacock Building, the PNB Building, and the Manila Trading and Supply Company warehouses and compared it to Ilocos Region where some buildings are more earthquake-proof. They assert that "Manila is a growing city and if we fail to adopt a building code, who knows but that within one century from now Manila may suffer the effects as that of Japan."[1034] One observation they highlighted was the stark contrast that low buildings were severely damaged, but tall structures though had cracks, remained intact.[1035] They listed down some failures in the construction of buildings in Manila: (1) foundation of buildings was forgotten in construction buildings, (2) failure on maximizing the proper use of concrete buildings, like in the PNB Building where floors were weak despite being concrete, (3) the use of “floating foundations” to resist horizontal forces, instead of separate footings, and (4) the use of all vertical structural element, such as for

[1030] “Letter from Mariano Barreto dated 27 February 1938”, EAR S2.1 020, Earthquake Data Records, Manila Observatory Library and Archives.
[1031] Ibid.
[1032] The National Research Council (NRC) of the Philippine Islands was created on 08 December 1933 by the Philippine Legislature under Act. No. 4120, and was organized with the cooperation of the Department of Agriculture and Commerce.
[1033] Ambrosio Magsaysay and Jose M. Feliciano. “Preliminary study of the earthquake of August 20, 1937.” *National Research Council of the Philippine Islands, Bulletin No. 14* (Dec 1937): 3-54.
[1034] Ibid., p. 7.
[1035] Ibid., pp. 8 and 11.

bearing walls, columns, frames, and partitions to resist horizontal forces.[1036]They argue that the government can follow the "empirical rule" followed in building the church of Paoay in Ilocos Norte, where the large popular buttresses were built.[1037]They further that some old structures in the archipelago survived great earthquakes because the "builders of old churches and buildings had taken into consideration the fact that they were constructing in an earthquake country, and therefore provided tall walls with suitable buttresses or pilasters, taking advantage of the rigidity produced by intersecting cross walls and carefully tying walls above aisles, and doors and window opening by means of semi-circular arches…Foundations were also given careful consideration, because any uneven settlement of footings may prove disastrous to any structure."[1038] They pointed out that the "common sense rule" was followed in the buildings in Manila; thus, the instability of it, or destruction, in times of strong tremors, is an inevitable scenario.[1039] Moreover, they highlighted that the country must learn from the experience of Japan after the 1923 Great Kantō Earthquake that destroyed major towns and cities in several prefectures in the Honshu island of Japan.[1040]

The authors ended their study by suggesting several recommendations. Since many masonry and frame buildings in the islands – churches, assembly halls, theaters, and cockpits do not follow the stability requirements; a new building code is needed not only for Manila, but also for the whole country.[1041]They recommended the following technical measures for constructing and rehabilitating edifices: (1) the maximum height of buildings should be limited to 30 meters in Manila and in all parts of the islands, based on Art 59 of Manila Building Ordinance; (2) for adequate protection for local condition, a seismic factor of 1/10 must be provide; (3) the settlement of "made land" or silty sub-soil when subjected to either a long time load or a sudden shock should be investigated; (4) and No high thin walls for theaters or churches should be permitted, counter folded or tied up monolithically to the foundations, floors r roofs, in such a manner that they can withstand the above mentioned seismic factor, and unless every part of the foundation can safely carry the maximum load produced by small seismic factor.[1042] They also appealed to the government that seismology, geophysics, and structural engineering must be given more attention as a scientific discipline.[1043]

In another study published at the same bulletin, Pablo Sales, Associate Member of the Seismology Section of NRC, comprehensive research on the guidelines in earthquake-proof design and construction.[1044]He pointed three core principles to be considered to attain earthquake-proof edifices: (1) rigidity, (2) rational distribution, and (3) Making the natural period of elastic oscillation of the building smaller than the probable period of

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[1036] Ibid., pp. 11-12.
[1037] Ibid., p. 11.
[1038] Ibid.
[1039] Ibid.
[1040] Ibid., p. 12. For the 1923 Great Kantō Earthquake in Japan, see Gregory Clancey, "The Great Kantō Earthquake and the submergence of the Earthquake Nation", in *Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930* (Berkeley: University of California Press, 2006): pp. 212-234.
[1041] Ibid.
[1042] Ibid., p. 15.
[1043] Ibid.
[1044] Pablo A. Sales, "Fundamentals of earthquake-proof design and construction." *National Research Council of the Philippine Islands, Bulletin No. 14* (Dec 1937): 61-88.

vibration of an earthquake of destructive intensity.[1045] He proceeded in discussing in details the particular technical recommendations on how to properly execute the core principles. The ideas he presented were an application in the Philippine context, the general parameters abroad, particularly the ones used in Japan and the United States. Sales detailed twelve critical parameters to be looked closely upon to attain the resilience of a structure in times of tremors: location of the building, acceptable method of building design, orientation of a structure, ground plan shape of the building, height of the edifice, the building's foundation, general and superstructure characteristics, strength of structures wherein acceleration, forces, and working stresses are calculated precisely, use of materials, and precautionary measures in their applications.[1046] The study also listed down suggestions for the government's perussal. The recommendations were both theoretical and technical, taking into consideration the need for a paradigm shift on attitude towards new modes of public construction. Salas' study suggested that the government must implement a new building code, wherein aseismic design based on "rigidity theory" shall be used, and must also cover other structures such as dams, retaining walls, bridges, pipes, chimneys, etc.[1047]This theory entails that every part of the building must be designed for each to function individually. He also proposed a reform in how the government documents buildings plans in the country, that “the keeping of plans of the government must be improved in the same way as is done in other countries so as not to distort their original form, and to bring about efficient reference to them in case of emergency or investigation.”[1048] He also urged the government to invest in people, instruments, and facilities for research and disaster information communication. He recommended that two or three *pensionados* be sent abroad to Waseda University, Standford University, and Massachusetts Institute of Technology, to conduct study visits and to learn from experts in seismology and seismic constructions.[1049] Regarding instruments and facilities, they recommended that the College of Engineering in the University of the Philippines (UP) purchase a new modern earth-shaking table. Related to this, a subject of "Earthquake-proof Design and Construction" should be taught in the UP.[1050] The study also recommended the purchase of “Beggs Deformeter” instrument to be used by the Bureau of Public Works for the mechanical solution of structures, and the sufficient reservoirs and connections, and order sufficient modern fire equipment for fire protection.[1051]

Moreover, Salas recommended that the government must revise some provisions of the exisiting building code, as well as certain urban planning policies to be more dynamic concerning preparing for calamities. On the one hand, he said that the building code must indicate that its gives architects and engineers the exclusive right to design buildings and other engineering architectures, and must require owners, engineers, and contractors to provide specific documents and do certain tasks to endure safety of buildings and constructions.[1052] On the other hand, the government must adopt a permanent program of straightening and widening streets so that there are better control

[1045] Ibid., p. 61.
[1046] Ibid., pp. 62-82.
[1047] Ibid., p. 82.
[1048] Ibid., p. 84.
[1049] Ibid., p. 85.
[1050] Ibid.
[1051] Ibid.
[1052] Ibid.

and flow of traffic, and must promulgate information and regulations to prevent panic in congested districts.[1053]

President Quezon, as a response to the grave damage brought about by the 20 August earthquake, issued an order creating the Earthquake Board, headed by Selga, director of the PWB.[1054] This board was somehow a revival of a previously existed Earthquake Committee created in 1924 by then American Governor-General Leonard Wood and was headed by Algué, former director of the PWB.[1055] The latter was created "for the purpose of making a scientific study of the conditions existing in the Philippine Islands…and to recommend practicable means of preparedness or precautionary measures, giving particular attention to constructions, water system (including canalization and sewage), natural drainage, gas and electric plants and system, the location of the cable lines, and such other features as the board may deem necessary, especially in the regions believed to be the most exposed danger. The board is authorized to call upon any office or individual employees of the government for any information that may be needed in this work."[1056] The former was established on the same ground. It was tasked to study the earthquake situation in the country, recommend solutions, and draft policies pertaining to public safety and infrastructures.[1057] Unfortunately, the 1924 Earthquake Committee proved to be ineffective in addressing the concerns and in fulfilling its objectives, due to some political limits and considerations. The 1937 Earthquake Board was urged by some scientists to be a permanent one so that there is a body of men who may be available for qualified opinion when an occasion arises.[1058] Furthermore, it was suggested that it be an automatic section of the NRC, and call it the "Earthquake Research Board", and be given necessary appropriation for research as it's the practice in other countries that bear the same earthquake dilemma as the Philippines.[1059]

b.2.3 Cultural correlation of the 1937 earthquake with other previous earthquake experiences in Luzon

Rumors are prime instigators of fear amongst people. Whether in typical life situation or cases of natural hazards, it causes massive disruptions in the normative state or orderly thinking and response of people and institutions. And in many cases, these experiences are unnoticeably repeated, or become a cycle where people are rendered to be helpless. Most likely, panic, stress, and sometimes disillusionment caused by these rumors hamper the proactive way of responding to the risks brought about by the natural environment. Based on available documentary sources, it was only in the end decades of the 19th century that scientific institutions were able to reach and engage people, particularly in the provinces, on matters about scientific information about the environment. This can be seen with the way people, and the colonial government, has responded to disasters, either concerning mitigation or damage alleviation. But despite

[1053] Ibid.
[1054] William Repetti, *The Manila Observatory, Manila, Philippines* (Washington D.C., 1948), p. 29
[1055] Leonard Wood, Executive Order No. 9, "The Study of Earthquakes in the Philippines", *Science*, Vol. 59, No. 1526, INS S1.1 067, Institutional Records, Manila Observatory Library and Archives.
[1056] Ibid.
[1057] Repetti, pp. 29-30.
[1058] Sales, "Fundamentals of earthquake-proof design and construction."pp. 85-86.
[1059] Ibid.

these, it can be observed the culture of townspeople to treat disasters as supernatural phenomena.

After the 20 August earthquake, the PWB received a report from Tayabas, and it stated that the people believed a story, or rumor, that the island of Alabat in the Tayabas Coast will be swallowed by the sea when a series of 33 tremors.[1060] A government periodical, *The Philippines Commonwealth* called this an "interesting aftermath".[1061] The people of Alabat immediately decided to leave their homes, but Father Selga of PWB assured the people that there was no danger that the island would sink, after a quick verification of the situation and validating the information about the supposed news that caused panic.[1062]

This kind of hazard rumormongering was not new in the province of Tayabas. This sort of panic-causing false news spreading has "haunted" some towns in the province, and other provinces in Luzon, in several recorded incidents. In the towns of Mauban in Tayabas, the people believe that during the 1873 and 1890 typhoons that passed by the province, there was a ball of fire called the *fuegos santelmos* at the center of the storm.[1063] This idea brought fear to people and considered it a sign of the end of the world. Related to this idea, was the spread of rumors to some towns of Tayabas, Cavite and even in the farms of the Bicol region regarding a great typhoon that will pass by their towns. Director Selga of the observatory coined the term *tifonitis* to describe the mass state of fear of people in the archipelago due to the frequency or extraordinary intensity of typhoons.[1064] An anonymous letter from an old man in Mexico, Pampanga spread rumors that a typhoon will destruct their town.[1065] This incident is similar to a rumor in the town of Candelaria in Tayabas. A man wrote to Selga asking explanation to the rumors that a severe typhoon will flood their town. Selga explained that the rumor is caused by fear due to several calamities, like the flood in the nearby town of Mauban in the early days of November 1934.[1066]

Another compelling case that catches the attention of researchers is the incident, which took place in the town of Candelaria in Quezon in 1934. In a letter of Mariano C Ramos to the director of the Philippine Weather Bureau (PWB) Miguel Selga, on 27 November 1934, the former asked for a clarification about the rumors that spread in the town regarding a typhoon, and a subsequent flood, which will hit the town.[1067] In his letter, he said:

> Rumors has been rampant among the common masses in this locality right after the typhoon last November 15, that

[1060] "Churches Damaged by Last Friday's Temblors." *The Philippines Commonwealth* 7.35 (26 August 1937): 1, 4.
[1061] Ibid.
[1062] Ibid.
[1063] "Letter of Eulogio Pelejo dated 10 November 1928", TYP S2.1 003 and "Letter of Juan V. Eleazar dated 18 November 1928", TYP S2.1 004, Typhoon Data Records, Manila Observatory Library and Archives.
[1064] Bankoff, "Storms in History", p. 179.
[1065] Ibid.
[1066] "Letter to Mariano Ramos dated 28 November 1934", TYP S2.2 001, Typhoon Data Records, Manila Observatory Library and Archives.
[1067] "Letter of Mariano C. Ramos to Miguel Selga, 27 November 1934", TYP S1.1 001 Typhoon Data Records, Manila Observatory Library and Archives.

> another typhoon is forthcoming before the end of the month. It is said that this coming typhoon is even more severe than the former and is characterized by a big flood. This locality according to the belief will be submerged in water some three meters deep although I know no big river to overflow likewise in Mauban, Tayabas. This belief is made stronger of the occurrence of earthquake last night at about nine o'clock, which probably you are already aware of. Now that the undersigned considers you only the best authority on this matter, I hereby seek your comment with regards to this matter. As the belief has been formed without any scientific basis, which lead me to doubt, but because of the excitement of the people, so I was forced to consult you. Also please inform me as to the cause, origin, and extent of the last earthquake.[1068]

In his reply, PWB Director Selga clarified the issue, saying that the rumors have no foundation; that the town was well drained and flood will hardly take place.[1069] He said he considers such pronouncements as unsound, fatal, and detrimental to the public good, and cause sufferings and anxiety in the mind of the people.[1070] This correspondence exchange is just an example of the wide array of scientific investigations made by the Manila Observatory regarding people's beliefs on typhoons. For example, in the towns of Mauban in Tayabas, the people believe that during the 1873 and 1890 typhoons that passed by the province, there was a ball of fire called the *fuegos santelmos* at the center of the storm.[1071] This idea brought fear to people and considered it a sign of the end of the world. Related to this idea was the spread of rumors to some towns of Tayabas and Cavite, and in the farms of the Bicol region regarding a great typhoon that will hit their towns. Fr. Miguel Selga of the observatory coined the term *tifonitis* to describe the mass state of fear of people in the archipelago due to the frequency or extraordinary intensity of typhoons.[1072] An anonymous letter from an old man in Mexico, Pampanga spread rumors that a typhoon will destruct their town.[1073]

A similar incident happened almost eighty years later. On 22 July 2014, a false tsunami alarm left one person dead and caused massive panic amongst the residents of Candelaria town in Quezon.[1074] Thousands of people crammed the town center to seek refuge; many also went to the nearby bus stations to evacuate to other towns. As an official of the city's disaster risk reduction committee said:

> We really don't know where the rumor came. We suddenly received information that there are some people evacuating

[1068] Ibid.
[1069] "Letter to Mariano Ramos dated 28 November 1934", TYP S2.2 001, Typhoon Data Records, Manila Observatory Library and Archives.
[1070] Ibid.
[1071] "Letter of Eulogio Pelejo" dated 10 November 1928, TYP S2.1 003 and "Letter of Juan V. Eleazar" dated 18 November 1928, TYP S2.1 004, Typhoon Data Records, Manila Observatory Library and Archives.
[1072] Bankoff, "Storms in History", p. 179.
[1073] Ibid.
[1074] "1 dead as hundreds flee false tsunami alert in Quezon", Philippine Daily Inquirer (PDI), 23 July 2014.

> the area…It was really chaotic. I told our staff to block the people and tell them that there is no truth to these rumors but they told me they could not stop the rush of the people.[1075]

In an initial observation, an unverified SMS message caused panic, which spread like wildfire amongst the residents. And the urgency of the people to believe in the message was created by the series of hazards and disasters that hit the country: Typhoons Henry and Glenda (July 2014), the Bohol earthquake and Super Typhoon Yolanda in October and November 2013.[1076] One should note that several things should be debunked from this incident. First, that it was a false alarm, as a tsunami was not likely to happen because there was no occurrence of an earthquake. Second, its geographic location suggests a very small or even, a rare incidence of an earthquake, as no fault line is near it nearest coastal territory, and the closest mountain from the town, Mount Banahaw, has been an extinct volcano since the middle of the 18th century. The 1934 earthquake in the Southern Luzon region has left significant topographic effects in the area, as well as cultural and historical memories to the people of Tayabas and Laguna.[1077] One can diachronically connect this earthquake to succeeding earthquakes, such as the ones in 1743 and 1937 that happened in the region, had had lasting impact correlation with people's social memory of hazards and disasters. Mojarro (2018) argues that based on several 18th century *relaciones de suceso* (newsletters) of several religious missionaries who were assigned in some parishes in Southern Luzon, the earthquake severely affected the towns od Sariaya, Tayabas, Lucban, presently part of the province of Quezon, and Majayjay, Liliw, and Nagcarlan in the province of Laguna.[1078]

It is interesting that given the period difference between the two incidents, it manifests some forms of cultural continuity in how people view hazards. The proliferation of rumors circulating in times of environmental risks is still prominent in the town mentioned. Despite the developments in technology and communication, the phenomenon of false information, and massive panic, still linger.

Similar to this case, PWB also did work in clarifying cleared speculations and queries from people regarding the earthquakes. In August 1937, people of Tanauan, living near the Taal Volcano, rushed into the Ambulong seismic station to get information after the five-minute earthquake they felt.[1079] A similar event happened in the town of Alabat in Tayabas; people asked clarification from the authorities of the observatory regarding the earthquake they felt during the night of 20 August 20 1937 because they were afraid to

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[1075] Ibid.

[1076] Ibid.; "NDRRMC Situation Report on Typhoon Henry as of 22 July 2014" <https://bit.ly/2r5OFm8>, Date accessed: 31 October 2018; "Typhoon Glenda (Rammasun) sweeps through the Philippines" < https://bit.ly/2FCBC5H>, Date accessed: 31 October 2018.

[1077] Miguel Selga, *Los terremotos de Enero de 1743 en Tayabas y Laguna de Bay*, Publications of the Manila Observatory Vol. 5, No. 1 (Manila: Bureau of Printing, 1941); Miguel Selga, *Los terremotos de Enero de 1743 en Tayabas y Laguna de Bay,* pp. 4-13, INS S1.2 022, Institutional Data Records, Manila Observatory Library and Archives.

[1078] Jorge Mojarro Romero, "Relaciónes de sucesos y terremotos en la Filipinas del siglo XVIII", *Titivillus* 4(2018), pp. 100-102.

[1079] "Letter from Pastor P. Vidal dated 20 August 1937", EAR S2.1 005, Earthquake Data Records, Manila Observatory Library and Archives.

return to their houses.[1080] In a letter sent to Segundo Santos, district commander of the Philippine Constabulary in Albay, Selga explained his decision not to publish in the *Tribune*, a newspaper, and his answer to the query of the people regarding the earthquake in Albay and Catanduanes in early August 1926.[1081] He said that he might be misinterpreted and that can be used to impose fear to the less educated.[1082]

Though science, as a discipline, sounds "elitist" in many instances, we can infer that the weather bureau engaged the local population on how to further understand nature, from the point of view of modern science. In a society like the Philippines, where the "default" framework of understanding things is through traditions and religion, and where people tend to interpret things culturally and religiously, this communication lines and spaces made and developed by the weather bureau show us how modern knowledge can be passed on to other areas of learning, through common modes of communication and interaction.

c. The 1968 earthquake: Manila and Casiguran, and the Ruby Tower Tragedy

The postwar war years in Philippine history has always been portrayed as a period of Filipino Republicanism and American neocolonial intervention in the country. Since the establishment of the third Philippine Republic, the focus of the historical narrative, as was in history per se, is the reconstruction, rehabilitation, and the building of a "new" Philippines, as a free and independent state and country. In the 1950s, the government launched an industrialization program, and government institutions were framed and reframed into a vision wherein every component was expected to enhance its capabilities and services to the economy and the public in general. Modernization and expansion of government function was seen, and the government envisioned the idea of a modern country. In the early 1960s, there was a paradigm shift in the economic policies in the governments, and politicians, policy-makers, and economic managers were in a debate on which road to take to solve the country's economic need, whether to choose a new track, an export-oriented industrialization, or remain as a import substitution economy, that somehow favors economic protectionism and a nationalist industrialization.[1083] Given this, one can work on the assumption that the Philippines indeed, has progressed, politically and economically. But what happens when a disaster struck the capital city, once again? How did the government and the people respond? Was there a change in the way sectors of society reacted to the challenged posed by the natural environment? Almost two decades after the calamity that was the August 1937 earthquake, another one devastated the capital city and caught the government and people, unprepared and hapless on the "uniqueness" of the disaster's gravity and effect to the Manila. Another point to ponder on is the issue of state-sponsored nationalism. This was projected in various media, and the state used a plethora of mechanisms to create a sense of national sentiments towards different aspects of the country's life, from

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[1080] "Letter from Juan Ruiz dated 21 August 1937", EAR S2.1 013, Earthquake Data Records, Manila Observatory Library and Archives.
[1081] "Letter to Segundo Santos dated 23 August 1937", EAR S2.2 001, Earthquake Data Records, Manila Observatory Library and Archives.
[1082] Ibid.
[1083] Teresa S. Encarnacion-Tadem, "Technocracy and the Politics of Economic Decision Making during the Pre-Martial Law Period (1965-1972)", *Philippine Studies: Historical and Ethnographic Viewpoints* 63(4), p. 546.

geographical-territorial to origin and present being, and on social and political perspectives. And this dominance of a national life narrative promoted by the state has unraveled the way people responded to certain unusual or chaotic social circumstances, as natural hazard-induced calamities. One columnist describes the 1968 Manila earthquake rescue operations as:

> All of Philippine life was there: the private employee, the government bureaucrat, the well-helped, the poor, the middle-class. Those who weren't there, but who were united with Ruby rescuers through broadcast media, sent something of their own heavy equipment to gasoline and candy, all the things that keep man and machine going, and those that dignify the dead.[1084]

As an assertion, national scientific institutions are significant in nation-building. These agencies are mandated to deliver plans and programs and aimed at advancing economic development and social progress through the benefits of modern science and technology. Laws and legal decrees established institutions; the primary idea is that these will become centers of ideas and applied knowledge for advance people's welfare through innovative projects. The case of the August 1968 earthquake, and probably, in the following sizeable disastrous earthquake incidents in the country, reflects the projection of "modernity" and "nationalism" regarding dealing with hazards and disasters. The people and the government tended to considered disasters brought about by earthquakes as a combination of various factors – God's wrath, a test to the Filipino soul/spirit and resilience, and as "wake-up call" to the overlooked aspects of the modernization programs in the country.

The country's institution monitoring weather and environmental hazards were severely devastated during the last years of the Pacific War in the Philippines. On February 1945, the returning American forces started their month-long military campaign to recapture and liberate Manila from the Imperial Japanese Forces. The encounters resulted to civilian massacre and destruction of almost the entire city's building and houses. On the 9th of February, in the afternoon of the second Friday of the month, two bureau employees saw several Japanese soldiers went through the whole PWB building and started sprinkling gasoline on instruments - precious telescopes, seismographs, time instruments, weather recorders, and in the library where 20,000 volumes of documents where stored.[1085] They were also seen to have brought in the astronomical dome straws used for barrack fire.[1086] In just hours, the fire destroyed almost half of the PWB building. The three days of battle until the 11th, and the bombing on the 14th left the PWB into ashes. The fire burned thousands of unpublished scientific studies, data, and manuscripts.[1087] Charles Deppermann lost manuscripts ready for printing, or published ones but not distributed yet, representing two or three years of work.[1088] Repetti accounts that from his quarters in Los Baños Prison Camp, which is 35 miles southeast

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[1084] Ma. Elena H. Abesamis, "A Race with Time at the Ruby Rescue!", *The Sunday Times Magazine* (18 August 1968).
[1085] Hennessey, p. 115.
[1086] Repetti, *The End of the First Manila Observatory*. INS S1.1 054, Institutional Date Records, Manila Observatory Library and Archives, p. 16.
[1087] Charles Deppermann, "The Manila Observatory Rises Again". *Philippine Studies*, Volume 1, No. 1 (1953), p. 33.
[1088] Ibid.

of Manila, he saw the fire in the capital [1089], and maybe he had wondered if, by any miracle of a sort, the observatory was spared from the blaze of flames.

The plan to rebuild the PWB back to its status before the war was a colossal task to a lot of stakeholders. The Commonwealth just got back from exile and still has to grapple the more significant problems of dealing with political collaborators and economic rehabilitation. Nonetheless, the government laid down proposals to reorganize the PWB as a premier scientific and weather institution as early as July 1945. Various sections of the U.S. Army approached Father Selga to plan out the reconstruction of the weather bureau.[1090] Reviving the functions of the bureau after the war started in 1945. Though funds came in the succeeding months, rebuilding structures and purchasing new instruments became very slow. The seismic station in the Ambulong area in Taal, Batangas was repaired for three years, until it became operational in 1948.[1091] A new geophysical facility was established in Diliman, Quezon City, having modern electromagnetic photo-recording seismographs as new installations; for the old seismic station such as at Baguio, Iloilo, and Davao, strong motion seismographs were installed in 1951.[1092] In light of the Philippine industrialization programs launched in the 1950s, the weather bureau was expected to enhance its capabilities and services to the economy and the public in general. One primary goal of the bureau modernization was to expand its geophysical service by acquiring more modern seismological instruments.[1093] The Geophysical Division of the PWB remained a vital part of the agencies work. In line with the governments thrust to create institutions for the promotion of national welfare, this division of the PWB assumed significant tasks: (1) preparation and dissemination of technical advice to the public on geophysical matters and phenomena, such as tsunamis and seismic sea waves, (2) supervision of the operation and maintenance of geophysical observatory and seismic observation network, (3) formulation, coordination, and development of geophysical studies on Philippine seismicity and utilization of the same in earthquake engineering, and (4) utilization of geophysical data with related scientific and technical agencies.[1094] This work of the PWB on seismology continued until it was mandated by a new act, which created a revitalized weather institution in the Philippines come the 1970s.

c.1 The 02 August 1968 earthquake: Devastated Manila and Casiguran

In the early morning of 02 August 1968, an Intensity VI-Rossi-Forrel Scale earthquake hit the island of Luzon[1095], affecting the capital city, and some coastal towns in the province of Quezon. One post-disaster government report indicates that the earthquake took 322 human lives, 300 people got injured, and almost 30 buildings in Manila were severely damaged.[1096] A report of an ad hoc committee of the Geological Society of the Philippines described the earthquake as “the most powerful of a series to shock the

[1089] Repetti, *The Manila Observatory*, p. 16.
[1090] Deppermann, “The Manila Observatory Rises Again”, p. 34.
[1091] *Weather Bureau Centennial, 1865-1965: Philippine Republic Weather Bureau Centennial Souvenir* Program (Manila, 1945), p. 10.
[1092] Ibid.
[1093]*Weather Bureau Centennial, 1865-1965*, p. 11.
[1094] Ibid., p. 22.
[1095] A. R. Flores*, The Luzon Earthquakes of August 2, 1968 and April 7, 1970.* (n.d.), p. 483.
[1096] Ibid.

country in at least two decades, jarred Northern Luzon and battered some sectors of Manila."[1097] In the earthquake bulletin issued by the PWB, based on the field station reports from 23 towns from 16 provinces, the earthquake varied between Intensity III to Intensity VII.[1098] The epicenter was identified to be the area 45 kilometers from Casiguran, Quezon, near a master fault at Singalan Bay.[1099] This estimation was determined by based on the data gathered from different weather bureau stations, namely in Casiguran, the PWB Geophysical Observatory in Quezon City, Legaspi in Albay, and from the Cebu Weather Station.[1100] The nature of the earthquake was tectonic and was characterized to be similar to the December 1949 earthquake in Luzon.[1101] Initial estimated placed the epicenter within a 200-kilometer radius from Manila.[1102] Foreign seismological entities, such as the Mareus Baath of Seismological Institute of Uposala Sweden placed the earthquake at Intensity 7.5 on the Richter Scale.[1103]

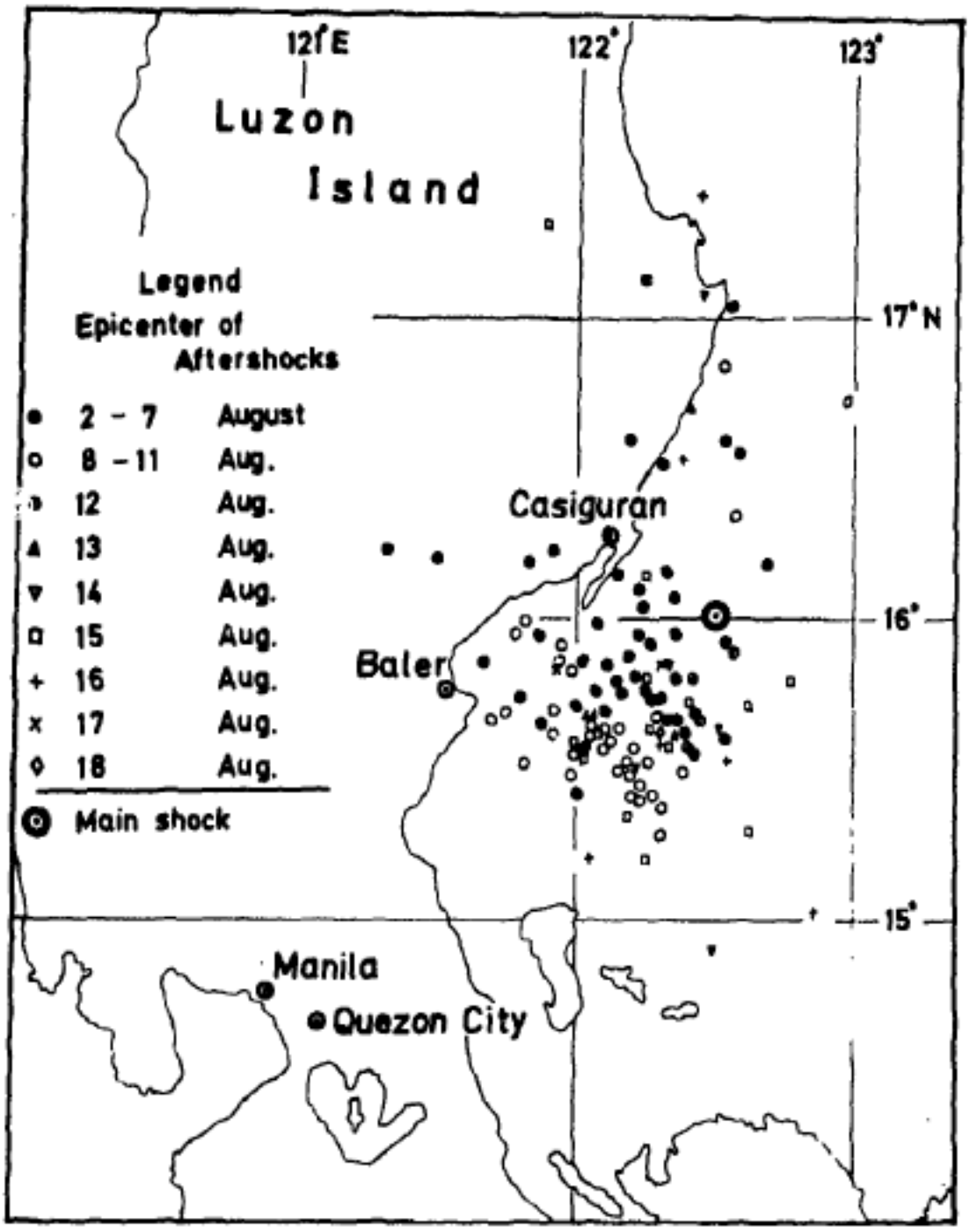
The first major ground movement was felt at 4:21am, in Intensity VI, and lasted for one minute; and was followed by an aftershock of the third intensity, at 4:46am.[1104] One broadsheet described the early morning tremors as: "The first and more violent, rolled in like a steamroller, tumbling home appurtenances, knocking down old and new buildings alike, driving cracks on concrete edifices and roads and public constructions."[1105] Initial reports published in newspapers reveal various earthquake intensities in different cities in Metro Manila and the provinces. In Manila, it was Intensity 4 in Manila, and in Quezon City the first shock was Intensity 5, and the second was Intensity 3; in the provinces, Baguio, Intensity 6, Baler, Intensity 6, Aparri and Tuguegarao, Intensity 6; Ambuklao, Intensity 5, Sumalig, Intensity 5, Lucena and Camalig, Intensity 5, and Vigan, Intensity 5.[1106] The First and Second Philippine Constabulary Zones also made initial assessment of the situation and order in the provinces, such as in Bulacan, Benguet, Cagayan, Ifugao, , Ilocos Norte, Isabela, Ilocos Sur, Mt. Province, Nueva Ecija, Nueva Vizcaya, Tarlac, and Zambales, and reported minimal or no damage at all.[1107]

[1097] Generoso R. Oca, "The Geology of Greater Manila and its Bearing to the Catastrophic Earthquake of August 2, 1968." *The Philippine Geologist* XXII.4 (Dec 1968), p. 171.
[1098] Roman L. Kintanar, "The Luzon Earthquake of August 2, 1968." *Philippine Economy and Industrial Journal* XV.9-10 (Sept-Oct 1968), p. 43.
[1099] Ibid.
[1100] Ibid.
[1101] Max Buan, Jr. "Extra! 800 Trapped in the Building (First Photos here!); Quakes rock all Luzon." *Manila Times* XXIII.160 (2 Aug 1968): 1, 3.
[1102] Ibid.
[1103] Eddee RH. Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1104] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3.
[1105] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1106] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3; "Hundreds Die in Quakes! 5-story building crumbles." *Manila Times* XXIII.160 (2 Aug 1968): 1,3.
[1107] Antonio Zumel and Marius Panuncialman, "200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.

Map No. 5
Isoseismal Map of the 02 August 1968 Earthquake[1108]

[1108] https://www.phivolcs.dost.gov.ph/html/update_SOEPD/1968CasiguranEQ/index-casiguran.html

Map No. 6
Epicenters and Aftershocks of the 02 August 1968 Earthquake[1109]



[1109] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969

Table No. 17
PWB Earthquake Bulletin No. 1 about the 02 August 1968 Earthquake[1110]

Field Station	Intensity
Casiguran	VII
Baler	VI
Tuguegarao	VI
Aparri	VI
Baguio	VI
Dagupan	VI
Iba	VI
Manila	VI
Cabanatuan	VI
Alabat	VI
Quezon	V
Tarlac	V
Ambulong	V
Infanta	V
Jomalig	V
Laoag	IV
Lucena	IV
Calapan	IV
Aurora	IV
Catarman	IV
Virac	IV
Romblon	III
Vigan	III

More than a dozen buildings in Manila, both public and private, were identified to have suffered from massive damage after the early morning earthquake of 02 August. It was estimated that almost 40 of Manila's buildings was severely damages, most of which where in Intramuros, Escolta, and Manila Post Office areas.[1111] The most devastated was the collapsed Ruby Tower Building, a 6-storey commercial apartment, located at the area of Doroteo Jose-Lope de Vega, and Teodora Alonzo, Sta. Cruz, Manila.[1112] The building had 95 apartments, 19 each floor, with the first floor for offices; condominium basis system; only 3 years old when the earthquake happened.[1113] The destruction of the Ruby Tower Building was described as “a layer of cake collapsing.”[1114] Initial reports indicated that a considerable number of people, almost 80 families, most of them were tents, were trapped inside the collapsed building, ranging from 800-1000 individuals, and

[1110] Kintanar, “The Luzon Earthquake of August 2, 1968.” *Philippine Economy and Industrial Journal* XV.9-10 (Sept-Oct 1968), p. 43.
[1111] “The Big Quake: Like a House of Cards”. *Weekly Nation* (August 12, 1968): 8, 12, 77; Castro, “82 found in collapsed building.” *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1112] Buan, Jr., Extra! 800 Trapped in the Building”, *Manila Times* XXIII.160 (2 Aug 1968): 1, 3.
[1113] “Ruby Death Toll Now 143; Rescuers find 5 more survivors.” *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a.
[1114] Ibid.

a number pegged at 200 was identified to have died.[1115]

Aside from Ruby Towers, five more buildings stood to be demolished as the earthquake left them practically in rubbles – Great Eastern Hotel in Carriedo, The Philippine Bar Association building in Bonifacio Drive, Port Area; the Pan-American Building on Escolta, the Aloha Theater and Premier Hotel in Tetuan, Sta. Cruz, and the former American Hospital Building in Aduana, Intramuros.[1116] Other building had to be vacated from, pending safety clearance from city authorities. Most of theme were banking and insurance establishments in Escolta, Dasmarinas, and the rest of Binondo and in C.M. Recto.[1117] A few buildings in Ermita, like the Philam-Life and Magsaysay buildings were issued temporary closing because of certain vital damages.[1118]

Several bridges in manila were also damaged. The Nagtahan Bridge in Sta Mesa district was temporarily closed as the southern lanes of it was found to have large cracks, and debris from buildings and fallen signboards block the other lane.[1119] Miraculously, the other six bridges along Pasig River did not have any damage.[1120] The Malacañang Palace, as well as some areas in Quezon City, Makati, and Pasay suffered minor damages.[1121]

There were reported six fire incidents that happened in Manila, all caused by snapping electrical wires. One was in the vicinity of FEU in Morayta, Manila; one in Feati University; another one was in a warehouse in South Harbor Pier 9 Shed C Berth 2, wherein 2 million pesos worth of shipment were burned down, and one at the Medica Center in Gen. Luna Street.[1122] In FEU, due to panic, three employees jumped to their death; two employees of the Feati University, namely Rogelio Neubo and Geronimo Montinola, suffered the dame fate.[1123] Five schools in Manila that suffered relative damages, including Arellano University.[1124] At the Port Area, the fire gutted 3000 tons of cargo consisting of confectioneries, transistor radios, and general merchandise, worth 30 million.[1125] A CPS report said that firefighters arrived after the fire was identified to be out of control. But a report from the Manila Fire department indicated the fire started 25 minutes before the earthquake.[1126] Meralco reported that due to snapping electric wires and lines, sporadic flashes of light was seen simultaneously, Manila and its nearby suburbs were subjected to temporary blackout.[1127]

[1115] Ibid.; Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1116] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1117] Ibid.
[1118] Ibid.
[1119] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3.
[1120] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1121] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3; "Ruby Death Toll Now 143; Rescuers find 5 more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a.
[1122] Ibid.; Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3; "Hundreds Die in Quakes! 5-story building crumbles." *Manila Times* XXIII.160 (2 Aug 1968): 1,3; "The Big Quake: Like a House of Cards". *Weekly Nation* (August 12, 1968): 8, 12, 77
[1123] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1124] Ibid.
[1125] Ibid.
[1126] Ibid.
[1127] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3; Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.

Table No. 18
List of Damaged Buildings in Manila after the 02 August 1968 earthquake[1128]

Name	Age/ Years	Location	No. of Storeys	Damage
Ruby Tower Apartments	3	D. Jose	6	Collapsed
Philippine Bar Association	2	C. Aduana	6	Very severe
Great Easter Hotel		Carriedo		Very severe
Pan-American Building		Escolta		Very severe
Aloha Theatre and Premier Hotel	1	Dasmariñas	8	Very severe
American Hospital Building		C. Aduana		Very severe
Tuason Realty Building	19	Escolta	6	Very severe
Trinity Building	9	T.M. Kalaw	7	Severe local
Diamond Tower Apartment	3	Magdalena	11	Moderate
Liwayway Hotel	33	Echague	9	Severe
National Library	10	T.M. Kalaw	6-9	Local
Old Philippine National Bank Building	50	Muelle D.B. Nacional	7	Severe
Botica Boie Bldg. (People's Bank and Trust Company)	18	Escolta	7	Moderate
Araneta and Tuason Bldg.	9	Muelle D.B. Nacional	8	Moderate
Old Development Bank of the Philippines Building	19	Muelle D.B. Nacional	8	Moderate
Pheonix Bldg.	8	Escoletos	7	Slight
La Tondeña Bldg.	1	Echague	8	Several local
New PNB	2	Escolta	12	None
Yo Chin Lim & Sons Bldg.	-	D. Jose	4	None
Overseas Passenger Terminal	-	Pier 9	3	Several local
Metropolitan Cathedral	20	C. Aduana	-	Damage to cupola
Far Eastern University Arts Building	-	Quezon Blvd.	7	Moderate
Arellano University		Legarda Avenue		Slight
Feati University				Slight
Filipinas Insurance				Slight
Traders Commercial Bank				Slight
Manila Banking Corporation				Slight
Gocheco Building				Slight
Pearl Tower				Slight
PhilAm Life Building		UN Avenue		Slight

[1128] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969; A. R. Flores, *The Luzon Earthquakes of August 2, 1968 and April 7, 1970.* (n.d.): 483-492; Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.

Magsaysay Building		UN Avenue		Slight
Iglesia ni Cristo in Moriones		Tondo		Slight
United (First Hotel)				Slight
Pedro Guevarra Elementary School				Slight

In a report made by a reconnaissance team from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) that visited the country weeks after the earthquake, they estimated that the government lost an estimated P4,519,000 pesos due to damages in public infrastructures and government-owned buildings and properties.

Map No. 7

Location of Damaged Buildings in Manila after the 02 August 1968 Earthquake[1129]

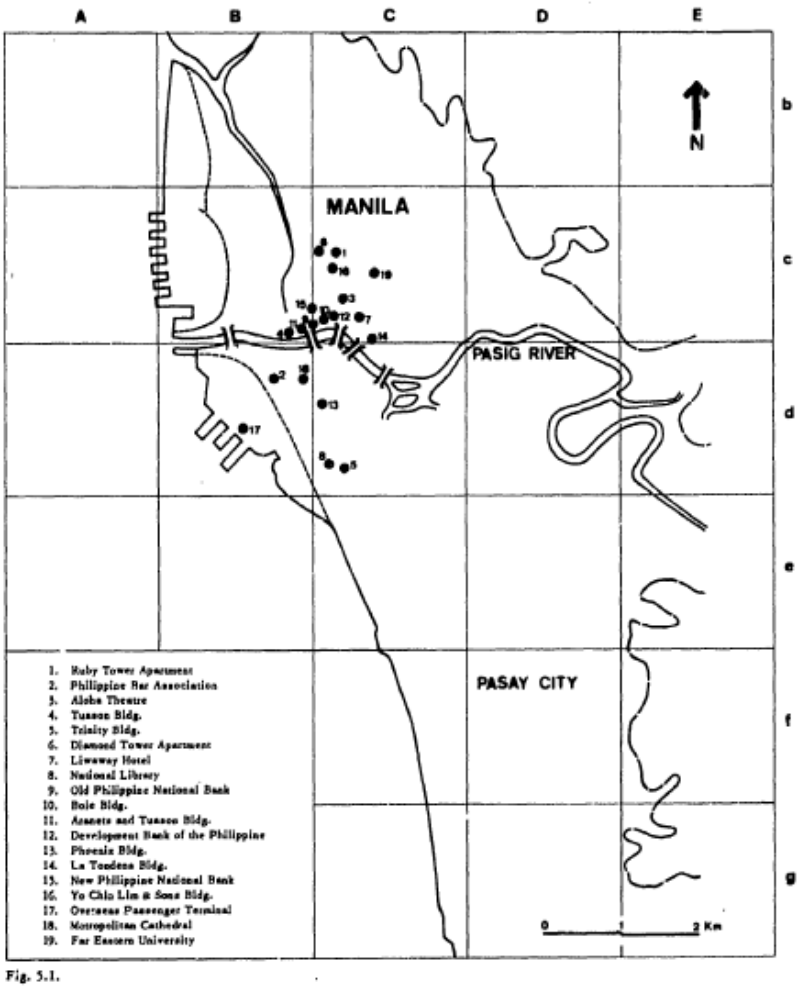


Fig. 5.1.

[1129] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969

Table No. 19
Estimated Damages to Public Infrastructures and Government-owned Buildings[1130]

Area	Buildings	Cost per Item (in Pesos)	Total (in Pesos)
Greater Manila	Maternity and Children's Hospital	160,000	
	National Library Building	250,000	
	The Philippine Veterans Building	50,000	
	Building for Electrical Works	52,000	
	29 Other	163,000	
	Damage not yet assesses (probable)	100,000	775,000
	Pier 9 – Passenger Terminal Building (burnt shed and other damage	2,800,000	
	Nine other properties	254,000	3,054,000
Casiguran	Damage to government buildings, roads, bridges, and private properties; Damage in other areas	460,000	460,000
Other Cities	Cabanatuan City (three bridges)	180,000	
	Tagaytay City (buildings and highways)	50,000	230,000
TOTAL		**4,519,000**	

Aside from Manila, other area that was severely hot by the 02 August earthquake was Casiguran in Quezon province. Fathers Hames Hennessey and Sergio Su opf the MO estimated the epicenter to be 45 kilometers east of Casiguran town.[1131] Local described the event as: "Here, the earth swallowed up around 20 nipa houses while dozens of others stand dangerously tilted."[1132] The earthquake came, and literally cracked the ground open, leaving a gash 12 feet deep in some places and 3 kilometers long – follows the rover, reaches 3 barrios.[1133] The earthquake caused fissures, where water and mud blew up, and a tidal wave that drowned one fisherman and panicked the Casiguran's residents, whom run to the Ermita hills, a high ground at the ouskirts of the

[1130] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969.
[1131] Alberto Rous, "Earth Cracks in Quezon; Quake damages at Casiguran, near epicenter described." *Manila Times* XXIII.168 (10 Aug 1968): 1, 15a.
[1132] Ibid.
[1133] Ibid.

town, to save themselves.[1134] Acting Mayor Faustino Torres said residents heard the roaring, rushing sound as the fissure formed, and second before the actual quake, they heard the sea roared, “tumunog ang dagat”.[1135] One fisherman named Virgilio Valencia, 30 years old, and father of 7, died due to drowning.[1136]

The damaged facilities in Casiguran town include the municipal building, the town pier, a footbridge, the municipal health building, and several school houses.[1137] In barrio Culat, 20 nipa houses sank sideways, and in Barrio Dadit and Luwal, houses were tilted because of the fissure. The fissure overrun with it 45 hectares of rice land, destroying crops.[1138] Teodosio Peña, barangay captain of Culat, gave a short account of his experience of the earthquake: "First I felt a very strong quake and then I heard the sound of water gushing up from the ground and then I saw my aparador (cabinet) falling on my children. I jumped up to hold it back, but it fell just the same, hitting one of my children. We thought that the end of the world had come."[1139] After the earthquake, people rushed to an upland area known as the Ermita hill and stayed there because of fear of the tremor, landslide, and big waves from the sea. The town, literally, “lives in a state of anxiety and fear, not knowing whether another big quake is coming.”[1140] After the earthquake, Casiguran can only be reached through Baler through the sea, and the incident isolated a population close to 15,000 people for almost a week. Dr. Corazon Galola, the sole rural health doctor in Casiguran, said that, as medical supplies were running out, there's a danger of disease outbreak because the earthquake demolished the water system that dates back to the prewar period and people get water from shallow wells, which turned to be blackish after the quake.[1141] Captain Peña of barrio Culat said he had sent a telegram to President Ferdinand Marcos, which contained a report of the extent of the earthquake's damage, and an appeal for support through food and medicine for the town of Casiguran.[1142]

Weather Bureau Head Roman Kintanar immediately ordered a thorough study of the earthquake in Casiguran and sent a team of experts to assess the situation in the said town. Field reports also indicate that there were isolated damages and landslides in Southeastern Isabela and Northeaster Nueva Vizcaya.[1143] There was an upheaval of the Manglad River; it was 15 meters high, 85 meters long, and 25 meters wide, and caused an earth dam, diverted the flow of water, and resulted to the loss of water in artesian wells.[1144] The initial information gathered by the Weather Bureau, from Casiguran to Manila reported, 1 death, 5 injured persons, and 167,000 worth of property; while a separate team from the Manila Observatory estimated the damages in Casiguran: schools, P35,000, buildings, P20,000, roads and bridges, P30,000, homes, P10,000, irrigation system, P2,000, agricultural crops, P10,000, and other damages, P15,000.[1145]

[1134] Ibid.
[1135] Ibid.
[1136] Ibid.
[1137] Ibid.
[1138] Ibid.
[1139] Ibid.
[1140] Ibid.
[1141] Ibid.
[1142] Ibid.
[1143] Kintanar, “The Luzon Earthquake of August 2, 1968.” *Philippine Economy and Industrial Journal* XV.9-10 (Sept-Oct 1968): 43.
[1144] Ibid.
[1145] Ibid.

Authorities also reported that one prisoner, named Julian Gabas confined in the municipal building due to illegal possession of firearms, was buried by the hollow blocks, but was able to go out of the debris, and fled to the Ermita hills after that.[1146]

Two days after the 02 August tremor, Manila felt two more earthquakes. Recorded in the seismographs of the Manila Observatory and Commission on Volcanology (Comvol) in Quezon City and Ambulong Station in Taal Volcano respectively, the earthquakes were estimated to have originated 1400 kilometers from the Philippines, probably from Formosa or Southern Japan.[1147] According to the Weather Bureau and the Manila Observatory, the last earthquake is a "dying out in small shocks"; since 5:03pm 03 August to 8:25am 04 August, the PWB recorded 4 aftershocks, but all in all, there were 141 since the 0 August earthquake.[1148]

c.2 The Ruby Tower Rescue: The Government, the NGO sector, the Chinese, and the Scientific Community

As the sun rose in the skies of Manila of that fateful day of 02 August 1968, all eyes and attention were focused to the collapsed Ruby Tower in Sta. Cruz Manila. And from that morning, until after almost a week of operations, the government, and different sectors in Manila at that time worked together, despite the lack of immediate resources, and knowledge and capacities to deal with such large and difficult rescue operation. One journalist argues, "The Ruby crisis proved that the will to rescue matched the will to live."[1149] The Ruby tower rescue operations became the center of the August 1968 issue not only of the gravity of destruction and loss of live in this specific disaster area, but more so, on the aspect how it touched critical issues such as the corruption in the building code, and the lingering "anomisity" of the general public to the Chinese in Manila.

The Ruby Tower disaster can be considered a unique kind of a disaster induced by a hazard, which is an earthquake, and magnified and made more complex by a spectre of different social dimensions revolving around the Manila during that time. One news report's innocent description, I think sums up this point: "Surprisingly, all the buildings surrounding the Ruby Towers came through the earthquake unscratched. Newspapers reported that the foundations of the building simply gave away bring down the six floors where at least 90 Chinese families were sleeping."[1150] Furthermore, on the one hand, the way government responded, and the flow of resources and human capital support from non-government organizations show a layer or kind of disaster response management the society has during that time; different groups of people were present: registry people, doctors, religious and civilian volunteers.[1151] On the other hand, the Ruby Tower story manifests different cultural and political vignettes particularly how Filipinos look at the disaster as an event: it was projected both as manifestations of goodwill, human

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[1146] Ibid.
[1147] Alberto Rous, "2 tremors rock Manila anew." *Manila Times* XXIII.162 (4 Aug 1968): 1, 19a.
[1148] Ibid.
[1149] Ma. Elena H. Abesamis, "A Race with Time at the Ruby Rescue!". *The Sunday Times Magazine* (18 August 1968)
[1150] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1151] Abesamis, "A Race with Time at the Ruby Rescue!". *The Sunday Times Magazine* (18 August 1968).

resilience, and the Filipino's culture of care for the welfare of in need to the victims, and as an event that surfaced the underlying latent cultural judgment and perception amongst the Chinese in Manila.

c.2.1 "Operation Ruby": Rescue operation at the heart of downtown Manila

At 8am of 02 August, Executive Secretary Rafael Salas arrived at the disaster area and immediately convened a group of people to operationalize the rescue effort.[1152] The moment he realized the gravity of the situation, he appealed to the people, through the media, for additional cranes, acetylene torches, crowbars, and other equipment. The crane from a construction company, Washington Construction Co., arrived first.[1153] President Ferdinand Marcos and First Lady Imelda Marcos visited the disaster site late last night to oversee the rescue operations and stayed until early this morning.[1154] The President earlier announced the suspension of classes in Manila and in nearby suburbs in the capital region on that day, Friday, and on Saturday, 03 August, and set up a nationwide relief operation for Manila.[1155] He was reported to have visited the disaster site for three times, the last was at late night of 03 August, where Gen Manuel T. Yan, Chief of Staff of the Armed Forces of the Philippines (AFP) accompanied him. In a display both of concern and publicity stunt, the President inspected the Ruby Tower operations in crutches in waling because of a sprain which he sustained a few months ago while playing gold in Baguio has returned after slipping in Malacañang. Marcos eagerness to visit the site, giving the benefit of the doubt, was a manifestation of him being a chief executive of the state. But look at the whole picture, this can be read as a good publicity stunt. It as an apparent attempt to create an image of a Marcos that is in action, to cover up the worsening economic and bureaucratic conditions in 1969, and in preparation for his reelection bid in 1969.[1156]

The official rescue force, called "Operation Ruby", had both the military and the civilian institutions tapped to work in the rescue operations. The rescue force was headed by Major General Gaudencio V. Tobias, together with Brig. Gen. Emilio J. Zerrudo, zone commander of the Philippines Constabulary in Manila.[1157] Firemen, law enforcement officers, and other city employees, sided by the members of the AFP and the Manila Police District (MPD), and national welfare agencies personnel went to the disaster site by afternoon of 02 August. On the second day of the operations, an estimated 2000 rescue workers were in the Ruby Tower area.[1158] Rescuers utilized bulldozers and cranes in the grim task of recovering bodies, dead or alive, under the collapsed building. The disaster area – "picture of feverish sire" – dump trucks, cranes, jackhammers, and other equipment; they used blowtorches, and it hastened the operations as they were

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[1152] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3.
[1153] Ibid.
[1154] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1155] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3; "The Big Quake: Like a House of Cards". *Weekly Nation* (August 12, 1968): 8, 12, 77.
[1156] Lewis E. Gleeck, Jr., *President Marcos and the Philippine Political Culture* (Manila: Loyal Printing, Inc., 1987), pp. 74-77.
[1157] Antonio Zumel and Marius Panuncialman.,"200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15; "Hundreds Die in Quakes! 5-story building crumbles." *Manila Times* XXIII.160 (2 Aug 1968): 1,3.
[1158] Zumel and Panuncialman, "200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.

able to cut steel and concrete.[1159] The Department of Social Work (DSW), together with the Philippine National Red Cross (PNRC), released and distributed funds and relief goods for the rescue operations. The DSW released 130,750 pesos for relief and rehabilitation, and 10000 for the victims of Ruby Tower, coming from the initial order of President Marcos regarding the release of 2 million pesos calamity fund; and the two agencies set up an equipment and food station near the disaster area.[1160] The authorities converted the Arellano High School as a rescue center, wherein four classrooms were converted into hospital rooms, and the rest are temporary shelters and food stations for rescuers, and victims and survivors.[1161] The Manila Health Department treated rescuers who suffered various injuries, as part of the Manila City government's rescue operation initiative, led by Mayor Antonio J. Villegas.[1162] Moreover, records at the Communication Center set up across the ruined building showed the names and information about the survivors; their condition and to what hospital they were brought in.[1163] "Acts of kindness and generosity" prevailed in the disaster site, President Marcos said; he added, "…Their voluntary contribution to the government agencies have accelerated an endeavor in which speed is of the utmost importance."[1164]

The Weather Bureau, since the after of 02 August, has monitored the possible occurrence of another quake, or series of aftershocks. It issued several precautionary warning to the people, including staying away from narrow alleys, buildings, rivers and banks, unstable objects or structures, damaged walls, and ceilings, and most importantly, in believing in wild rumors, and reminded them to always listen to instructions from authorities.[1165] Other government and private scientific agencies, such as the Comvol and the Manila Observatory, also issues their own public precautionary warnings, based on the data they gathered from their stations in Taal, and in Baguio and Davao.[1166]

It looked like the necessary government agencies, and the private sector has joined hands in mobilizing their resources to operationalize the aim to rescue as many lives from the collapsed Ruby Tower. But it didn't go smoothly. There was a horde of problems, shortcomings, and dilemma the rescue teams faced during the weeklong operations. One journalist reported her interviews with the people at the disaster site hours after the earthquake struck Manila:

> "And there was chaos. No proper equipment were around on the first day; only a flurry of contradictory suggestions o how to best save the victims. 'Dig from the ground,' said one. 'Start from the top,' said another. 'Search

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[1159] Ibid.
[1160] Zumel and Panuncialman.,"200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15; "The Big Quake: Like a House of Cards". *Weekly Nation* (August 12, 1968): 8, 12, 77.
[1161] Zumel and Panuncialman.,"200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.
[1162] "Ruby Death Toll Now 143; Rescuers find five more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a; Zumel and Panuncialman, "200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.
[1163] "Ruby Death Toll Now 143; Rescuers find 5 more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a.
[1164] Ibid.
[1165] Buan, Jr., Extra! 800 Trapped in the Building", *Manila Times* XXIII.160 (2 Aug 1968): 1, 3
[1166] Alberto. Rous, "Take precautions: Earthquake aftershocks continuing." *Manila Times* XXIII.171 (13 Aug 1968): 1, 9a.

> horizontally, floor by floor,' cried someone else. 'I know the buildings, let me tell you where you start digging,' insisted another. Too many were eager to help, and only succeeded in getting in help's way."[1167]

Aside from the apparent lack of big equipment during the first days of the operations, the intermittent rains, the heat, and unwarranted spectators hampered the rescue. Some rescuers lapsed from dehydration, and many suffered cuts and bruises despite gloves and cuts.[1168]

One government agency specially designed to respond to social needs in times of disasters, the Civil Defense Administration (CDA), was apparently out of sight during the Ruby Tower rescue operations. The Civil Defense Administration has been created by law to prepare the populace for emergencies like natural disasters and wars, but has failed to accomplish its mission through the years – ample supply of trained rescuers is needed.[1169] House leaders urged President Marcos to reactivate the CDA, with particular emphasis on training and rescue workers; suggestion came from Speaker Jose B. Laurel, Jr., and House Assistant Majority Floor Leader Joquin R. Roces (North Manila) after hearing the observations of congressional ladies, such as Mrs. Remedios laurel, Mrs. Virgie Veloso, and Mrs. Lita Roces, who assisted in the relief operations at the Ruby Towers.[1170] It was observed by many that the biggest handicap of the rescue work was the lack of trained rescuers; for example, a survivor with a broken rib developed another complication because of mishandling by some rescuers.[1171]

[1167] Abesamis, "A Race with Time at the Ruby Rescue!". *The Sunday Times Magazine* (18 August 1968).
[1168] "Ruby Death Toll Now 143; Rescuers find five more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a.
[1169] Ibid.
[1170] Ibid.
[1171] Ibid.

Photo No. 11
The Collapsed Ruby Tower after the 02 August 1968 Earthquake[1172]

c.2.2 Support from other government institutions and the private and non-government organizations

Support from different sectors of society complemented the government's shortcomings concerning resources, workforce, and equipment. The media covering the operations since the first day have commended this act by the said sectors. One report described it as, "…In this effort there appeared to be no end to human compassion. Assistance seemed to materialize from all segments of the community. A doctor from the province showed up at the disaster site and asked what he could do to help."[1173] President Marcos, in a statement on 03 August, commended the private individuals and

[1172] "The Big Quake: Like a House of Cards". *Weekly Nation* (August 12, 1968): 8, 12, 77
[1173] Zumel and Panuncialman, "200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.

organization, which helped in the rescue operations, the last 36 hours “has witnessed innumerable acts of kindness by men, women, and even children.”[1174] Organizations include Manila Boy Scouts, Rizal Boy Scouts, Chinese Scouts, Knox Methodist Church, Saint Mark's Methodist Church, UST Hospital medical interns, the ROTC, and the US Navy, Marine, and Air Force. A 120-man team composed of the US Marines and sailors and additional 32 airmen rushed to the disaster scene Friday night and helped in the rescue operations and pledged to remain in the area as long as they were needed. They donated 500 units of blood plasma, 55 units of morphine, and 200 body bags to the disaster area.[1175] Local governments and civic organizations, from Cagayan to Batangas, have pitched in – collecting and distributing medicine and supplies to stricken families.[1176] Aside from the volunteer rescue teams, anonymous individuals also sent their donations to the rescue operations facilities and in the hospitals, in the form of cash, clothes, food, and medicine.[1177]

c.2.3 Deaths, casualties, and survivors of the Ruby Tower collapse

"Operation Ruby" was not only a nightmare of pulling out possible survivors from the collapsed Ruby Tower, but also a dilemma for hospital facilities, and post-disaster recording and documentation. The amount of death in Ruby Tower has surpassed the total number of deaths in one incident in recent decades, and it somewhat holds the most number of casualties in one disaster site alone. One journalist describes the death at the Ruby Towers as: "Death stole in at the Ruby Tower like a thief in the night, carting away one huge haul of human loot: men, women, children, and even babies born or yet to be born."[1178] Almost all the recorded deaths and injuries were at the Ruby Towers Apartment, except for less than a dozen from other parts of Manila, and four provinces. The reports gathered from various sources reveal different information. For consistency, it is indicated in the table below the data of deaths (whose body was recovered) and injuries from multiple locations hit by the earthquake.

[1174] “Ruby Death Toll Now 143; Rescuers find 5 more survivors.” *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a.
[1175] Ibid.; Zumel and Panuncialman, “200 Still in Wreck.” *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.
[1176] Castro, “82 found in collapsed building.” *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1177] Zumel and Panuncialman, “200 Still in Wreck.” *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.
[1178] Nancy T. Lu, *The Sunday Times Magazine* (18 August 1968).

Table No. 20
List of Casualties (deaths and injuries) of the 02 August Earthquake[1179]

Place	Number of persons killed	Number of persons injured
Manila (Ruby Tower) [Recovered bodies]	268	284
FEU and Feati University	5	
Manila (Palomo Building)	1	2
Manila (Tondo)	2	
Casiguran, Quezon	1 (child)	
Guagua, Pampanga	1 (male)	
Bulacan and Pangasinan	2	
Total	**280**	**286**

Other reported fatalities not from the Ruby Tower include Cynthia Quemil, ten years old, a fallen concrete all in the Palomo Building in Manila hit her, which caused her death; she was pronounced dead on arrival in St. Francis Xavier's Hospital.[1180] In Tondo, the tremor wrecked several houses; an elderly Chinese couple, Tan Tio Teng and Fely Tan, was pinned to death when their house collapsed.[1181] One fisherman from Casiguran, Virgilio Valencia, 30 years old, died due to drowning when caught by the tidal wave while in the sea.[1182]Three unnamed deaths were reported in the provinces of Bulacan, Pampanga, and Pangasinan.[1183]

Hospitals in Manila, such as the PGH, St. Francis Xavier Hospital, and Dr. Jose Reyes Hospital were overflowed with injured persons. American musician Jerry Wilson, who was brought to Manila by the Manila Symphony Society, was severely injured after being hit by concrete blocks while sleeping, was brought to the PGH.[1184]

On the first day of the operations in Ruby Tower, the first to be brought out was a certain Luis Godoy, 56 years old.[1185] Three young individuals followed him were reported and were brought immediately to the hospital: Eufemia Leaño, 13, Zeni Lui, 16, and Rosa

[1179] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969; "Hundreds Die in Quakes! 5-story building crumbles." *Manila Times* XXIII.160 (2 Aug 1968): 1,3; Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2; "Ruby Death Toll Now 143; Rescuers find 5 more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a; Zumel and Panuncialman, "200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.
[1180] "Hundreds Die in Quakes! 5-story building crumbles." *Manila Times* XXIII.160 (2 Aug 1968): 1,3.
[1181] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1182] Rous, "Earth Cracks in Quezon; Quake damages at Casiguran, near epicenter described." *Manila Times* XXIII.168 (10 Aug 1968): 1, 15a.
[1183] Ibid.
[1184] Hundreds Die in Quakes! 5-story building crumbles." *Manila Times* XXIII.160 (2 Aug 1968): 1,3.
[1185] "The Day Manila Trembled: Sudden Death and Destruction". *The Sunday Times* (11 August 1968).

Villalobos, 15.[1186] At 7:30pm of 03 August, aglimmer of hope shone upon the rescuers as they were able to pull out a smiling and uninjured Filipino, and a blood-caked 1-year old Chinese baby.[1187] Many of the people who were pulled out from the Ruby Tower debris were able to be brought in hospital, but most of them passed away due to extreme injuries.[1188] After four days of rescue operations, Maj. General Tobias expressed little hope for some 100 persons still burried in the collapsed tower.[1189] One major problem was the painful identification of presumably dead residents of Ruby Tower had to be done haphazardly in dingu morgues and shadowy funeral parlors in Manila, because the recovered bodies brought there were already decomposed beyond recognition.[1190] Another difficulty in tracing the work of the rescue operations was the variations in reported information by newspapers covering the event. In the first five days of the coverage, there was vagueness in the reporting of casualties: if the numbers are solely on the Ruby Tower site, or if it's the total number from all areas affected by the quake.

Table No. 21

Daily Number of reported fatalities and injuries of the 02 August 1968 earthquake[1191]

Day/Date	Reported Number	Newspaper Source
Day 1, 02 August	82 bodies from Ruby Tower only	*Manila Daily Bulletin* 242.3 (3 Aug 1968)
Day 2, 03 August	104 bodies from Ruby Tower only	*Manila Daily Bulletin* 242.4 (4 Aug 1968)
Day 3, 04 August:	143 bodies from Ruby Tower only	*Manila Times* XXIII.162 (4 Aug 1968)
Day 4, 05 August	224 bodies, 395 rescued	*Weekly Nation* (August 12, 1968)
Day 5, 06 August	186 bodies, 258 injured	*The Sunday Times Magazine* (18 August 1968)

An account of a Filipino family that survived and rescued from the Ruby Tower rubbles showcase a relatively perfect story of the hope in times of disasters. The story of Florida Camara, and her children is a story of an accident, almost turned into a tragedy, and ended up as a proof of God's love, and the persistence of hope, as per the media have reported and projected it. Florida's cousin Nellie Arreola works as a house helper to a Chinese family. On the day of the earthquake, her, together with her two children, a two-year-old Ferdinand and five-month-old Oprenicio, were staying in the house where her

[1186] "Ruby Death Toll Now 143; Rescuers find 5 more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a.
[1187] Zumel and Panuncialman, "200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15.
[1188] Ibid.
[1189] "The Big Quake: Like a House of Cards". *Weekly Nation* (August 12, 1968): 8, 12, 77
[1190] Lu, *The Sunday Times Magazine* (18 August 1968).
[1191] Castro, "82 found in collapsed building." *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2; Zumel and Panuncialman, "200 Still in Wreck." *Manila Daily Bulletin* 242.4 (4 Aug 1968): 1, 15; "Ruby Death Toll Now 143; Rescuers find 5 more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a; "The Big Quake: Like a House of Cards". *Weekly Nation* (August 12, 1968): 8, 12, 77; Abesamis, "A Race with Time at the Ruby Rescue!". *The Sunday Times Magazine* (18 August 1968).

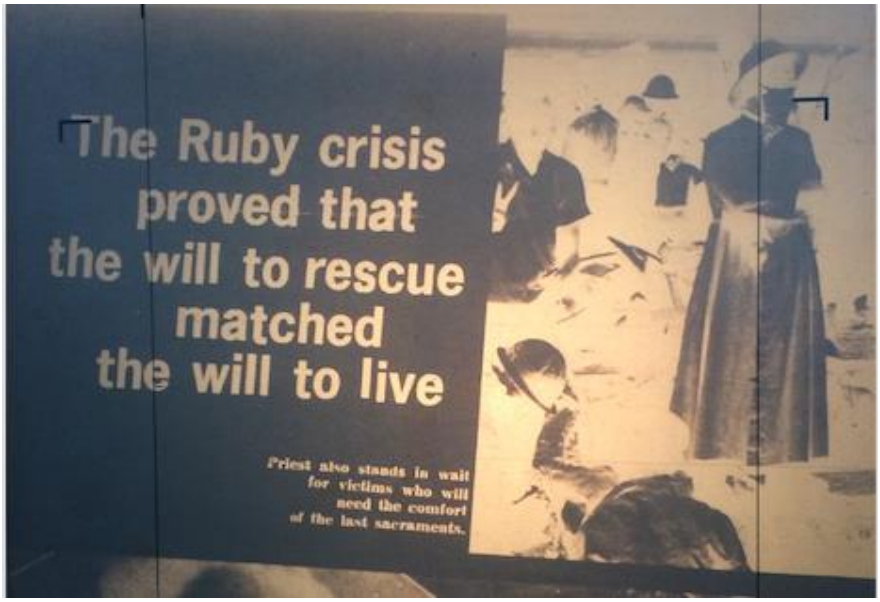
cousin worked and based on their story, they were Bicol-bound the following day.[1192]In an interview, Florida tells:

> "During the first few hours I was able to breastfeed the baby. Later I even had to let my elder son suck from my breast when he started asking for water…But much later on I could no longer feed them with my milk and trusting in the Divine Providence, we waited for rescuers to spot us." (speaking in Tagalog)[1193]

The rescuers saved them after almost 9 hours; the two kids, 5-month old Oprenicio and two-year-old Ferdinand, were separated from their mother, as rescuers brought them to different hospitals. Due to the nature of the rescue, wherein the three of them were pulled out of the building at different times, the information about the two children was lacking. Sister Jacqueline Blondin, M.I.C., a nun volunteering in the rescue operations, did the social work of locating the mother of the two. The baby was found at the Chinese General Hospital (CGH), through the initials found in the baby's clothing. Rescuers sent the mother to the Metropolitan Hospital. A newspaper story describes the reunions of Florida and Oprenecio as: "There are the scene of such a pathetic human drama all the onlookers could not help but shed tears of gladness over the happy family reunion. As the television camera zoomed in for a real close-up of the kicking baby whom the newscaster announced unknowingly as still unidentified that Sunday night the diminutive Oprenicio was already sleeping snugly under the watchful eyes of his loving mother."[1194] Dr. Jaime Laya, a physician from the CGH, almost decided to adopt the baby.[1195]

Photo No. 12

A description of the Ruby Tower rescue operations in a feature article[1196]



[1192] Lu, *The Sunday Times Magazine* (18 August 1968).
[1193] Ibid.
[1194] Ibid.
[1195] Ibid.
[1196] *The Sunday Times Magazine* (18 August 1968)

c.2.4 The Ruby Tower and the Chinese

In 2018, it was the 50 years since the tragic Ruby Tower incident. Some news reports commemorating the event focused on the aspect of the earthquake's magnitude, and the problems on public infrastructure leading to the passage of a revised and enhanced national building code.[1197] But the Ruby Tower incident is more than that. One aspect of this disaster that should be given attention to understand it's significance, or implication, to the dynamics not only of the government's response to the disaster but also of the way Filipino perceive the disaster as a unique one, is it's "Chinese-ness". Reports since the first day of operations portray all "deaths" as Chinese. A news report after the second day of rescue operations listed down the names of fatalities in the Ruby Tower site:

Table No. 22
List of dead Chinese residents of the Ruby Tower after the 02 August 1968[1198]

Men	Women
Henry Young	Lily Ian Young
Sy Touy	Felisa Valdecanto
Tan Pue Pin	Justiniana Manahan
William Manahan	Herminia Cipriano
Chiong Ang Kiat	Magdalena Lim
Luy Chang	Fancy Chang
Wong Geo Cheong	Esperanza Uy
Johnny Wong	Rosita Cheong
David Wong	Rosalina Ong
Luis Tan	Rosa Ching
Ong Pian Tang	Anita Tan
Dy Ching Kee	Virginia Hao
Chua Pek Chiong	Rosario Yu Beng
Tan Tian Tek	Chipa Santos
Peter Tan	Delly Ko
See Suey Hieng	Teresita Dy
Vicente Hao	Feliz Quan
T. Hao	Elizabeth Huan
Ma Chi	Ernesto Guan
Chan Ga	Lita Ortillo
Nga Ming	Melencia Tan Lim
Chan Chut	Orlanda Aviana
Yu Yun	Ana Yee
Tip Fu	Lourdes Yee
Chin Chuan	Peggy yee
Lee Sin	Ellen Yee

[1197] Gwen de la Cruz, "Looking back: The 1968 Casiguran earthquake", https://www.rappler.com/move-ph/issues/disasters/65064-casiguran-earthquake; Ellalyn de Vera Ruiz, "Looking back: Ruby Tower Disaster, Casiguran Quake", https://news.mb.com.ph/2018/08/02/looking-back-ruby-tower-disaster-casiguran-quake/;
[1198] "Ruby Death Toll Now 143; Rescuers find 5 more survivors." *Manila Times* XXIII.162 (4 Aug 1968): 1, 9a.

Sui Kut	Lei Yee
Hurry Pong	Wong Sik Ling
Benito Lim, Jr.	
Leong Tang Tai	
Wok Man King	
Chan Lai	
Federico Lim	
Yap To	
William Ting	
Sui Kut	
Ting Su Lay	
Leong Lan Tai	
38	**28**

One can note that the names that the Chinese who died in the rubbles of Ruby Tower still practice their traditional Chinese way of naming; but one can also observe there were several of second-generation Chinese who had used the Filipinized or Americanized naming system. From this one issue can be brought out – the way "Filipinos" look at "Chinese FIlipinos" or "Filipino-Chinese". One journalist comprehensively points out the sentiment of many towards the Chinese during that time:

> A most interesting sidelight to the whole thing was the public reaction to the disaster. It was all very human. Now, we Filipinos, as a rule, don't take too kindly to the Chinese. For a number of reasons: they refused to be assimilated, they tend to control our economy as well as our politics (the affluent ones are known to support crooked politicians or candidates from either side), they are the lenders, and we are but the borrowers, they (or many of them, anyway) don't conform to our immigration laws, they secretly profess subversive doctrines, they use some of our women as dummies, and so on… Now, the 600-odd occupants of the Tower represented the fear segment the Chinese community. When it fell did we rise in hurrah? Did we say, 'Good for them, that means less of those necessary evils'? Of course not. We rushed to the wreckage and as we pulled the bodies out of the ruins with did not bother to ask whether he was an overstaying alien a usurer, a Red or a Pink. All we were interested in was whether it was dead or alive. If it was dead, well, at least it could be given a decent burial. If it was alive we cheered at the thought that the fellow human was back with us in the world of the living. The lesson in the Ruby Tower is simple: a human life no matter what the shade, creed, belief or custom, is the most precious thing… Later perhaps when things shall have subsided into the deepest known each of the memory we Filipinos can go back to not talking too kindly to the Chinese - should they persist in their stubbornness to be assimilated. That's all very Filipino, that's all very Chinese, - and that's all very human, too."[1199]

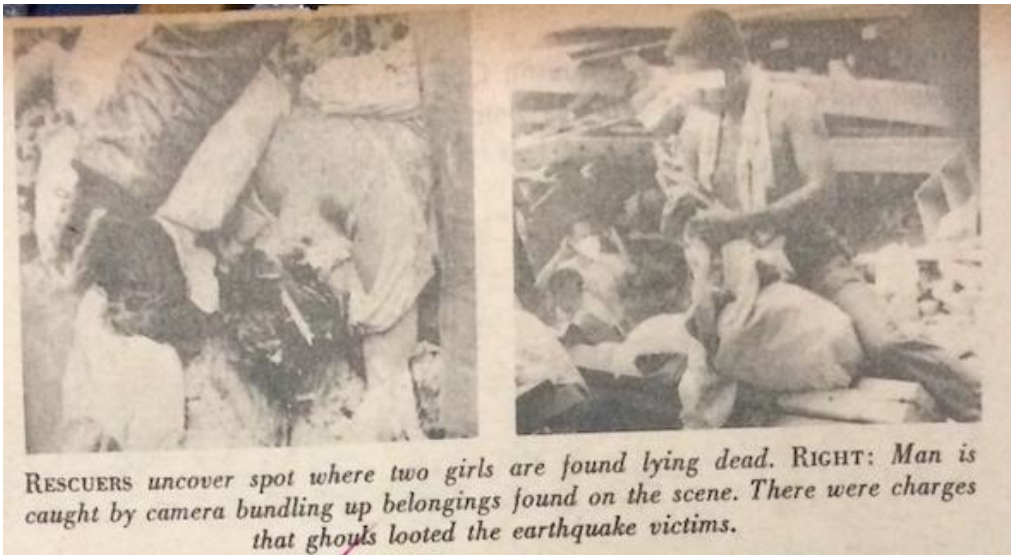
[1199] A. O. Flores, "The Ruby Rescue: Gem of a Story". *The Sunday Times Magazine* (25 August 1968).

This sentiment, which one can read as an admission of partial alienation or ostracizing the "Chinese", is rooted both on the long history of Chinese presence in the country, which dates back in the Spanish era, and, the international political milieu at that time. To further explain this idea, it is important to point out that in the 1960s, the government of the Philippines, same as in the past decades, was critical with the influence of socialism and communism, which is contextualized in the larger "Cold War" dynamics. Thus, the communism-critical people, or media, for example, saw the Chinese residents in Manila, as bearers of problematic Communist doctrine. Problematic in the sense that many Chinese residents in the Philippines were migrants from Southern China, and in cultural history, they were the one critical of their government, primarily because of language issues. Southern Chinese migrants are Hookien-speaking people, contrary to the "dominant" Mandarin-speaking government. In the history of China, this issue of dialect wars causes massive division for centuries.

The visible military and police presence in the disaster site was read as a way to prevent massive looting because the collapsed building was a Chinese building, thus, there' "Chinese treasure", specifically gold. One unfortunate matter about the incident was the cases of looting in the disaster site. As many of the people living in Ruby Tower were Chinese, they were deemed to be rich, and the collapsed building was a wreck for lost treasures. Capt. Cenon D. Antonio, from the Army Engineers Office, and two MPD policemen, were arrested by their comrades while allegedly looting at the Ruby Tower site.[1200] One patrolman, Jose San Juan, alerted other police officers when he saw Antonio carrying pieces of Chinese gold.[1201] Aside from this, the rescue team was able to recover 48 gold bars and P40,000 during the stretch of the rescue operations.

Photo No. 13

Looters or Scavengers? People collecting goods at the disaster area of Ruby Tower, August 1968[1202]



RESCUERS *uncover spot where two girls are found lying dead.* RIGHT: *Man is caught by camera bundling up belongings found on the scene. There were charges that ghouls looted the earthquake victims.*

[1200] Castro, “82 found in collapsed building.” *Manila Daily Bulletin* 242.3 (3 Aug 1968): 1-2.
[1201] The Big Quake: Like a House of Cards”. *Weekly Nation* (August 12, 1968): 8, 12, 77
[1202] “The Big Quake: Like a House of Cards”. *Weekly Nation* (August 12, 1968): 8, 12, 77; “The Day Manila Trembled: Sudden Death and Destruction”. *The Sunday Times* (11 August 1968).

Accounts of survival from young Chinese high school students portray stories of both hope and dismissal from their promising life in Manila. Earliest survivors were the three Teh brothers, Jaime, Alberto, and another one, who drugged their way out of the debris themselves less than an hour after the collapse.[1203]Rescuers sent them to the Metropolitan Hospital. Jaime Teh, a student from Philippine Chinese High School, from apartment room 501.[1204] Their parents were nowhere to be found. The three became orphaned after the earthquake. In Room 210, from a supposed family, only a 16-year old Mary Keng, a student from St. Stephen's High School, from Quezon, was saved. In the narration of her memory: "When the earthquake started shaking the building and the concrete walls began to topple down my first instinct was to run out of the room…During the calm that shortly followed, I could sense a man somewhere up there looking around with his flashlight. I called to him foe help."[1205] Keng recalled that when she was rescued, his brother Arsenio, 19, and two other brothers, 17 and 15, were left inside.[1206] He added, residents in an apartment in a nearby street of Ruby Tower, tried to insert a bottle of soft drink for her to drink, and later on, used a water hose too. Francisco Uy, 20, a student from Chang Kai Shek High School, from Catbalogan, Eastern Samar, tells his story while in the hospital: “During those long trying hours of patient waiting I dared not move for fear that there would be another cave-in. My other companion in the same room kept complaining about the heavy pressure on his chest. Something has fallen on him. He also kept asking me for food. He told me that should he be rescued he would leave Manila for good.”[1207] Francisco heeded the advice of his dead friend; he left Manila after.

A journalist who covered the story of the young Chinese survivors portrays them as vulnerable and hopeful at the same time. One can ibserve that there's a pattern of linear history - where experiences of disasters always end at the mercy of the Divine, and the future rests on the fate decided by a Heavenly being. Aside from the correlation of nature's wrath as Godly acts, the narrative that always appears the perrnial surfacing of heroism in times of disasters caused by nature, as if environmental disasters are acts of war. The duality of chaos and heroism and grieving and rejoicing is considered archetypes of a "disaster story". [1208] One journalist who covered the Ruby Tower operations narrates: “but the saving grace of disasters is that it brings to the surface the heroic qualities of people who, onlivious of danger to themselves, would go all out to help the less fortunate, and generously give material and moral succor…”[1209] The story of the experience of the young Chinese survivors has been concluded in this manner:

> “Meanwhile, the living will have to go on living. But the life will never be the same again. The orphaned, the homeless, the property-less, the physically-maimed, and the mentally-affected will set about building a future for themselves…But they will never forget. Surely, this earthquake has been called the strongest within living memory, cannot be forgotten

[1203] Lu, *The Sunday Times Magazine* (18 August 1968).
[1204] Ibid.
[1205] Ibid.
[1206] Ibid.
[1207] Ibid.
[1208] Abesamis, “A Race with Time at the Ruby Rescue!”. *The Sunday Times Magazine* (18 August 1968).
[1209] Rosario M. Querol, “Floods, Earthquakes, The Pope’s Encyclical and Imelda’s Projects”. *Weekly Nation* (19 August 1968): 42.

> toom soon. For such as this, human memory has a way of limiting with fear, and painful remembrance, and sobriety, and, it is hoped, with new-found faith in an all-merciful Providence."[1210]

Five decades since the tragedy, the Filipino-Chinese community in Manila has memorialized the event in various manners. First, is the erected inside the Manila Chinese cemetery is a Ruby Tower Memorial Shrine, which is composed of a tower with three pylon-like pillars with a ring on top of it, and a memorial that shows the names and photos of the victims of the tragedy.[1211] Another one is the Ruby Tower Disaster Victims Association, Inc. (RTDVA), a private non-government organization, which has an office in Doroteo Jose, Manila. The RTDVA was established in 1977, almost a decade after the disaster.[1212] The objective of the association is to help and extend financial support to the sons and daughters, grandsons and granddaughters, and other relatives of the victims of the 1968 earthquake.[1213]To gather money for their beneficiaries, the whole building of RTDVA in Manila is being rented as hardware shops and food stalls.[1214] The remaining living founders and their relatives are all living abroad, and most are in China. Every second of August, many of them visit the Philippines to commemorate the Ruby Tower earthquake disaster.[1215]

For the Chinese residents of Manila, the cultural meaning of the tragedy goes beyond the aspect of natural hazards and urban structure disasters, but more of a social reminder of a tragedy that claimed lives of hundreds of Chinese people who migrated to Manila, and integrated themselves in a foreign land, that they considered their own. This kind of memorialization falls into what Pierre Nora (1989) argues as the *lieux de mémoire*, roughly translated as "sites of memory".[1216] Following his thought, people manifest that there is no spontaneous memory, that they deliberately "create archives, maintain anniversaries, organize celebrations, pronounce eulogies" to maintain a memory of important events, and thus making their individual and collective memories part of the grand historical narrative of a society.[1217] Thus, the memorial for the victims of the tragedy is a site of one portion, or generation, of the Chinese residents in Manila's memory of their relatives, of their experience in the city, and of their struggle to be part of the Manila where they chose to live in. The social memory of the disaster event has been concretized, literaly and figuratively, in a tower, alongside with other previous generations of Chinese residents in Manila, as a symbol of the Ruby Tower, which was once hailed as a gem of residential living in downtown Manila.

[1210] Ibid.
[1211] See photos of the Ruby Tower Memorial Shrine at the Manila Chinese Cemetery.
[1212] Interview with Teresita Dy, current Director of the Ruby Tower Disaster Victims, Association, Inc (RTDVA), 10 September 2018.
[1213] Ibid.
[1214] Ibid.
[1215] Ibid.
[1216] Pierre Nora, "Between Memory and History: Les Lieux de Mémoire", *Representations* 26, 1989: 7-24.
[1217] Ibid., p. 12.

Photo No. 14
The Ruby Tower Memorial inside the Manila Chinese Cemetery[1218]

Photo 14.1: The Ruby Tower Memorial

[1218] Photos taken on 05 September 2018.

Photo 14.2: Photos and Names of the people who died in the Ruby Tower, listed inside the mausoleum of the Ruby Tower Memorial

c.2.5 Geological problems and engineering papses: Scientific Reports and Studies about the Ruby Tower incident

The first line of scientific endeavor to further understand the nature and comprehensively assess the effects of the earthquake that struck in Luzon on 02 August 1968 was the was the seismological institutions that monitored the earthquake. These were the Philippine Weather Bureau (PWB), the Commission on Volcanology (Comvol), and the Manila Observatory (MO). The three agencies have their respective stations, with functioning seismographs, around the archipelago. The PWB has five: In Quezon City, Ambulong and Gulod in Batangas, Legazpi in Albay, and Cebu City; the ComVol has four: in Taal, Batangas, Mayon in Albay, Misericordia, and in legzapi City in Albay; while the MO has three: in Quezon City, Baguio, and Davao.[1219] With this number of stations, one may seem that seismological information collected is enough to identify the most vital knowledge about the earthquake. But apparently, a problem was seen. Even though the three agencies agreed on the nature of the earthquake, which is a tectonic tremor, experts from each agency disagreed one another and had varying identification of the earthquake's epicenter.[1220] The PWB identified the epicenter to be 175 km ENE of Manila, somewhere in Isabela; the ComVol said that it was 50 km from Taal, and 308 km from Legazpi, 20 km from Manila; while the MO stated that it was 250 km from Manila along the earth fault extending from Lingayen Gulf to Dingalan Bay.[1221] There can interpret that there was a seeming "scientific animosity" between the three. After consulting with several agencies, the experts from the UNESCO stated in their report that WB, MO, and Comvol must increase "friendly".[1222] This professional rift is associated with the relatively ill-equipped PWB, relying support from a specialized Comvol, which has a mandate on studying volcanoes and volcanic phenomenon, and from the MO, which has, since the 1950s, a private, public service laboratory of the Jesuit Fathers of the Ateneo de Manila University. In a newspaper interview, PWB Director Romulo Kintanar that to be able to do a comprehensive seismological service, the PWB needs more seismographic equipment to study earthquakes; only nine seismographic stations in the country while the actual number required is 50.[1223]

Aside from this, the observed multiplicity of information from experts also appeared among geologists and geophysicists who were tapped to study the earthquake. In a presentation to government officials, Frithjof Voss, a German geologist and visiting Professor at the University of the Philippines said that the cause of the earthquake and the Ruby Tower's collapse was due to the presence, and the location of the tower, of and in two graben (grave) in Manila.[1224] Sediments and alluvial soil loosely fill these, one is 50-60k years old, and through the years, has sunk 100 meters low.[1225] Local geophysicists are eager to question Dr. Voss's theory-explanation, on how he but

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[1219] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969.
[1220] "The Big Quake: Like a House of Cards". *Weekly Nation* (August 12, 1968): 8, 12, 77.
[1221] Ibid.
[1222] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969, p. 53.
[1223] Rous, "Earth Cracks in Quezon; Quake damages at Casiguran, near epicenter described." *Manila Times* XXIII.168 (10 Aug 1968): 1, 15a.
[1224] Abesamis, "The Tremors that come from the Fault of the Earth". *The Sunday Times Magazine* (25 August 1968): 22-23.
[1225] Ibid.

agreed in his proposition to conduct city subsoil mapping of Manila.[1226] In a scientific report of the Ad Hoc Committee of the Geological Society of the Philippines (GSP), geologists looked at the geologic history of the Metro Manila area, geologically speaking, was formerly a submerged region; and concluded that commercial districts of Sta. Cruz, Sampaloc, Quiapo, Escolta, Intramuros, Port Area, Ermita, Paco and Malate, the area profoundly affected by the tremor, are underlain by transported materials deposited as deltaic sediments on top of the tuff bedrock, which is a result of tectonic movements that can be seen in area around the region: uplift of Tagaytay Ridge, and tilting of the Guadalupe area.[1227] Furthermore, explaining the sudden collapse of the Ruby Tower, they said it absorbed, to a great extent, by the tuff bedrock; thus the alleged "faults" and "graben" in downtown Manila and vicinity as reported in the newspapers do not exist".[1228]Gervasio (1966), a geologist of the Philippines Mines Bureau, expanded this study of GSP.[1229] Extrapolating from these scientific exchanges, and from reading between the lines of newspaper reports, nationalism can be put into the equation – that there was an evident animosity amongst government scientists to foreign experts. The earthquake triggered the contestation of knowledge, which served as a challenged to Filipino scientists to further explain the nature of the Philippine archipelago so that the media will not rely on foreign scientists for scientific explanations of hazards such as earthquakes.

Upon the request from the Office of the President, the UNESCO sent an earthquake reconnaissance has been sent to the Philippines to study the effects of the 02 August earthquake. Dr. Syunitiro Omote, acting director of the Tokyo International Institute of Seismology, served as head of the team, composed of members Dr. Etaka Osawa, University of Tokyo earthquake engineering professor, Dr. Ytaka Osawa, soil mechanics professor from Tokyo Institute of Technology, and Robert I. Kinner, engineering seismologist from the New Zealand Department of Scientific and Industrial Research at Wellington.[1230] The aim of the team centered on two objectives: (1) to make a preliminary study of the seismological and engineering aspects of the earthquake, and 2) to identify actions should be taken to improve knowledge of the seismic conditions of the country and the means of protection against earthquake.[1231] The UNESCO committee's report centered on three aspects. First, it was a study of the nature of the earthquake, by analyzing the data from seismological stations in the country, the PWB stations, Manila Observatory stations, and Comvol, as well as from available geological and geophysical studies about the Philippine archipelago; second, it thoroughly studied the status of the public and private buildings severely and partly damaged by the earthquake; and lastly, made pragmatic recommendations on how to deal with specific urban and architectural rehabilitation issues emanating from the problems identified after the earthquake.[1232]The committee identified various reasons on the collapse and severe destruction of buildings, most of which were due to shortsightedness in architectural and engineering planning

[1226] Ibid.
[1227] Generoso Oca, "The Geology of Greater Manila and its Bearing to the Catastrophic Earthquake of August 2, 1968." *The Philippine Geologist* XXII.4 (Dec 1968), p. 172-174.
[1228] Ibid., p. 177.
[1229] Froilan C. Gervasio, "A Study of Tectonics of Philippine Archipelago." *The Philippine Geologist* XX.2 (June 1966): 51-75.
[1230] Rous, "Take precautions: Earthquake aftershocks continuing." *Manila Times* XXIII.171 (13 Aug 1968): 1, 9a.
[1231] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969.
[1232] Ibid., pp. 5-53.

and execution and outdated and improper structural components that are not fir to earthquake-prone countries. At the end of their report, the UNESCO team made several recommendations, particularly, on matters related to scientific approaches in dealing with earthquakes and earthquake-resistant construction. They recommended that the Citizen's Committee of the Manila City Government finalized their documentation of data related to the earthquake, as well as separate documentation of the city's subsoil condition, through intensive geological research.[1233] They also made specific recommendations in the city's building code, on the establishment of additional seismological stations around the country, and investing in education, training, and research for experts, particularly on maximizing the potential for study opportunities abroad and the inclusion of seismology and earthquake engineering in university curricula.[1234]

c.2.6 The August 1968 earthquake and the revisions in the National Building Code

One reality the authorities had to be dealt with after the Ruby Tower tragedy was the dire need to revisit the building practices in Manila, as well as in many urban towns and cities in the country. The 1968 earthquake, as well as another one, prompted the approval of the National Building Code.[1235]

Mayor Antonio J. Villegas of Manila initiated the series of inquiries and investigastions regarding the cause of the collapse of the whole Ruby Towers Apartments. Upon the recommendations of the experts and engineers, he created a “Citizen’s Committee” to investigate the cause of the collapse of the Ruby Tower. It had a five-member board, composed of Cesar Concio who acted as Chairperson, and members Cesar Caliwara, Fiorello Estuar, Napoleon Campomanes, and Petronilo Parungao.[1236] The members of the committee were big names in the field of civil engineering and architecture in the country.

In a report made by Flores (1970), he identified various reasons of possible collapse of the tower. The information he used was based on the initial findings of the Villegas Citizen’s Committee. He argued that in general the collapse was caused by the failure to mee the standards of a high-rise building: the inadequacy of design, lack of ductility in the columns and beams, poor quality of materials, improper placing of reinforcement bars, poor workmanship, and lack of supervision, all of which were responsibilities of the contractor of the building.[1237] The Omote et. al Report of 1969 earlier identified these causes: their team identified that the “disastrous failure of this building during the earthquake was doubtless due to a combination of several factors”, such as unbalanced stiffness of the structure, lack of capacity to abscorb shocks, unsuitable components to carry the towers’ overloaded capacity, the use of low-strength concrete and hollow concrete blocks.[1238] Moreover, the committee found out that among other things, that the building instantaneously collapsed after the shock and that no soil exploration test

[1233] Ibid., p. 51-52.
[1234] Ibid., p. 52-53.
[1235] Flores, *The Luzon Earthquakes of August 2, 1968 and April 7, 1970.* (n.d.), p. 483.
[1236] Gervasio, “A Study of Tectonics of Philippine Archipelago.”, pp. 51-75.
[1237] Flores, *The Luzon Earthquakes of August 2, 1968 and April 7, 1970.* (n.d.), p. 484.
[1238] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, “Luzon Earthquake of 2 August 1968.”, p. 38.

conducted at the site before its construction."[1239] They also found out through their extensive studies that most of the buildings which are moderate to severely damaged are located along the north bank of Pasig River in Escolta district, apparently, in the loose and poorly consolidated sediments, the seismic energy released by the earthquake is amplified and its full force in transmitted on to the building structures.[1240]

One can infer that these structural failures were cuased of substandard materials and execution of an ineffective constructure plan, which in the first place, should have been identified when tha plan passed through the necessary enfineering auditing offices, from the city to the national level. Possible acts of corruption through ineffective screening of structural plans and issuance of building permits might or had happened along the way. Azurin (1992) column considered the 1968 Ruby Tower incident as a "Pandora's Box of Anomalies".[1241] Volunteers in the rescue operations noticed the few steel rods in the walls and posts' the engineering department of manila because an initial target of investigation, as negligence on their part, and a possible collusion with the building's contractors existed.[1242] He described the investigation initiated by the Manila City Government as follows"

> But ther probe's final outcome got buried in the debris because it was becoming obvious that if the probe were to proceed to its logical conclusion, it would surely be shown that the City Hall was itself a Pandora's Box of anomalies concerning illegal construction and other violations of building laws. And worse – the selling of sites occupied by creeks and estuaries. Which would explain the perennial floods in Manila have become disastrous not necessarily because of the downpours but because of the destruction of the natural drainage system. Often it is human greed and folly that blend in making ordinary occurences like typhoons and tremors into human tragedies.[1243]

Due to this, aside from the the series of earthquakes from 1968-1972, the Senate, through the Senate Working Committee for Amendments to National Building Code, headed by Senate President Gil Puyat and Senator Helen Z. Benitez, together with the professionals in the field, made possible the drafting of the National Building Code (NBC), approved into law on 26 August 1972.[1244] The NBC, known officially as Republic Act No. 6541 (An Act to Ordain and Institute a National Building Code of the Philippines), was aimed at declaring as a state policy "to safeguard the life, health, property, and public welfare consistent with the principles of environmental management and control", thus it must be a responsibility of the government to "provide a framework of minimum standards and requirements by guiding, regulating, and controlling…" the location, siting, design, quality of materials, construction, use, occupancy, and maintenance of buildings

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[1239] Oca, "The Geology of Greater Manila and its Bearing to the Catastrophic Earthquake of August 2, 1968", p. 175.
[1240] Ibid., p. 76.
[1241] Arnold Molina Azurin, "Nature's Fury, Human Folly." *The Sunday Times Magazine* (22 July 1990): 5-8.
[1242] Ibid., p. 7
[1243] Ibid.
[1244] Ibid., p. 489.

and structures.[1245] This law expounds the classification of buildings based on occupancy (Title III), and based on the type of construction (Title IV), and also reiterates the importance of proper light and ventilation, and sanitation (Title V), as well as standards on fore safety and protection.[1246] It also includes provisions on the protection of the public from these buildings, meaning on the projection of the structures concerning public properties such as streets, sidewalks, and pedestrians (Titles VI and VII). [1247] Moreover, the law also includes strict implementation of proper and necessary use of materials such as steel and plastic, as well as the mechanical and electrical regulations in building construction.[1248] Five years later, on 19 February 1977, RA 6541 was revised, and was promulgated as Presidential Decree 1096, titled "Adopting a National Building Code of the Philippines thereby Revising Republic Act Numbered Sixty-Five Hundred Forty One".[1249]

The passage of the NBC was a product of years of political lobbying and scientific research on the most suitable way of institutionalizing practices and codifying rules and regulations on public construction. In their recommendations on how to improve the Manila's urban landscape, the UNESCO Team emphasized the much-needed revisions in the city's building code. The team's recommendations encompassed aspect not only of the construction quality and design, but also on the foundation and proper identification of area through extensive zoning based upon known seismicity not only in urban areas but also in the whole country.[1250] Experts, geologists and seismologists, in the post-disaster assessment of the scientific reasons of the tragedy, have unanimously pointed out the needs for proper and appropriate soil zoning for public. In the years before the passage of the NBC, there was an evident clamor for local sub-soil zoning maps for metropolitan areas to show the dynamic soil structure to earthquake motions.[1251] Weather Bureau Chief Geophysicist Wellington Minoza suggests the institution of building codes for designing earthquake-proof structures and also the organization of researches on the behavior of the ground when the earth vibrates.[1252] Furthermore, experts also suggested that the institutionalization of rules and policies be applied to research agencies and documentation practices. A proposal for the establishment of a Building Research Institute, similar to that in Japan, was necessary to take care of the above recommendations and prosecute relevant studies, and to maintain collaborations with local research organizations and allied institutions in other countries.[1253] Moreover, some scientist also urged the practitioners in the field to adopt an International Scale for Magnitude and Intensity of Earthquakes, and Metric System

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[1245] Republic Act 6541, "An Act to Ordain and Institute a National Building Code of the Philippines", <www.thecorpusjuris.com/lesgilative/republic-acts/ra-no.6541.php>

[1246] Ibid.

[1247] Ibid.

[1248] Ibid.

[1249] Presidential Decree 1096, "Adopting a National Building Code of the Philippines thereby Revising Republic Act Numbered Sixty-Five Hundred Forty-One", <www.dpwh.gov.ph/dpwh/references/laws_codes_orders/national_law>

[1250] S. Omote, Y. Osawa, I. Skinner, and Y. Yoshimi, "Luzon Earthquake of 2 August 1968." Series No. 977. Paris: UNESCO, 1969, pp. 51-52.

[1251] Flores, *The Luzon Earthquakes of August 2, 1968 and April 7, 1970.* (n.d.), p. 489.

[1252] Abesamis, "The Tremors that come from the Fault of the Earth". *The Sunday Times Magazine* (25 August 1968): 22-23.

[1253] Flores, *The Luzon Earthquakes of August 2, 1968 and April 7, 1970.* (n.d.), pp. 489-490.

for measurements to achieve better coordination of all scientific researches and technological development.[1254]

In his column, one journalist noted, “But why did he pick on Manilans in particular? That’s another ‘Why’ and the only answer to that is an old line which says that ‘God moves in a mysterious way’.”[1255] This view can be the default answer to questions on why Manila had experienced the worst earthquake destructions. Dismissive as it may seem, people tend to submit to these kinds of rhetoric because of the failure of a consistent, proactive, and structured approach to mitigate the effects of disasters. Experts noted that another set of information, reactions, measures, and policies were identified and implemented after the 02 August 1968 earthquake. Authorities appreciated the new knowledge on the geologic nature of Manila because of the unique case of a whole building that collapsed, killing hundreds of people. The codification of mechanisms and regulations in constructing buildings and infrastructure was made possible due to the extremity of the Ruby Tower Tragedy, making it a turning point, and an event that surfaced the malpractices and outdated style and designs in public constructions, not merely or less of earthquake-resistant buildings.

Moreover, the public saw another call to the government from scientists to prioritize research so that urban communities can be disaster-prepared. This time, aside from seismologists, geologists and practitioners in urban planning and civil engineering were amongst the one calling for institutionalized and structured response, as seen in their active role in the passage of the country's updated building code. The codification came into light not only because of concern but also of scrutiny. The Manila City Government was quick to act on creating a committee to investigate the tragedy; geological reasoning and building construction issues did not convince them, as they believe the tragedy was also a case of inappropriate engineering practices. Furthermore, the national government's decision to call the help of the UNESCO to step in the situation reflected its desire not only to be updated in the field of earthquake-resistant buildings but also to establish an independent study and assessment of the situation. One may speculate that it might be probably because of the lack of enough capacity to determine the root cause of the tragedy, or the state was dubious of its institutions.

Nevertheless, one thing that the Ruby Tower Tragedy brought to light, as passé, as it may sound, is that it was able to integrate more sectors in the field of disaster preparedness. One journalist observed that days after the earthquake, “the earth’s every movement became the concern not only of lonely geophysicists and seismologist in their run-down buildings but also of the ordinary layman, stilled and silenced by the awful sounds beneath his feet.”[1256] The ordinary people became much more aware of the disaster hazards such as earthquakes may cause, it people, communities, and the government are not ready to respond and to mitigate its effects.

[1254] Ibid.
[1255] Flores, “The Ruby Rescue: Gem of a Story”. *The Sunday Times Magazine* (25 August 1968).
[1256] Abesamis, “The Tremors that come from the Fault of the Earth”. *The Sunday Times Magazine* (25 August 1968): 22-23.

d. The 1983 earthquake: Disaster and Politics under a Dictatorial Regime

d.1 Disasters and the Marcos Dictatorship: A Context

The decade of the 1980s was a period of political and economic turmoil in the country. The Philippine under an authoritarian regime entered its second decade since President Ferdinand Marcos placed the Philippines under a martial rule in 1972. Politically, Marcos held most of the power – executive and legislative; although there was the presence of the bogus Interim Batasang Pambansa (IBP), which was supposed to hold the legislative power under the existing 1973 Constitution. Economically, the decade of the 1980s tested the economic policies implemented in the previous decade. Marcos technocrats managed the economy on a macro-level; while in reality, his cronies – family and relatives, friends, fraternity brothers, and local political elite allies, owned much of the country wealth, and controlled vital industries and corporations. The concentration of the country's wealth was in the hands of the few; a study in 1980 points out that 98% of the country's economic sector had four or five companies controlling 35% of the total output.[1257] As McCoy (2018) argues, "…whenever possible, crony capitalists reinforced their economic power with control over the government agency charged with regulating their industry."[1258] Given the volatile political and economic situation the country was facing during the first years of the 1980s, social movements rose as a robust counter-regime force that filled the streets and strengthen the armed struggle in the provinces. During this time as well, the traditional and moderate politicians were consolidation power, through active engagement in their crucial support areas, the middle class and the overseas exiles, particularly Filipinos in the United States.

Given these political and social contexts, the local population can be located and viewed by analyzing the social impact of the several natural and human-induced phenomena such as typhoons, earthquakes, and flooding in the context of existing political situations, and institutions in control.

In the 1970s, Marcos also used the "nationalism" card to show to the "greater" public that social discipline vis-à-vis urban order must be followed, specifically by the people living in "squatters" area, or slums or congested, gentrified urban communities of informal settlers, which were built row houses and throwing garbage in esteros *(*estuaries) in Manila, by labeling them as unpatriotic and selfish, reinforced his idea of a "Bagong Lipunan" (New Society).[1259] This approach of the Marcos regime to hazards was a product of a series of disasters that struck significant centers of population in the country in the 1970s. Warren (2013) furthers that "the impact of a typhoon-related natural disaster on Philippine society and politics in the 1970s depended upon two sets of factors: namely, the political and material capacity of the government to react to the disaster and the relevant aspects of the political culture."[1260] Furthermore, the typhoons and flooding, which hit Luzon, specifically Manila and the major provinces such as Pampanga, Nueva Ecija, and Pangasinan in 1972, in Manila, Quezon, and Bicol region

[1257] Citing Fr. John F. Doherty's study, Alfred McCoy, "Global Populism: A Lineage of Filipino Strongmen from Quezon to Marcos to Duterte", *Kasarinlan: Philippine Journal of Third World Studies* 2017 32(1-2), p. 32
[1258] Ibid., p. 33.
[1259] James Warren, "A Tale of Two Decades: Typhoons and Floods, Manila and the Provinces, and the Marcos Years", *The Asia Pacific Journal* 11.43 (3), p. 13.
[1260] Ibid., p. 2.

in 1976, and the Moro Gulf Tsunami in 1976, tested the Marcos regime capacity in responding to the impacts of natural hazards.[1261] Given the political context of 1970s, months prior the declaration of Martial Law, and in during the height of its implementation, there was a definite change in the mechanisms employed by the government, especially in terms of generations funds, managing (and mismanaging) relief operations, and the setbacks such as politicizing rescue and relief efforts and post-disaster rehabilitation, and more evidently, patronage politics. The response of the government to these disasters was two: one aspect for Ferdinand, and the other one, for Imelda. The former handled the general responses, which were more about the government's policies and programs in responding and rehabilitating communities affected; while his wife did the specific ones, which focused more on relief operations.[1262]

On the one hand, connected with the idea of crony capitalism, the local scene in the provinces affected by floods was also an area for "clientist politics". The relief process and distribution of relief goods reflected Marcos' patronage politics: personal loyalties, ethnic preference, and partisanship were clear culturally configured political system entrenched, and were observed in times of disasters.[1263] Under Marcos, "the convergence of interests and activities leading to control of the pattern and personnel involved in the administration of available disaster relief was a blatant, albeit complex, political issue and problem, which involved bureaucrats, military personnel, entire communities, trans-national donors, and market interests."[1264] On the other hand, Badillo and Zinnia showed in their study how the phenomenon of tsunami corresponded to the trend in the 1970s and 1980s - when science became a booming discipline, and particular institutions were being established and reorganized to meet the demands of public service and policymaking.

Their preliminary yet comprehensive study of the causes and impacts of the Moro Gulf tsunami brought light to the scientific and somehow the social nature of the disaster, two years after it happened. Agencies such as Philippine Geophysical and Astronomical Services Administration (PAGASA) and Philippine Institute of Volcanology and Seismology (PHIVOLCS) were mandated to deliver plans and programs; projects aimed at advancing economic development and social progress through the benefits of modern science and technology. Laws and legal decrees established institutions; the primary idea is that these will become centers of ideas and applied knowledge for advance people's welfare through innovative projects[1265] This interpretation that the newly established PAGASA was formed to "tame typhoons"[1266] resonates this explanation.

d.2 The August 1983 Ilocos Norte earthquake: A double-edged tremor

During this same decade of the 1980s, another tragedy can be considered a microcosm of the socio-political realm of the regime, and a manifestation of the mirror image metaphor of natural and human-induced tragedies handled, and how both these images

[1261] Ibid., pp. 3-4; Victor L. Badillo and Zinnia C. Astilla, *Moro Gulf Tsunami of 17 August 1976* (Quezon City: Manila Observatory, 1978).
[1262] Warren, "A Tale of Two Decades", p. 13.
[1263] Ibid., pp. 12-13.
[1264] Ibid., p. 7.
[1265], Badillo and Zinnia, *Moro Gulf Tsunami of 17 August 1976.*
[1266] Warren, "A Tale of Two Decades", p. 5.

led both reflect how way the Marcos government and the Filipinos view these disasters as both coincidental and a result of God's wrath. The August 1983 Ilocos Norte earthquake coincided with a lot of things about the Marcos regime and the volatile socio-political situation of the era. First, it happened in the Marcos home province, Ilocos Norte, and it forced the government to declare a state of calamity in the province. Second, it happened during the time that Marco's failing health due to lupus erythematous, almost took his life. Third, the year of 1983 was a period of major economic decline due to failed domestic economic policies and global recession. And lastly, it was also the same time that his political arc nemesis from the traditional opposition bloc, Benigno "Ninoy" Aquino, Jr., decided to return and was about to arrive in Manila. Interesting was how the government responded and conducted the relief and rescue operation in Ilocos Norte, in a "hands-on" manner, and at the same time deal with the political storm that was hounding Malacañang Palace during those fateful days of August 1983. Reports coming from government-controlled newspapers projected the rescue and relief operations in Ilocos Norte as a full government response – Marcos, Imelda, and their son, Ilocos Norte Governor Ferdinand "Bongbong" Marcos, Jr., had a complete control of the situation, with the military and the local government unit in full operation to give relief and rehabilitate the province. But, one would ask, given the health condition and the looming political crisis concerning Ninoy Aquino's return, the First Family and the military had another problem to deal.

d.2.1 The earthquake of 02 August 1983: Extent and damage

The documentary sources about the 17 August 1983 earthquake did not expound the role of scientific institutions in the post-disaster programs of the government. The available materials concerning this earthquake, from newspapers to published government reports, have limited information about the extend of the earthquake. The PAGASA, and the Bureau of Mines and Geo-Sciences, produced the two available scientific reports of the August 1983 earthquake.[1267]

On the evening of 17 August 1983, an Intensity VII (Rossi-Forel Scale), Magnitude 5.7 (Richter Scale) earthquake hit the province of Ilocos Norte.[1268] It was felt exactly at 8:18pm, and the epicenter was located to be 430 kilometers north of Manila, approximately in the area of Laoag City, the capital of Ilocos Norte.[1269] The Bulletin published the first newspaper report about the quake, which barely included extensive information about the earthquake, indicating only its extent, and some preliminary data gathered by the PAGASA.[1270] Cities in Luzon felt the tremor and recorded varying intensities: Vigan, Ilocos Sur (Intensity VI), Aparri, Cagayan (Intensity V), Baguio, Benguet (Intensity IV), Dagupan, Pangasinan (Intensity III), Metro Manila (Intensity III),

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[1267] R.G. Valenzuela and L. C. Garcia, *Laoag Earthquake of 17 August 1983 Summary Report* (PAGASA, 10 October 1983); N.G. Santiago and E.A Rillon, *Assessment on the effects of the August 17, 1983 Earthquake in Laoag City* (Bureau of Mines and Geo-sciences, December 1983). Unfortunately, no available copies of these works were found. Only a summary of their finds is available at the PHIVOLCS website <https://www.phivolcs.dost.gov.ph/>.

[1268] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3; "North Luzon hit by strong quake". *Times Journal* 9.298 (18 August 1983): 1

[1269] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.

[1270] "Earthquake". *Bulletin Today* (18 August 1983): 12.

and Puerto Galera, Occidental Mindoro (Intensity I).[1271]Other local reports indicate that the earthquake was also felt other provinces in Luzon, such as Nueva Ecija, Tarlac, Pampanga, and Southern Luzon provinces.[1272] The earthquake was characterized as tectonic, and caused by massive adjustments along the fault line crossing the Ilocos region.[1273] It was compared to be the same as the earthquake that jolted Southern Mindanao in April 1976.[1274] PAGASA Chief Roman Kintarar emphasized that Laoag and the surrounding Ilocos Norte regions are earthquake-prone areas, as they sit on the path of major fault line, along with the western coast of Luzon.[1275] Several days before the 17 August earthquake, two earthquakes were registered in the Ilocos region; one on 11 August, Intensity V, and one on 13 August, Intensity II.[1276]

Map No. 8
Isoseismal map of the 17 August 1983 Earthquake[1277]

[1271] "North Luzon hit by strong quake". *Times Journal* 9.298 (18 August 1983): 1; "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2.
[1272] "North Luzon hit by strong quake". *Times Journal* 9.298 (18 August 1983): 1.
[1273] "Ilocos towns prone to quakes". *Times Journal* 9.299 (19 August 1983): 1,2.
[1274] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.
[1275] "Ilocos towns prone to quakes". *Times Journal* 9.299 (19 August 1983): 1,2.
[1276] Ibid.
[1277]https://www.phivolcs.dost.gov.ph/html/update_SOEPD/1983LaoagEQ/index-laoag.html, Website of the Philippine Institute of Volcanology and Seismology (PHIVOLCS) <https://www.phivolcs.dost.gov.ph/>

The whole province of Ilocos Norte was severely affected by the tremor. The Ministry of National Defense (MND), through the National Disaster Coordinating Council (NDCC) reported that 11 towns of the province were identified to have suffered from the earthquake.[1278] In a survey of the Defense Ministry done three days after the earthquake, they identified 87 major structures destroyed by the quake, and 212 others were partially damaged.[1279] Initial estimates made by Vice Governor Roque Ablan Jr, the damages were estimated at 50 million pesos.[1280] In an unusual assessment, Public Works Minister said that the damage to Ilocos Norte was only minimal, that only a small number of commercial, residential, and government buildings damaged.[1281]

According to the report by the Office of Civil Defense (OCD), Laoag City registered the most number of collapsed and severely damaged infrastructures, which include commercial buildings, municipal and school buildings, libraries and museums, and private houses.[1282] The towns of San Nicolas, Bacarra, Currimao, Batac, Vincar, and Sarrat, President Marcos' hometown.[1283] In Laoag City, the initial survey identified three buildings collapsed, and five bridges destroyed, 12 other structures damaged, including two churches and dozens of houses.[1284] Succeeding reports indicate almost 40 buildings were damaged, many of which were newly constructed.[1285] Three bridges from Laoag City to Sarrat town collapsed, and a 25-meter portion of the highway caved-in.[1286] Majors buildings in the city that suffered included the Llanes Building, Benson Building, Yabes and Juan Building, Goodwill Building, Linus Building, Dempson Building, Tecson Chemical Storage House, the Laoag City Sinking Tower, the Philippine Veterans Bank, and the Laoag City International Airpot.[1287] In the barrios of Alsem and Surog, a landslide buried 45 houses.[1288] Laoag City Mayor Rodolfo C. Fariñas ordered the suspension of classes on19 August, to enable inspectors to check on school buildings which have suffered wall cracks.[1289] Education Minister Onofre D. Corpuz said regular classes in all schools in all Ilocos Norte not suspended, but reported that 150 schools suffered negligible damages and that the Ministry of Education was in a close watch with foreign students who might be affected by the tremor.[1290]City official also ordered the closure of moviehouses for them to inspect their structures.[1291]

[1278] Jose de Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 1, 10.
[1279] "Contractors of collapsed buildings face probe." *Philippine Sunday Express* XII.106 (21 Aug 1983): 1, 6.
[1280] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3; Relief stepped up: 'Bongbong' leads rescue operations." *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7.
[1281] "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2.
[1282] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1283] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.
[1284] Ibid.
[1285] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1286] Ibid.
[1287] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13; "20 still trapped in rubble?" *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7; "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2.
[1288] "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2.
[1289] Ibid.
[1290] De Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 1, 10.
[1291] Ibid.

Photo No. 15
Front Page of Philippine Daily Express, 19 August 1983[1292]

PHILIPPINES CITY EDITION ★★★

Daily Express

VOL. XII NO. 104 3 SECTIONS 24 PAGES 75 CENTAVOS IN METRO MANILA

MABUHAY!

Today is Friday, August 19, 1983

House arrest

DEFENSE MINISTER Juan Ponce Enrile says that should Ninoy Aquino arrive on or before Aug. 21 as he announced, he will be placed under house arrest, says Teodoro F. Valencia. Before Aquino left for the United States, that was his status, he adds. *Over a Cup of Coffee*, Page 4.

Wary stand-off

FRENCH paratroopers and Libyan-backed Chadian rebels were just 100 kms. apart across the Chadian desert yesterday as military commanders maintained a wary stand-off for the fourth day running. In Paris, newspaper *Le Monde* said the overall French troop strength may soon exceed 3,000 men. Page 7.

Back soon

JANICE de Belen is definitely coming back to television soon, but not to "Flordeluna." It's only a matter of time now. The girl who announced her "premature retirement" only two months ago has been swamped with many offers, for TV and the movies, and she is now "sorting out" some of them. *Pastime*, Page 21.

Prrt! Foul!

A YOUNG couple caught making love in a municipal rose garden in Liskeard, England, destroyed three rose bushes and 18 cornflower plants worth eight pounds ($12) at the height of ecstacy. "I was in the wrong, full of beer, and half asleep," prosecutors quoted a British rail worker at telling the police after his arrest. The couple was fined.

Cloudy today

AND finally, the weather: Metro Manila will be cloudy, with brief rainshowers while the rest of Luzon will have generally fair weather, also with isolated rainshowers. Visayas and Mindanao will have occasional rains. Yesterday's extremes: High at 12:55 p.m., 33.2°C; low at 5:30 a.m., 24.0°C. Sunrise today, 5:42; sunset, 6:17. Global weather on Page 2.

Express Index

Rexona Sports Highlights

5th straight win

JESS Hernandez and Felix Fernando worked together for a birdie on the second hole of a sudden-death playoff as Caribbeng edged out Beer Hausen, 2-1, yesterday for the Sweeties' fifth straight victory in the Mizuno-RPGA Corporate Cup golf tournament at Villamor course. Page 16.

AROUND 100 are feared buried in collapsed four-story Kaunlaran building (left) in San Nicolas. Rescue goes on round the clock (above).
PHOTOS BY MANUEL SILVA

QUAKE KILLS 21 IN ILOCOS

100 buried in debris

AT LEAST 21 persons have been reported killed while rescuers searched for some 100 others feared buried in one of three buildings which collapsed during an Intensity 7 earthquake that hit Ilocos Norte Wednesday night.

The temblor, one of the strongest to hit the country in recent years, also destroyed five bridges, damaged 12 other buildings, including two churches and six houses, and hospitalized scores of other persons.

Roads cracked, communication lines were severed and power was cut off in the seven most affected areas – Laoag City, San Nicolas, Bacarra, Currimao, Batac, Vintar and Sarrat, hometown of President Marcos and site of the recent wedding of Irene, the President's youngest daughter, and businessman Greggy Araneta.

THE QUAKE, the strongest since an Intensity 7 tremor jolted Southern Mindanao exactly seven years ago on Aug. 17, 1976, was felt in several other provinces in varying intensities. In Manila, it was hardly felt at Intensity 3.

The tremor, which was recorded at 8:18 p.m., was placed at Intensity 7 in the 9-scale Rossi-Forrel and Intensity 5.7 in the open-

(Please turn to Page 3)

August is earthquake-prone?

WHAT'S with August? At least three of the most devastating earthquakes occurred in August, and approximately seven years apart.

On August 2, 1968, the Casiguran earthquake toppled the Ruby Tower apartments in Sta. Cruz, Manila, and killed 300 persons in the city, the third biggest casualty figure recorded in the Philippines.

Eight years later, on August 17, 1976, the Mindanao earthquake and resulting tidal wave killed almost 4,000 persons, the biggest ever to hit the country but only the second strongest in terms of intensity.

Exactly seven years later, also on August 17, 1983, the Laoag earthquake, with an intensity of 7 in the Rossi-Forrel scale, killed 21 persons (so far) in Ilocos Norte, injured scores of others and toppled and damaged several buildings.

THE STRONGEST earthquake to hit the Philippines occurred in 1955 with an Intensity VIII and devastated Lanao province. Its magnitude of 8.1 was one of the biggest ever recorded in the world.

Only two other earthquakes had a

(Please turn to Page 3)

FR. MARIANO Sarazo and Vice Gov. Roque Ablan Jr. inspect heavily damaged Sta. Monica church in Sarrat, site of the June 11 Araneta-Marcos wedding. Inset is its ruined belltower.

Marcos: RP may review military pacts

...if US Congress tampers with agreed $900-M package

PRESIDENT MARCOS receives Rep. Stephen J. Solarz (D-New York), chairman of the House subcommittee on Asian and Pacific Affairs.

PRESIDENT MARCOS said yesterday the Philippines might press for a review of the whole range of its military agreements with the United States should there be any move to modify the $900-million compensation package under the RP-US military bases agreement.

This statement was made in an hour-long meeting with Rep. Stephen Solarz (D-New York), chairman of the US House sub-committee on East Asian Affairs, at the Malacanang Premier Guest House.

While he did not doubt the approval of the appropriation needed for America's commitment under the bases agreement, Solarz said that some of his colleagues have suggested a possible "reshaping" of the allocations to increase economic assistance and correspondingly decrease military aid.

THE PRESIDENT said that any modification of the allotments would affect Philippine requirements under existing defense plans, which he said have already been drawn up.

Besides, the President said, this would prompt an over-all review not only of the bases agreement but the whole gamut of agreements between the two countries as well as commitments on both sides.

The other two agreements are the Mutual Defense Treaty and the Military

(Please turn to Page 6)

'RED TIDE'

Poisonous algae now in Bicol; 17 reported dead

"RED TIDE" infestation has hit Sorsogon, where three fishermen died and 15 others became ill after eating mussels (tahong) suspected to have been contaminated with the poisonous algae.

The Ministry of Health said yesterday the death toll from the "red tide" is now 17.

The infestation, caused by the planktons, leaves a distinct rusty or dark-brown hue in the water.)

"Health officials said, however, the reports are still unconfirmed

(Please turn to Page 3)

The towns of Sarrat, Bacarra, and San Nicolas followed Laoag as the most devastated in the 11 towns in the province affected by the earthquake. In Sarrat, the Marcos hometown, damaged structured included the Sta. Monica Church, convent, and bell

[1292] *Philippine Daily Express* XII.104 (19 Aug 1983): 1

tower, town hall, Edralin Bridge, the Welcome Arch, the Marcos Museum, the People's Center, the municipal town hall, and schools and health centers.[1293] The Sta, Monica Church was the site of the televised wedding of presidential daughter Irene Marcos and businessman Greggy Araneta, collapsed on both ends, destroying the altar and choir loft, bell tower heavily damaged.[1294] The houses of AFP Chief of Staff General Fabian C. Ver, and Brigadier General Ramon Farolan, both in Sarrat, were damaged; those were renovated for the Irene-Greggy wedding.[1295] In San Nicolas town, government a tragedy as one of the recently built infrastructures in their town, the Kaunlaran Building, collapsed. San Nicolas Mayor Benjamin Madamba denied the reports that 100 persons were trapped inside the Kaunlaran Building.[1296] Many of the trapped tenants in the said building were boarders; apparently, students in Laoag schools, and salesmen from Manila.[1297] In the town of Bacarra, the Catholic Church's leaning bell tower collapsed, and three of the town's bridges were damaged, connecting it to the towns of Pasuquin and Batac[1298] In Vintar town, the quake destroyed a huge water tank and irrigation ditches.[1299]

d.2.2 Bongbong and the Ilocos Norte Provincial Government, and the AFP, the OCD, and the NDCC: Multiple groups, one rescue operation

The regime of Marcos was known and had projected itself as a government of full control. It was known as a regime to have a capacity to use the power of the executive and bureaucracy, and the military and the local government units, to immediately implement its projects. The government, headed by Marcos and pseudo-headed by Imelda Marcos and Gen, Ver, "produced new strategies and techniques of social control, through the development of their vice-like regulation and management of disaster relief."[1300]Putting ethnic affiliation and local political tutelage as factors, the government put into maximum use all of its resources to bring relief to the people of Ilocos Norte, and immediately rehabilitate it from the suffering caused by the killer earthquake. Indeed, it saw the light of quick and full-government response. But looking thoroughly with the reports published in government-controlled newspapers, one can observe two things: (1) there is an evident competition and distribution of work amongst "power groups" that led various rescue operations, and (2) there is an apparent attempt to hide the non-presence of Ferdinand and Imelda Marcos in the scenes, a contrast to the default template of hands-on father-mother tandem in times of disasters.

The Philippine Daily Express reported on 19 August 1983 that the President mobilized yesterday the entire government machinery to assist victims, and that the relief and rescue operations are in full swing under the supervision of his son, Gov. Ferdinand "Bongbong" Marcos, Jr., assisted by Public Works Minister Jesus Hipolito and other

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[1293] "20 still trapped in rubble?" *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7.
[1294] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.
[1295] "20 still trapped in rubble?" *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7; "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1296] Jose de Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 10.
[1297] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1298] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3; "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1299] Ibid.
[1300] Warren, "A Tale of Two Decades", p. 14.

officials.[1301] The young Marcos, visited the disaster-stricken sites, Laoag City and seven other towns, and on the same day, personally supervised the food distribution, and medical relief operations.[1302] In a report sent to his father, Governor "Bongbong" said that the situation is under control, and that priority in rescue and relief operations in the recovery of victims at the collapsed Kaunlaran building in San Nicolas town.[1303] The Ilocos Norte governor created an emergency task force named "Paglingap", which was composed of members from the provincial and city and town governments, the AFP, the Philippine Constabulary, the Ministry of Social Services and Development (MSSD). Full government authorities were tapped and performed their functions as needed.

The MPWH dealt with the immediate order of the President to bring all heavy equipment from nearby towns and provinces to Ilocos Norte, to hasten the rescue work.[1304] They sent a 25-man team to help in the rescue operations; equipped with jackhammers, compressors, acetylene torches, and electric generator as power lines was damaged.[1305] Government engineers also inspections, and immediate repair of roads and bridges while heavy equipment was mobilized to clear debris.[1306] The ministry also accepted the offer of the Association of Structural Engineers of the Philippines (ASEP) to check the designs and construction of buildings that either collapsed or damaged and help the government in determining on what building should be condemned.[1307]

The MSSD immediately implemented the distribution of the P100,000 fund for the victims of the earthquake, particularly the 265 families in Laoag City.[1308] An operations center was set up in Laoag, to distribute relief goods, and for shelter for the displaced people, such as the 2000 residents of Pagudpud left their homes due to threats of the rising sea level and big waves.[1309] The MSSD also coordinated to the Ministry of Health (MOH), which was able to send a truckload of medicines and a team of doctors, which included Dr. Jose Pujalte, the head of the National Orthopedic Hospital, to assist in the relief operations.[1310]

The relief mobilized the AFP personnel and people from different barangay in Ilocos towns; the army engineer brigade was tapped to speed up the repair of buildings.[1311] A

[1301] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 3.
[1302] "Relief stepped up: 'Bongbong' leads rescue operations." *Philippine Daily Express* XII.105 (20 Aug 1983): 1; De Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 1, 10; "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2.
[1303] "Relief stepped up: 'Bongbong' leads rescue operations." *Philippine Daily Express* XII.105 (20 Aug 1983): 1; De Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 1, 10; "Quake death toll now 24", "Ilocos situation under control", *Times Journal* 9.300 (20 August 1983): 1,2.
[1304] Ibid., p. 3.
[1305] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1306] "100 missing in quake found". *Times Journal* 9.301 (21 August 1983): 1,6; "Ilocos towns prone to quakes". *Times Journal* 9.299 (19 August 1983): 1,2
[1307] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1308] "Contractors of collapsed buildings face probe." *Philippine Sunday Express* XII.106 (21 Aug 1983): 1, 6.
[1309] "Quake death toll now 24". *Times Journal* 9.300 (20 August 1983): 1,2; "100 missing in quake found". *Times Journal* 9.301 (21 August 1983): 1,6.
[1310] "Quake death toll now 24". *Times Journal* 9.300 (20 August 1983): 1,2; De Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 10.
[1311] Ibid; "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.

five-person team of scientists from PAGASA was sent to Ilocos Norte and surveyed the area for their disaster preparedness program, which included Rolando Valenzuela, Senon Dejan, Edna Capulong, Angeles Doniego, and Isidro Berganio.[1312]

On 20 August 1983, on the fourth day of the province-wide rescue work, there was a need to step up the rescue operations. The head of the military initiated a separate mobilization. General Ver launched the Task Force "Damayan", and tasked Brig. General Victoriano Asada, PC-Region 1 Commander, as overall in charge.[1313] The task force was composed of the military and the police forces: The Ilocos Norte Philippine Constabulary, the Integrated National Police (INP), the AFP Corps of Engineers, the regional civil relations services, the Public Works Ministry, and other vital government services.[1314] The President had earlier tasked the AFP to make its military transportation and other facilities available for the disaster operations.[1315] The Ministry of Defense, through the NDCC kept a close watch of the situation as well.[1316] Together with another agency that is supposed to be designated to act in times of calamities, the OCD, the Defense Ministry and the NDCC coordinate with agencies for information low to the media. These agencies, together with the Philippine National Red Cross (PNRC), released updated information about casualties and injuries and news about the rescue and relief operations.[1317]

The post-rescue scenario all led to a probe of what caused the collapse of the Kaunlaran Building in San Nicolas town, as well as other buildings in Laoag City. Three agencies formed separated teams to investigate the engineers and contractors of the buildings that collapsed: the Ilocos Norte Provincial Government, San Nicolas Municipal Government, and the Ministry of Public Works.[1318] The Kaunlaran Building, a display center for cars and lodging houses of students and sales associates, was built two years ago and was worth 4 million pesos.[1319] Authorities verified that most of the materials used in the Kaunlaran Building were below standard; the collapse was due to inferior construction materials. The said investigation tried to pattern the way the local government responded like that of the 1968 Ruby Tower tragedy.[1320] San Nicolas Mayor Benjamin Madamda said that he would file criminal charges against the designers and contractors.[1321] Vice Governor Roquito Ablan said that they would investigate the designers and contractors of 10 other buildings that collapsed during the quake.[1322] A province-wide checking of buildings was also conducted to identify those that should be condemned due to the government engineers' concern that many buildings suffered

[1312] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1313] De Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 1, 10.
[1314] Ibid.
[1315] "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2.
[1316] De Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 1, 10.
[1317] "North Luzon hit by strong quake". *Times Journal* 9.298 (18 August 1983): 1; "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2; "20 still trapped in rubble?" *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7; "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1318] "Contractors of collapsed buildings face probe." *Philippine Sunday Express* XII.106 (21 Aug 1983): 1, 6.
[1319] Ibid.
[1320] Ibid.
[1321] Ibid.
[1322] Ibid.

damages.[1323] The Defense Ministry reported that in the whole province, the quake destroyed 87 major structures, and 212 were damaged partially.[1324] The Public Works Ministry tapped the service of private structural engineers to inspect buildings.

Based on reports from state newspapers, there were quite a few support generated from the private sector for this particular disaster. Regarding monetary donation, two organizations handed over financial help for the victims of the earthquake. The Federacion Internacional de Abogados (FIDA) Philippine branch started a fund campaign; they raised 15,000, as per SEC Commissioner Rosario N. Lopez. [1325] The Federation of Filipino-Chinese Chambers of Commerce and Industry (FFCCCI) turned to Ilocos Norte a check worth 100,000 as a donation, represented by one of its members, by Ralph Nubla.[1326] For workforce support, several mining companies from Benguet joined the rescue efforts in Ilocos Norte, in Laoag City and San Nicolas specifically.[1327] It is also observable that based on available documentary sources; there was no international support or foreign aid offered and delivered to the victims. Furthermore, scientific reports and studies about the said earthquake were rare or were not made at all.

d.2.3 Casualties, survivors, and the Marcos Family

A journalist described the August 1983 calamity in Ilocos Norte in this manner: "The earthquake tested Ilocano resiliency, and indeed it does."[1328] The tremor caused the death of dozens of individuals, most of which were trapped in collapsed buildings in San Nicolas and Laoag City. The Times Journal called these towns as "haven of dead" due to the relatively large number of dead people caused by the quake.[1329] Injuries and other casualties survived the earthquake either during the tremor or after their rescue. Identification of the dead was difficult. Indeed, the stories from newspaper reports reflect this perspective of the disaster. The government-controlled media portrayed the stories of survival as stories of hope, which included the account of the injured and survivors of the killer quake, and the way the Marcoses projected themselves as a caring family, and ready to conquer the adds to personally visit the victims, despite the subtle admission of an open secret regarding Ferdinand's health condition. It was the propaganda "formula" used by the regime to project a government of efficiency.

The first reports about the earthquake indicate that it killed almost 20 people, and caused the injuries of scores of people.[1330] In Laoag, authorities reported ten casualties, including two people named Erlinda Ang-Co, 23 years old, and daughter Valerie, who were both pinned in a rubble of a 3-story Benson Building.[1331] According to Conrado Co, they just finished their dinner when they heard thunderous sounds, then suddenly

[1323] Ibid.
[1324] Ibid.
[1325] De Vera, “Death toll now 16 in Ilocos quake.” *Bulletin Today* 130.20 (20 Aug 1983): 1, 10.
[1326] Ibid.; “100 missing in quake found”. *Times Journal* 9.301 (21 August 1983): 1,6
[1327] De Vera, “Death toll now 16 in Ilocos quake.” *Bulletin Today* 130.20 (20 Aug 1983): 1, 10.
[1328] Red Batario, “Resiliency of Ilocano comes to fore”, *Philippine Sunday Express* XII.106 (21 Aug 1983): 1.
[1329] “Quake kills 18 in Ilocos”. *Times Journal* 9.299 (19 August 1983): 1, 2.
[1330] “Quake kills 21 in Ilocos: 100 buried in debris.” *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.
[1331] Ibid.

glasses and things began flying.[1332] He told, together with nine other people, he climbed out of the collapsed building that his father owns.[1333] At the Leaño Building, rescuers found 29 year-old Rodolfo Cadloa dead, while three other individuals were injured.[1334]Injured individuals, numbering 17, were brought to Ilocos Norte Provincial Hospital in Laoag City and Mariano Marcos General Hospital in Batac; they were Estanislao Leaño, Larry Agbayani, Nelson and Stenill Bellado, Estenelli and Nemy Billedo, Estanislao Lim, Rolando Concepcion, Luna Matias, Melecio Yadao, Imelda Duldulao, Mariel Amina, Nancy Co, Yadao Kukol and his wife, Paolo Ang and his sone, Clarissa Makalutas, Arthur Abor, Lourdes Robles, Anuela Kalibo, Luna Matias, and Eulogio Bala.[1335]

The bulk of the rescue operations was on the 4-story Kaunlaran Building in San Nicolas where 110 persons, most were boarders – students and agents of a Manila-based firm were trapped after the relatively new building collapsed due to the intense ground movement.[1336] After the first day of search and rescue operations, rescuers pulled out seven bodies of the debris, including Rolie Concepcion, a salesman from Manila, who died a few hours after being rescued.[1337]On the second day, authorities rescued six more survivors, and they believed 50 more people were trapped inside the twisted Kaunlaran Building.[1338]

Various government agencies engaged in rescue and relief operations stated different numbers of casualties after several days since the killer quake. On 20 August, The NDCC reported 16 persons dead and 48 injured persons, but the MSSD said that there were 17 deaths and 190 injured individuals.[1339] The AFP and MND and NDCC, as well as the PNRC reported 21 persons were killed.[1340] The table below, whoich compiled all reports, indicate that there were 19 deaths cause by the earthquake.

[1332] "Glass, things began flying". *Times Journal* 9.299 (19 August 1983): 1,3.
[1333] Ibid.
[1334] Ibid.
[1335] "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13; "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2.
[1336] Ibid.; Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.
[1337] Ibid.; "Relief stepped up: 'Bongbong' leads rescue operations." *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7.
[1338] "Relief stepped up: 'Bongbong' leads rescue operations." *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7; De Vera, "Quake rescue work stepped up." *Bulletin Today* 130.21 (21 Aug 1983): 1, 10.
[1339] De Vera, "Death toll now 16 in Ilocos quake." *Bulletin Today* 130.20 (20 Aug 1983): 1, 10.
[1340] "20 still trapped in rubble?" *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7.

Table No. 23
List of casualties of the 17 August 1983 Ilocos Norte Earthquake[1341]

Name	Age	Location	Cause of Death
Erlinda Ang-Co	23	Laoag	Pinned down in Benson Building
Valeri Ang-Co	2	Laoag	Pinned down in Benson Building
Rodolfo Cadloa	29	Laoag	Pinned down in Leaño Building
Rudy Cadillon	19	Laoag	Pinned down in Dempson Building
Jose Colcol		Laoag	
Consolacion de la Cruz			
Rolando Concepcion	27	San Nicolas	Pinned down in Leaño Building
Manuel de la Candaba (Calzado?)		San Nicolas	Severe injuries
S.M.U. Canedo		San Nicolas	Severe injuries
James Ignacio		San Nicolas	Severe injuries
Manuel Ignacio		San Nicolas	Severe injuries
Donato Mateo		San Nicolas	Severe injuries
Patricia Ventomela		San Nicolas	Severe injuries
A certain Cañedo		San Nicolas	Severe injuries
A certain Belen, a housemaid		San Nicolas	Severe injuries
Feliza Lorenzo		Sarrat	Severe injuries
Maria Rumpawa (Rimpon?)		Sarrat	Severe injuries
Isabel Zuñiga		Vintar	Severe injuries
Agnes Ignacio		Unknown	Severe injuries
19 Individuals			

Stories of survival vary in detail, but all lead to the archetypal accounts highlighting hope and miracle. Eduardo Santos, a salesman trapped in the collapsed Kaunlaran Building tells how thankful he was to a kitchen appliance for saving his life:

> I couldn't understand why, but I did it. I just held into the refrigerator when the earthquake hit. My five children and my wife were already screaming, but I held on to that machine. Then the ceiling fell in but was checked by the refrigerator. My right middle finger was caught in between, but I wrenched it free. Then we just found ourselves outside of the crazily tilting place.[1342]

Santos added prayers saved them and helped them see the light, literally:

[1341] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.;"Relief stepped up: 'Bongbong' leads rescue operations." *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7.;"20 still trapped in rubble?" *Philippine Daily Express* XII.105 (20 Aug 1983): 1, 7; "13 dead as quake hits Ilocos". *Bulletin Today* (19 August 1983): 1, 13.
[1342] Red Batario, "Refrigerator saved 7 lives." *Philippine Daily Express* XII.105 (20 Aug 1983): 7.

> There were moans and shrieks there were mumbled prayers, there was a lot of crying and please for help…Then he said a little later, someone pointed to a ray of light coming from a crack in the building and everyone was roused. Looking for the source of light, he said they knocked down bits of pieces of wood and debris that got in the way, always groping, toward the direction where the light was coming from.[1343]

Through this, authorities reported that almost 60 people, mostly salesclerks and dealers from Manila, found their way out of the collapsed building, and miraculously survived the disaster.

Another "miracle" happened in Bacarra town. The Sta. Monica Church, the Spanish period church, and the site of the presidential daughter's wedding a few months before the quake were severely damaged. What awed and astonished the residents of Bacarra was that the 300-year old statue of Santa Monica, the town's patron, which fell from a three-story perch, still had an intact face.[1344] Inside the Bacarra church, parishioners scrawled notes on plaster-covered pews saying “Lord, forgive us: and “We love you, Lord.”[1345]

The President, and Imelda Marcos, who happened to be the Minister for Human Settlements, both have indicated, through the media release, that they were managing the situation in a hands-on manner. First, they “summoned” and ”“sent” their son, Bongbong Marcos to personally oversee the relief and rescue operation, making it a special task, despite the latter being the head of the provincial government unit of the Ilocos Norte as its governor. Also, the Marcos couple repeatedly indicated, in the days after the earthquake, that they were “ready to fly to Ilocos Norte if needed.”[1346] His first formal statement published in print media says: "The President extended his and the First Lady's condolences to the families of those who died in the catastrophe and assured the victims that the government was marshaling all its resources to help them."[1347]

The President added that said he sent “personal handwritten notes” to each of the families of the victims. In his message to the earthquake victims, the President said:

> The First Lady and our children join me in expressing our deepest sympathies to the many men, women, and children who have suffered so much from the tragedy that struck Laoag and other cities and towns in Northern Luzon last night, With the earthquake victims and their loved ones, we deeply feel their sense of anguish in this unhappy time. And we are anxious and hopeful that we will swiftly recover from the devastation inflicted on our families, our homes, our towns, and cities. To the injured and the dispossessed, I say: Your President and brother commiserate

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[1343] Recto L. Mercene, “Moans, prayers, all over”. *Times Journal* 9.299 (19 August 1983): 1,2.
[1344] “Quake kills 21 in Ilocos: 100 buried in debris.” *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.
[1345] Ibid.
[1346] “Quake kills 18 in Ilocos”. *Times Journal* 9.299 (19 August 1983): 1, 2; Rescue Work underway, FM extends condolences to victims *Bulletin Today* (19 August 1983): 1.
[1347] “Quake kills 21 in Ilocos: 100 buried in debris.” *Philippine Daily Express* XII.104 (19 Aug 1983): 3.

> and suffered with you during these tragic hours, and offers earnest prayers for your speedy relief and recovery. Let me assure you that every agency of the government is doing all it can to accelerate rescue operations, provide immediate relief to the injured and the sick, and rehabilitate damaged public facilities and properties. No effort will be spared to save lives and to bring the situation to normal."[1348]

During the Marcos years, several meanings and mentalities on hazards and disasters floated. Warren (2013) argues that "indeed, by the 1980s, newspaper findings suggest that Ferdinand and Imelda Marcos attempted to impose the notion of the wrath of God on the storm-ravaged people and flood victims in order to justify the failure of relief efforts and circumvent the new pressures put on their politically beleaguered government by repeated typhoon strikes."[1349] The regime saw the disasters of the 1970s and 1980s as an opportune time to show one clear propaganda slogan of the authoritarian rule – the creation of a compassionate society, through a government that cares and caters to the needs of the people affected. In the case of the August 1983 Ilocos Norte earthquake, they showed to their Ilocano supporters that they would not be left behind by the government in times of disasters. With the controlled flow of information through the regime-sanctioned media, it seemed that everything in the operations went well, not unlike the 1968 Ruby Tower tragedy wherein there were lapses in the rescue operations. The "invisibility of flaws", especially in calamity rescue operations, cannot be said to be present in the Philippines at this point. The controlled media focused on the smoothness of the response, and the loving care and concern of the Marcos family.

d.3 The Days of August 1983: The Situation in Ilocos Norte, and Marcos and Ninoy Aquino

Since the second week of August 1983, the Malacañang Palace had been restless and never been quiet. The political arch nemesis of the dictators was on his way back to the Philippines. Marcos himself was experiencing failed tests for his supposed kidney transplant on that month. A killer quake rocked his home province. In the midst of the rescue operations in Ilocos Norte, another earthquake, a political one, happened at the tarmac of the Manila International Airport on 21 August 1983.

On 13 August 1983, Ninoy Aquino, one of the most vocal critics of the Marcos regime from the traditional opposition, decided to go back to the Philippines after several years of a voluntary sojourn to the United States. Using a fake passport, he traveled for almost a week, with several layovers in different states and countries, from Boston and Los Angeles in the United States, and to Singapore, Hong Kong, and Taiwan, until he reached Manila on 21 August 1983. Sans the flowering reason of heroism and nationalism, pragmatically, Aquino decided to go home because of one main reason – the opposition needed a leader in an eventual power vacuum because of the "nearing" death of Ferdinand Marcos. As early as the first months of 1983, Aquino already had information about Marco's failing health. Various sources indicate that Marcos underwent

[1348] Ibid.; "Quake kills 18 in Ilocos". *Times Journal* 9.299 (19 August 1983): 1, 2; Rescue Work underway, FM extends condolences to victims *Bulletin Today* (19 August 1983): 1.
[1349] James Warren, "A Tale of Two Decades: Typhoons and Floods, Manila and the Provinces, and the Marcos Years", *The Asia Pacific Journal* 11.43 (3), p. 13.

a kidney operation on 07 August 1983, and he was recovering when Aquino started his trip back home.[1350] In a recorded phone interview between Aquino and close friend, businessman Steve Psinakis, the former informed the latter that he had received information from people in Manila that all the medical tests that Marcos undergone all failed, and that his scheduled kidney transplant operation will not push through.[1351] Imelda Marcos also revealed the health condition of Marcos in a separate interview years after his death, describing that when Aquino arrived in Manila, Marcos was not sick, but was dying.[1352] In an account by Raymond Bonner (1987), Marcos had a meeting with two American congressmen, and one of his guests recounted that he "looked awful" – eyes were teary, face was puffy, and was obviously in pain.[1353] On a different note, according to Jovito Salonga, former Senator and longtime oppositionist politician, recalls why Aquino decided to come home:

> "… Ninoy was getting impatient in Boston; he felt isolated by the flow of events in the Philippines. In early 1983, Marcos was seriously ailing, the Philippine economy was just as rapidly declining, and the insurgency was becoming a serious problem. Ninoy thought that by coming home, he might be able to persuade Marcos to restore democracy…"[1354]

As history has told for decades, Aquino, upon arrival at the MIA, was arrested by the members of the Aviation Security Command (AVSECOM) and was shot to death while going down the plane. That fateful day of 21 August 1983 was to be remembered, as the day Ninoy Aquino became a martyr and a hero. His family held a public display of his remains at their house in Quezon City; he was buried on 30 August 1983 at the Manila Memorial Park in Parañque, south of Metro Manila. The funeral march, which started from the Sto Domingo Church in Quezon City, was attended by almost two million people deemed to be a prelude to the people's uprising in EDSA three years later.[1355]

The day after the assassination, Marcos promised that a thorough investigation would be conducted to "track down all those responsible."[1356] A fact-finding commission was formed to investigate the assassination, composed by Supreme Court Chief Justice Enrique Fernando, former Justice Felix Antonio, and Batasang Pambansa Speaker Querube Makalintal.[1357] After a short period, the President dissolved the commission due to severe public criticism.

[1350] Raymond Bonner, *Waltzing with a Dictator: The Marcoses and the Making of American Policy* (New York: Times Books, 1987), p. 340.

[1351] "Ninoy's last recorded phone call before returning to Manila" https://bit.ly/2Kveu7P>, Date accessed: 31 October 2018.

[1352] "Batas Militar! Martial Law in the Philippines" <https://bit.ly/2SexQkt>, Date accessed: 31 October 2018.

[1353] Bonner, *Waltzing with a Dictator*, p. 349.

[1354] Jovito Salonga, "The Greatest President We Never Had", "Mga Kulay ng Kalayaan: The Story of Liberal Party and the Philippine Nation in Colors" <https://bit.ly/2RaF3Sr>, Date accessed: 31 October 2018.

[1355] Raissa Robles, "Ninoy's funeral was the day Filipinos stopped being afraid if dictators", ABS-CBN News Online, 26 August 2014 <https://bit.ly/2Kveu7P>, Date accessed: 31 October 2018.; Colin Campbell, "A million Filipinos line the Aquino funeral route", The New York Times, 01 September 1983 <https://nyti.ms/2Sbfd0F> Date accessed: 31 October 2018.

[1356] "Marcos: We'll track down all those responsible", *Philippine Daily Express* (22 August 1983): 1.

[1357] "Inquiry open to opposition", *Times Journal* (26 August 1983).

But what this event has to do with the Ilocos Norte earthquake? First, newspapers repeatedly reported that the government was hands-on in the rescue and relief operations in the province. Newspaper reports detailed that the authorities created several task force to address the needs of the people affected by the killer quake, particularly the ones headed by Bongbong Marcos and Gen. Ver. But coinciding with the events related to the Aquino assassination, one, or I suppose, many of the people of that time, especially in Metro Manila, did not absorb much of the way the government has projected itself as micromanagers in the Ilocos Norte calamity rehabilitation. One will tend to believe that they were busier with the political earthquake that shook them on 21 August. In fact, they tried to send a message to the people, through the newspapers, that they will use force to prevent the people from protesting or sympathizing with the death of Aquino. Veteran journalist Raisa Robles claims, "The propagandists behind the August 23 *Daily Express* front page also probably did not see the supreme irony behind having a sidebar with the word “Mabuhay” and a news item on the First Lady Imelda being “irked by traffic” beside a picture of the body of a murdered enemy of the regime…the assassination made the public sense for the first time how much it was being lied to by the government.”[1358] The perennial phrase used by the Marcoses in several newspaper reports: “The President said that he, and First lady, Imelda R. Marcos, were prepared to fly to the area if necessary”, was a tactical assurance to the people of Ilocos Norte that they wanted to be there, only that they were expecting something to happen, or something to arrive in Manila during those days. Of course, this was beside the fact that Marcos was bedridden at that time, so it was impossible for him to go to Ilocos Norte personally. Moreover, this also belied one fact that other state-controlled newspapers have reported in the past days since the earthquake struck on 17 August - that Bongbong Marcos was Ilocos Norte personally managing the rescue operations.[1359] Bonner (1987) had this account:

> Seeming to support the theory that Marcos did not order the killing at the airport is an incident that is to have occurred at the Malacañang when Imelda Marcos walked in on her husband after the news of the Aquino’s murder had reached him. Marcos reacted furiously; throwing something that struck his wife high on the cheek, just below the eye, raising a bruise. She went into a rage; the account goes, throwing and breaking hundreds of thousands of dollars worth of antiques. **She also remained out of sight for several days.** Was Marcos angry that Aquino had been killed? Or was he reacting so furiously because the job had been botched? [Emphasis mine]

Second point to ponder on is that the military and constabulary were reported to be very much present in the rescue operation in Ilocos Norte. That like Bongbong, Gen. Ver led a specific task force to hasten the operations. But given the volatile political situation in Manila, one might wonder how accurate the reports were. One may ask what would be the priority of the regime founded on the strength of its policing and military might, the tragedy in the dictator's home province, or the looming tension in the capital city that might cause the fall of the regime?

[1358] “FL Irked by Traffic”, Philippine Daily Express (23 August 1983); cited from Robles, “Ninoy’s funeral was the day Filipinos stopped being afraid of dictators”.
[1359] Ibid.

Photo No. 16
Front page of the Philippine Daily Express, 22 August 1983

Daily Express

Marcos: We'll track down those responsible

MABUHAY!

445458 wins P620,000

AQUINO SHOT DEAD

Security men kill assassin

AVSECOM

Welcomers shocked by slay news

Resiliency of Ilocano comes to fore

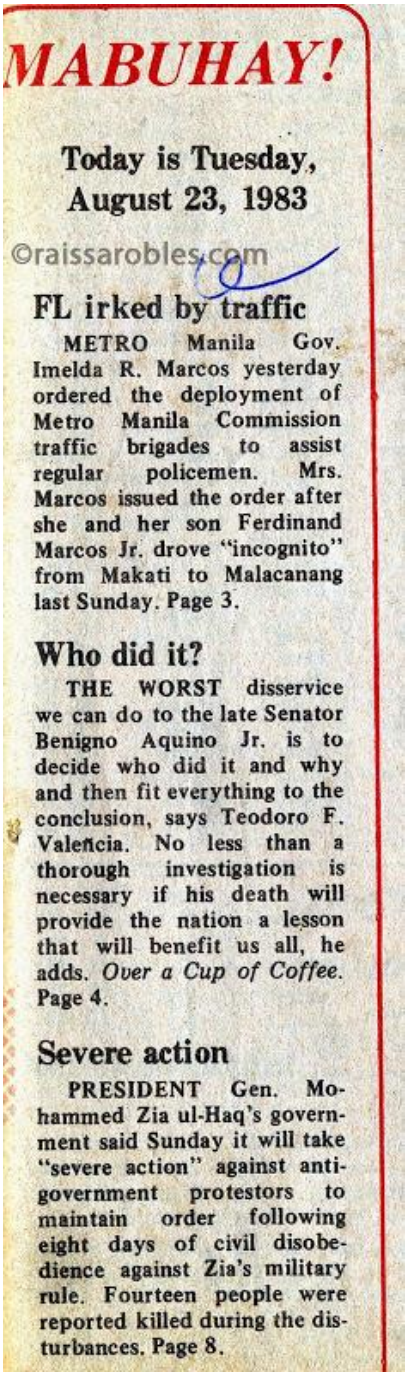
EYEWITNESS ACCOUNT

'I saw blood coming out'

Aliens edge out Filipino seamen

Photo No. 17

"FL Irked by Traffic", Philippine Daily Express, 23 August 1983[1360]



MABUHAY!

Today is Tuesday, August 23, 1983

FL irked by traffic

METRO Manila Gov. Imelda R. Marcos yesterday ordered the deployment of Metro Manila Commission traffic brigades to assist regular policemen. Mrs. Marcos issued the order after she and her son Ferdinand Marcos Jr. drove "incognito" from Makati to Malacanang last Sunday. Page 3.

Who did it?

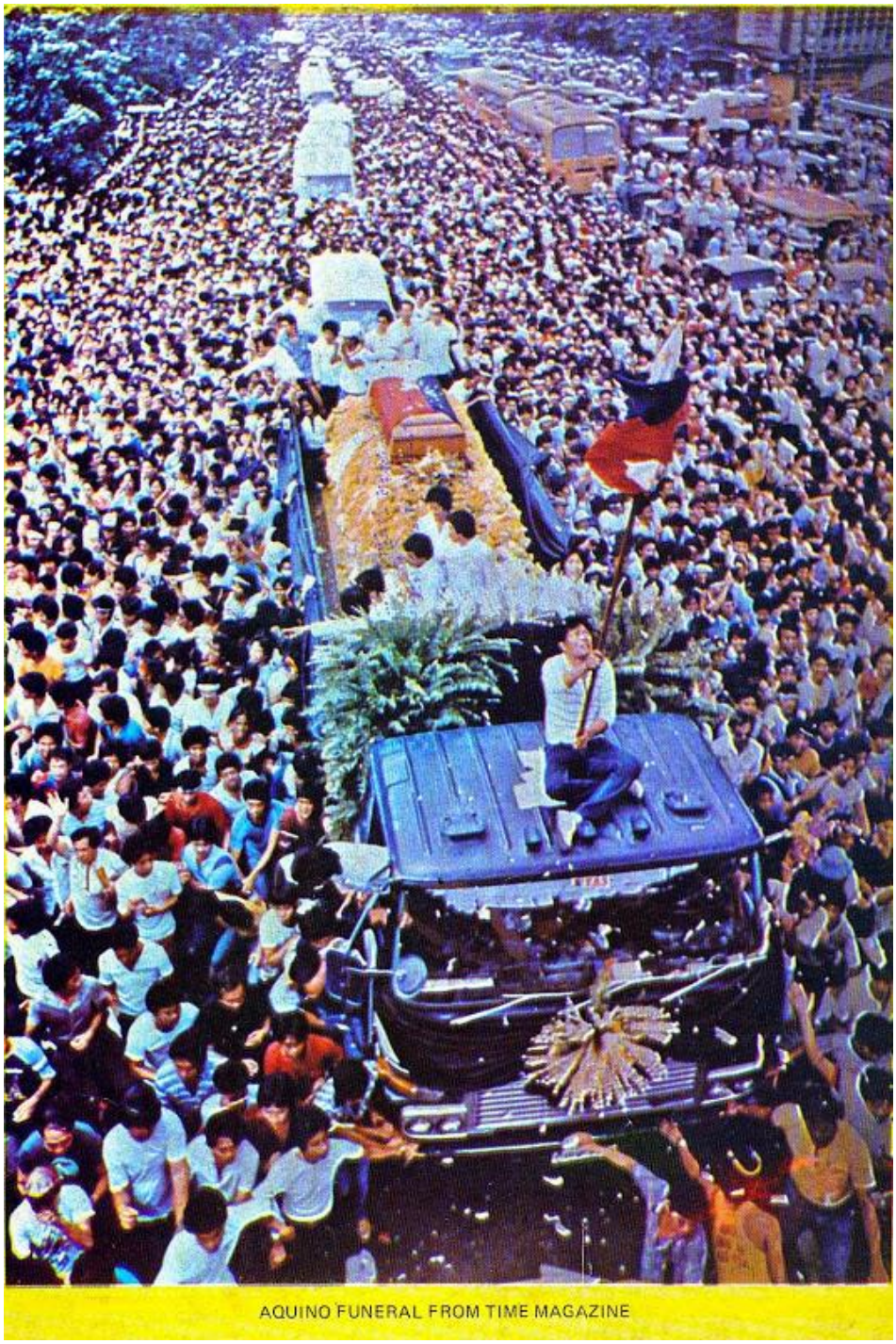
THE WORST disservice we can do to the late Senator Benigno Aquino Jr. is to decide who did it and why and then fit everything to the conclusion, says Teodoro F. Valencia. No less than a thorough investigation is necessary if his death will provide the nation a lesson that will benefit us all, he adds. *Over a Cup of Coffee.* Page 4.

Severe action

PRESIDENT Gen. Mohammed Zia ul-Haq's government said Sunday it will take "severe action" against anti-government protestors to maintain order following eight days of civil disobedience against Zia's military rule. Fourteen people were reported killed during the disturbances. Page 8.

[1360] Cited from Robles, "Ninoy's funeral was the day Filipinos stopped being afraid of dictators".

Photo No. 18
Ninoy Aquino Funeral, 31 August 1983[1361]



AQUINO FUNERAL FROM TIME MAGAZINE

[1361] Photo from *Time Magazine,* cited from Ibid.

d.4 The 17 August earthquake and the Marcos-Araneta "Royal Wedding"

The August 1983 earthquake is an example of a textbook disaster response. It is also a manifestation of the way the state used media to manage information flow, to project a notion of proper use of government resources in times of calamities, and to show and assure the public of the readiness of the government to respond to the needs of the disaster-stricken area. One cannot observe any problem or disruptions in the rescue operations made. This fact can be substantially related to how the government managed the information flow on a different tragic event in 1981, the collapse in the construction of the Manila Film Center. Apparently, despite it being a disaster where the government acted on a national level, it did not create a nationwide level of consciousness to the people. Instead, people focused their attention on the political events in Manila despite the government's attempt of media blockade on it.

Another significant aspect of the earthquake is that it is a continuation of a "royal wedding" that happened two months before. The wedding of the president's youngest child, Irene Marcos, to businessman Greggy Araneta on 11 June 1983, "offered an irresistible opportunity to show to the Filipinos and the world that the Marcos-Romuladez royal families could stage a wedding as grand, as luxurious, as impressive as that any of the world Monarch and in the process establish their own dynasty."[1362]Hernando Abaya, a leftist journalist, points out that Imelda's hand can be seen in every aspect of the elaborate *mise-en-scene* – from the venue, a replication of the Westminster Abbey replicating the Charles-Diananuptial, to the breakfast-luncheon a ala French monarch, to the carefully screened 1,000-person guest list, to the cultural symbols it wanted to portray, all to showcase a grand union of Filipino aristocracy, oligarchs, cronies, and elites.[1363] The wedding at Santa Monica Church in Sarrat, Ilocos Norte, which caused almost a million dollars of people's taxes, just to fulfill Imelda's dream of pageantry for every important event in their family's life.[1364] Imelda Marcos reportedly spent $20 million of government funds to create a royal wedding. Seagrave (1988) recalls:

> She transformed the local church into a cathedral, laid on twenty-four additional Philippine Airline flights, and ferried the eighty-six-piece Philippine Philharmonic Orchestra to Sarrat. With the help of Kurt Waldheim of Austria and King Hasan of Morocco, she imported a silver carriage from Vienna and seven white Arab stallions from Rabat for the bride's ride to the church."[1365]

The wedding was indeed a projection of the "blueblooded-ness" of the Marcos family, and a nuptial that tried to reconcile political differences with the Araneta family, a long term Marcos rival, as the former were part of the "old elite" Marcos' New Society challenged, demonized, and replaced with by his own group of oligarchs. This grandeur of a wedding is a clear manifestation of a satirical yet apt description of the habit of excessiveness and extravagance in public events, which was coined after her –

[1362] Gleeck, Jr., *President Marcos and the Philippine Political Culture*, p. 215.
[1363] Ibid., p. 216.
[1364] James Hamilton-Paterson, America's Boy: The Marcoses and the Philippines (Quezon City: Anvil Publishing, 1998), p. 421.
[1365] Sterling Seagrave, *The Marcos Dynasty: The Incredible inside story behind the corruption of Ferdinand and Imelda Marcos and the involvement of American business, organized crime, the CIA, the Pentagon, and the White House* (New York: Fawcett Columbine, 1988), p. 391.

Imeldific. But the idea of the imeldific is not just a manifestation of wealth, but also of megalomania and institutionalization of beauty as part of national memory (Chua, 2008-2009)[1366], and power and edifice complex (Lico, 2003).[1367]

Critics of the regime consider the wedding as a pretentious attempt to legitimize a myth of greatness and grandeur the Marcos family has claimed for a long time. And indeed, they found an unlikely ally to destroy this pretentious legacy. The 17 August earthquake was seen by a lot of anti-Marcos activists as "karma", revenge of God, as the million-dollar transformation was gone in a matter of minutes. Segrave adds, "…two months later an earthquake hit the Ilocos, killing twenty and demolishing the church. Local people took it as an omen."[1368] Barely three months after the church was renovated, it was put into shambles by the 17 August earthquake. Nature has its funny way of telling that extravagance had to stop, and the memory of an ostentatious wedding, a complete opposite of the real economic condition of the country at that time but remain faceless in the pages of the past. The following photos show the fate of the Santa Monica Church during the Marcos-Araneta wedding on 11 June 1983, and its destruction after the 17 August 1983.

Photo No. 19
The Irene Marcos-Greggy Araneta Wedding, 11 June 1983[1369]

Photo 19.1: Carriage Procession outside the Santa Monica Church

[1366] Michael Charleston B. Chua, "Ang Imeldific: Representasyon at Kapangyarihan sa Sto. Niño Shrine sa Lungsod ng Tacloban", *Philippine Social Sciences Review* 60-61(1-2).
[1367] Gerard Lico, *Edifice Complex: Power, Myth, and Marcos State Architecture* (Quezon City: Ateneo de Manila University Press, 2003).
[1368] Ibid.
[1369] From the Facebook page of Imee Marcos, <https://bit.ly/2PS4Im5> Date accessed: 31 October 2018.

Photo 19.2: Carriage carrying Irene Marcos and Greggy Araneta

Photo 19.3: The Marcoses: Ferdinand (left), Irene (center), and Imelda (right, not facing)

Photo 19.1: Irene Marcos and Greggy Araneta inside the Santa Monica Church

Photo No. 20

Ilocos Norte Governor Bongbong Marcos inspecting Santa Monica Church in Sarrat town[1370]

ILOCOS NORTE Gov. Ferdinand R. Marcos Jr. inspects the damage on Santa Monica church in Sarrat with sister Mrs. Irene Marcos-Araneta, Public Works Minister Jesus Hipolito and Deputy Minister Aber Canlas and other officials. Irene was married in the 400-year-old church.

[1370] "Quake kills 21 in Ilocos: 100 buried in debris." *Philippine Daily Express* XII.104 (19 Aug 1983): 1, 3.

d.5 Intertwined work: PAGASA, and COMVOL and PHILVOLCS

At this point, we can briefly tackle how the dynamics of the government in terms of its instutional responsed evolved during the Marcos years. The study of earthquakes was a task of the Philippine Weather Bureau since the established of the new Philippine Republic in 1946. The Philippine Weather Bureau existed as an all-in-one scientific agency focused on meteorology, seismology, volcanology, and other environmental and geological sciences. A series of volcanological phenomena in 1951 and 1952 prompted the establishment of a national agency focused on the volcanology. These were the eruption of Mt. Hibok-Hibok in northern Mindanao and the formation of the Didicas Volcano on the northeastern coast of Luzon. Given these events, which was no doubt made headlines, reinforced the need to have a state-level agency that will be at the forefront of monitoring and addressing concerns and preparations for imminent volcanic eruptions. With the growing necessity for a national body for volcanology, the government created the Commission on Volcanology. Passed on 20 June 1952, Republic Act No. 766, known as *"*An Act to safeguard life and property against volcanic eruptions and dangers by creating a Commission on Volcanology and providing relief for victims of such calamity, and for other purposes*"*[1371] became the legal basis of the Comvol. The government placed the Comvol under the Executive Board of the National Research Council of the Philippines (NRCP). As legislated, it was composed of different government officials and bureau heads concerned with the science of volcanology: the Director of the Bureau of Mines, the PWB Director, the Chairman of the Section on Geology, Seismology, and Volcanology of the NCRP, and a representative of the Geological Society of the Philippines.[1372] Less than six months after the act was passed, on 16 December 1952, the commission fully functioned as a government agency.[1373]

Though seismology was an essential branch of the COMVOL's work, come 1972, it was institutionalized to be part of the revitalized weather bureau, Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA). This agency, established through Presidential Decree No. 78, was placed under the Department of National Defense.[1374] All matters regarding earthquakes and other seismological concerns were under the mandate of PAGASA.[1375]The need for a more scientific approach to the government's efforts to mitigate disasters brought about by natural hazards compelled the transfer of PAGASA from the Defense Ministry to the NSTA. By virtue of the Executive Order No. 984 issued on 17 September 1984, PAGASA was placed under NSTA supervision.[1376] The transfer has an impact on PHIVOLC's functions.

[1371] *Laws and Regulations passed during the Third Session and Sixth and Seventh Special Sessions of the Second Congress of the Republic of the Philippines in 1952*, Volume 7, Republic Acts Nos. 674 to 833 (Manila: Bureau of Printing, 1953), pp. 262-264.

[1372] *Laws and Regulations passed during the Third Session and Sixth and Seventh Special Sessions of the Second Congress of the Republic of the Philippines in 1952*, p. 262.

[1373] *Annual Report of the Commission on Volcanology, Fiscal Year 1969-1970* (Quezon City: National Research Council, 1970).

[1374] Presidential Decree No. 78: Establishing the Philippine Atmospheric, Geophysical, and Astronomical Services Administration, *Vital Documents in the New Society: All General Letters of Instructions and Presidential Decrees from November 26, 1972 to January 25, 1973*, Volume 3 (Manila: Central Book Supply, Inc, 2004), p. 57.

[1375] See Sections 3c, 4b, and 4c, *Presidential Decree No. 78*, pp. 58-59.

[1376] See Executive Order No. 984: Transferring the Philippine Atmospheric and Geophysical and Astronomical Services Administration to the National Science and Technology Authority,

Indicated in Section 3 of the said order the National Geophysical and Astronomical Office, a division of PAGASA, was merged with PHIVOLC, adding seismology as one of its scientific turf.[1377] The order thus provided for the centralization of seismological studies and researches in the institute; the agency was then known as Philippine Institute of Volcanology and Seismology (PHIVOLCS).[1378]

The year 1982 was a turning point in the history of major scientific agencies in the Philippines. During this year government restructured the National Science Development Board (NDSB), the highest policy-making and supervising body for science and technology development in the country and gave them additional powers and mandate. On 17 March 1982, President Marcos issued Executive Order No. 784 reorganizing the NDSB and its agencies into a National Science and Technology Authority (NSTA).[1379] The reorganization of NDSB into NSTA was based on a prior decree issued in 1978, the Presidential Decree No. 1416, which grants the President to reorganize national government offices as he sees it as a necessity for administrative function growth.[1380] The establishment of NSTA was founded on imperative that scientific and technological efforts are geared to meet the demands of economic and social development and that the results of such endeavors to be appropriately applied and utilized for the benefit of the Filipino people.[1381] With this, it was an essential move to transform science and technology institutions of the government into revitalized science and technology machinery under the general direction of the NSTA.[1382]

Given these institutional shuffling and institutionalization of scientific micromanagement, one can infer that the government can directly act on the scientific needs in times of disasters, through proper monitoring of environmental hazards that control it. But the politics of the era made the supposed transition to expanded work of science to the public made it more complicated and ministerial; thus, these agencies couldn't maximize their work, for example, in response to the August 1983 earthquake in Ilocos Norte.

Providing for its reorganization, and for other purposes, The LawPhil Project <https://bit.ly/2zsCLqT>, Date accessed: 31 October 2018.

[1377] Ibid.

[1378] *Annual Report of the Philippine Institute of Volcanology and Seismology (PHIVOLCS) 1984*, (Quezon City: National Science and Technology Authority, 1985), p. 1.

[1379] Executive Order No. 784: Reorganizing the National Science Development Board and its agencies into a National Science and Technology Authority and for related purposes, *Philippine Presidential Decrees and Other Vital Legal Documents*, Volume 86 (Manila: Central Book Supply, Inc., 2004), pp. 89-102.

[1380] Presidential Decree No. 1416: Granting continuing authority to the President of the Philippines to reorganize the National Government, *Philippine Presidential Decrees and Other Vital Legal Documents*, Volume 55 (Manila: Central Book Supply, Inc., 2004), pp. 34-35.

[1381] Executive Order No. 784, *Philippine Presidential Decrees and Other Vital Legal Documents*, Volume 86, p. 89.

[1382] Ibid., pp. 89-90.

e. The 1990 earthquake: A “Fiscal Earthquake” and a “Political Tremor”

In contemporary Philippine history, it is considered that the July 1990 Baguio earthquake is the most devastating tragedy in the country's recent past. It a major test to the "new" political order, as the calamity struck the country during the years of transition from a dictatorial regime to a democracy. Though it happened four years since the administration of Corazon Aquino started, it was a litmus test to her government's capacity to respond to such a huge calamity, given the fact that the country's economy at that time was facing major fiscal nightmare due to the problems left by the previous regime.

As the restored democracy came close to half a decade, calamities such as the June 1990 Baguio earthquake indeed challenged the Philippine state in terms of responding in a centralized. Manner. The nature of the new government after 1986 was designed to decentralize power and to give proper checks and balances amongst co-equal branches of the government. The more than three years old constitution was beginning to stand on its own as the basis of the country bureaucratic set-up. And indeed, the way the Aquino government handled the situation shows an apparent lack of direct control of the institutions, agencies, and state mechanism in responding to disasters, Not that the dictatorial regime had a better response to calamities, but the bureaucratic order of after 1986 made it difficult for the government and the society, in general, to cope with the needs of the devastated areas, adding to the equation the factor that was the financial shortage the country was facing since the late 1980s. As Bello, et. al (2009) argue, the post-EDSA system was a picture of an “anti-development state”, characterized by (1) paying debts by borrowing, (2) failure to deliver economic prosperity and problematic economic leadership, (3) protest from the middle class and alienation if the masses, (4) and a depressed market due to disconnected economic programs of debt servicing, labor export, neoliberalism, and selective liberalization of the economy.[1383]

Aside from the fiscal problems, the June 1990 earthquake did not let the Aquino government get a little bit of rest from the political turmoil it has been facing since 1986. The Aquino leadership, with Cory and his loyal military officials, namely Defense Secretary Fidel V. Ramos and AFP Chief of Staff Renato de Villa were recovering from the fourth and almost successful coup-de-etat (or rather the most successful in series of those) that happened in December 1989. This was of course coincided with other political uprising the government was taking care off – the continued revolutionary struggle of the Communist Party of the Philippines, through its group the New People' Army (NPA), and the secessionist movements in Mindanao led by the Moro Islamic Liberation Front (MILF) and the Moro National Liberation Front (MNLF). Furthermore, even though President Aquino continued to have quite high popularity among the majority of the Filipinos, the politics of the period was still polarized, between the "Corystas" waving the "L" (Laban) sign, and the "Loyalistas", or the fanatics of the deposed Marcos regime. Indeed, the famous label to the present, that serves both a joke and criticism of her administration – "Calamity Cory', was somehow an apt term for these tumultuous years. The June 1990 Baguio earthquake was projected not only as a disaster caused by a natural hazard but a calamity that revealed the underlying political and economic problems of the country. The prevailing macho politics of the late 19th century Philippines reinforced the taunting of a woman president, experiencing

[1383] Walden Bello, et al., *The Anti-Development State: The Political Economy of Permanent Crisis in the Philippines* (Pasig: Anvil Press, 2009).

catastrophic period in the last years of her highly praised "EDSA" government. Disasters reveal the societal grammar of an era.

e.1 The June 1990 earthquake: Intensity and extent

e.1.1 Intensity and magnitude

On 15-16 July 1990, two major earthquakes rocked western Visayas and central-northern Luzon, respectively. In Panay Island, a 6.2 magnitude earthquake, centered underground just northwest of Kalibo, Aklan.[1384]Authorities reported several deaths in several provinces in the island, such as in Gulasi, Antique, and Cuartero, Capiz. Related to the ground movement, a flashflood spawned by a tornado in Zamboanga del Norte on Tuesday causing a total of 65 deaths.[1385]Provincial officials declared a state of calamity in the said province; hardest hit was Jose Dalman town, with 51 persons initially reported dead, and 60 houses were carried away and destroyed by floods.[1386] The Philippine Constabulary-Integrated National Police was tasked to lead local government agencies undertaking rescue and relief operations for the said provinces.[1387] Four months prior, an Intensity VI earthquake rocked the Visayas, centered on Camiguin Island, and was also felt in Cebu, Negros, and Bohol islands, and the northern Mindanao city of Cagayan de Oro.[1388] PHIVOLCS said that the earthquake had no connection to the abnormal condition of the volcanoes Kanlaon in Negros Island and Bulusan in Sorsogon.[1389]

The other one was a 7.7-magnitude (US Geological Survey) and Intensity VII (PHIVOLCS and NDCC) earthquake estimated to be 10 kilometers southeast of Cabanatuan City in Nueva Ecija province.[1390] The first shock happened at exactly 4:26pm on 16 July; Metro Manila, Cabanatuan City, and Baguio City strongly felt the tremor; but the extent of the quake reached Northern Luzon and the Bicol Region, and caused a tidal wave in the La Union coastline, in Agoo town.[1391] Officials described it as "an earthquake with a strength of 3 atomic bombs" and "strongest quake to hit the country in 22 years," referring to the earthquake in 1968 that caused the collapse of the Ruby Tower in Manila.[1392]There was a 120-kilometers long major rupture between Gabaldon in Dingalan bay and Kayapa, 30 kilometers east of Baguio City.[1393] There was

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[1384] "Four killed in Panay temblor." *Manila Times* XXXII.167 (16 June 1990): 1; "Quake, flood death toll: 65." Manila Bulletin 210.16 (16 June 1990): 1, 17.
[1385] "Quake, flood death toll: 65." Manila Bulletin 210.16 (16 June 1990): 1, 17.
[1386] Ibid.
[1387] Four killed in Panay temblor." *Manila Times* XXXII.167 (16 June 1990): 1.
[1388] "22 hurt in Visayas quake." *Manila Times* XXXII.40 (9 Feb 1990): 1,7.
[1389] Ibid.
[1390] "68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1, 6; Eddee R. H. Castro, "Quake hits Luzon; 30 confirmed dead." *Manila Bulletin* 211.17 (17 July 1990): 1, 18.
[1391] Eddee R. H. Castro, "Quake hits Luzon; 30 confirmed dead." *Manila Bulletin* 211.17 (17 July 1990): 1, 18; 68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1, 6.
[1392] "68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1.
[1393] Giovanni Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo: Descriptions, effects, and lessons learned* (Presidenza del Consiglio del Ministri, 1994), p. 40.

also major liquefaction occurred in the Pangasinan and Tarlac Provinces, 70 kilometers long and 20 kilometers wide.[1394] Roads in the Central Plain, between Dagupan and Tarlac and near Lingayen Gulf, were severely affected by the liquefaction-induced effects.[1395] Major bridges in Central Luzon collapsed, and long stretches of concrete highways were severely damaged, making them impassable and cutting off many municipalities from commercial travel.[1396] River facilities, parapets, and protective structures, in general, suffered widespread damage due to ground shaking or to lateral spreading induced by liquefaction; sewerage networks were almost entirely disrupted in cities affected by this liquefaction.[1397] Dams were also damaged in various ways: Ambuklao and Binga in Benguet, Masiway, and Pantabangan in Nueva Ecija.[1398] Of the public utilities, the electricity network was the most badly hit. Numerous poles were tilted, and the electricity supply was interrupted for days and even weeks in some of the remotest areas.[1399] The National Power Corporation (NAPOCOR) announced that power was cut off in many areas, as damages were seen in Binga Hydroelectric Plant which resulted to the cut of power supply in Northern Luzon for hours a day; other plants such as Calaca, and Sucat 2 and 3 were also affected.[1400]

Rantucci (1994) argues that "…the earthquake caused limited damage in the epicentral area in comparison to Baguio City and the towns along Lingayen Gulf where damages were severe…The destructive effects of the earthquake on the zone west of the ground rupture were exacerbated by the countless landslides which affected the Caraballo Mountains and the Central Cordillera."[1401] The Sierra Madre and Cagayan Valley Basin in the eastern side of the Luzon were displaced northwestward; as a result, many bridges, barriers, and undulations along faults in the Central Valley basement and the Cordillera were progressively sheared off during the six months after the main quake.[1402]

Provinces in Luzon felt varying earthquake intensities : in Cabanatuan, Intensity VIII, in Manila and Baguio, Intensity VII, in Quezon City and Ilocos Sur, Intensity VI, in Tuguegarao, Cagayan, Intensity IV, in Ilocos Norte and Bicol region, Intensity III, and the earthquake's jolter was felt in Palo, Leyte, at Intensity I.[1403] Volcanologists said that Cabanatuan City had registered as high as 8.2 Intensity on the Richter scale.[1404] Seismologists did expect more aftershocks for one week up to one month because of the earthquake's movement nature.[1405]

[1394] Ibid., p. 41.
[1395] Ibid., p. 59.
[1396] "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1397] Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo,* p. 59.
[1398] Ibid.
[1399] Ibid.
[1400] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. "Death toll: 223; calamity declared." *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1401] Ibid, p. 58.
[1402] Ibid., pp. 90-96
[1403] Ibid.
[1404] Dante Solano, "It was 8.2 in Cabanatuan." *Manila Bulletin* 211.18 (18 July 1990): 1, 21
[1405] Ibid.

Map No. 9
Earthquake Intensity Map of the 16 July 1990 Earthquake[1406]

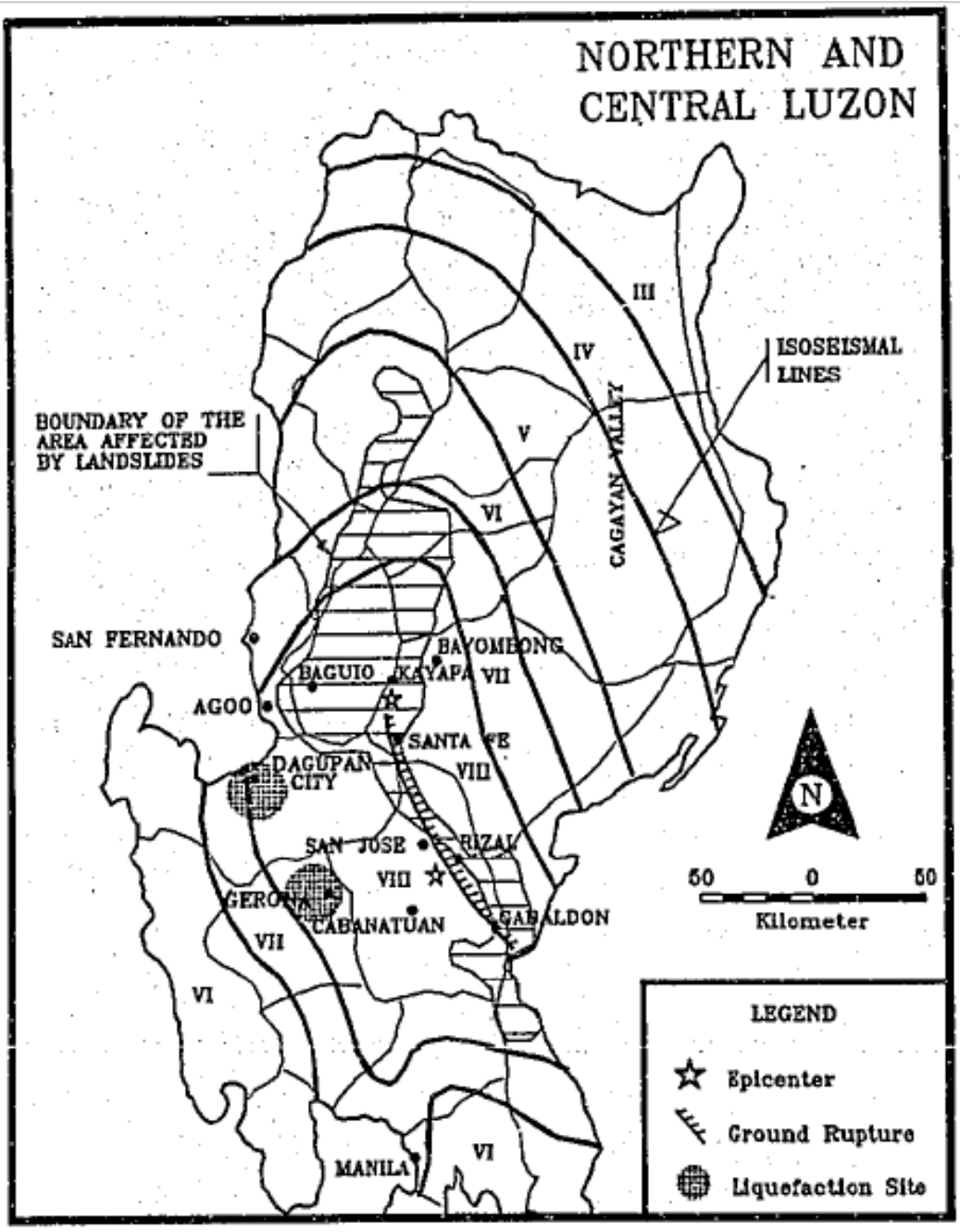


Fig. 4.16 – *Earthquake Intensity Map based on the Rossi-Forel Scale (Appendix C). Adapted from Punongbayan and Torres (1990).*

[1406] Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo*, p. 56.

Map No. 10
The 16 July 1990 Earthquake Rupture[1407]

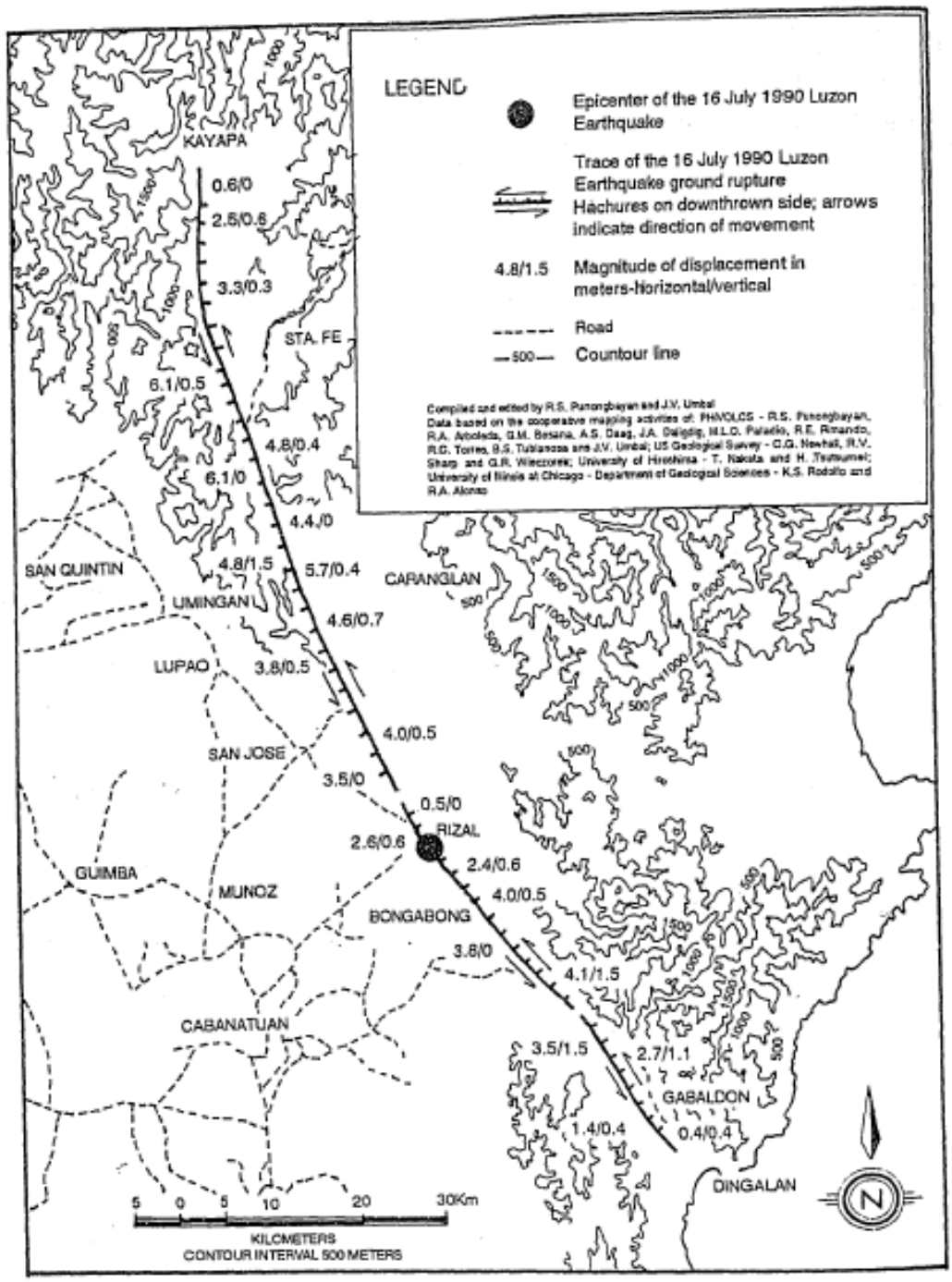


Fig. 1. The 16 July 1990 Luzon earthquake rupture (After Punongbayan and Umbal, 1990).

[1407] *The July 16, 1990 Luzon Earthquake: A Technical Monograph. Inter-Agency Committee for* Documenting and Establishing Database on the July 1990 Earthquake, 1992.

The extent of the earthquake's damage in the whole island of Luzon can be seen in how it hampered the economic activities of the region. Post-disaster scientific studies point out that nearly 100,000 houses suffered damage, 40% of which were virtually destroyed.[1408] Over two million people suffered from the effects of the earthquake, becoming homeless or jobless as a result of the damage to buildings, infrastructures and local activities; the agricultural potential of the region and the physical environment were drastically affected.[1409] Damage to agriculture, irrigation and drainage system, transportation and telecommunication, power and water supply, and property losses was almost incalculable at first glance. Damage to property and economic losses run into billions of pesos. Below is a summary made about the cost of damage the earthquake caused to the country:

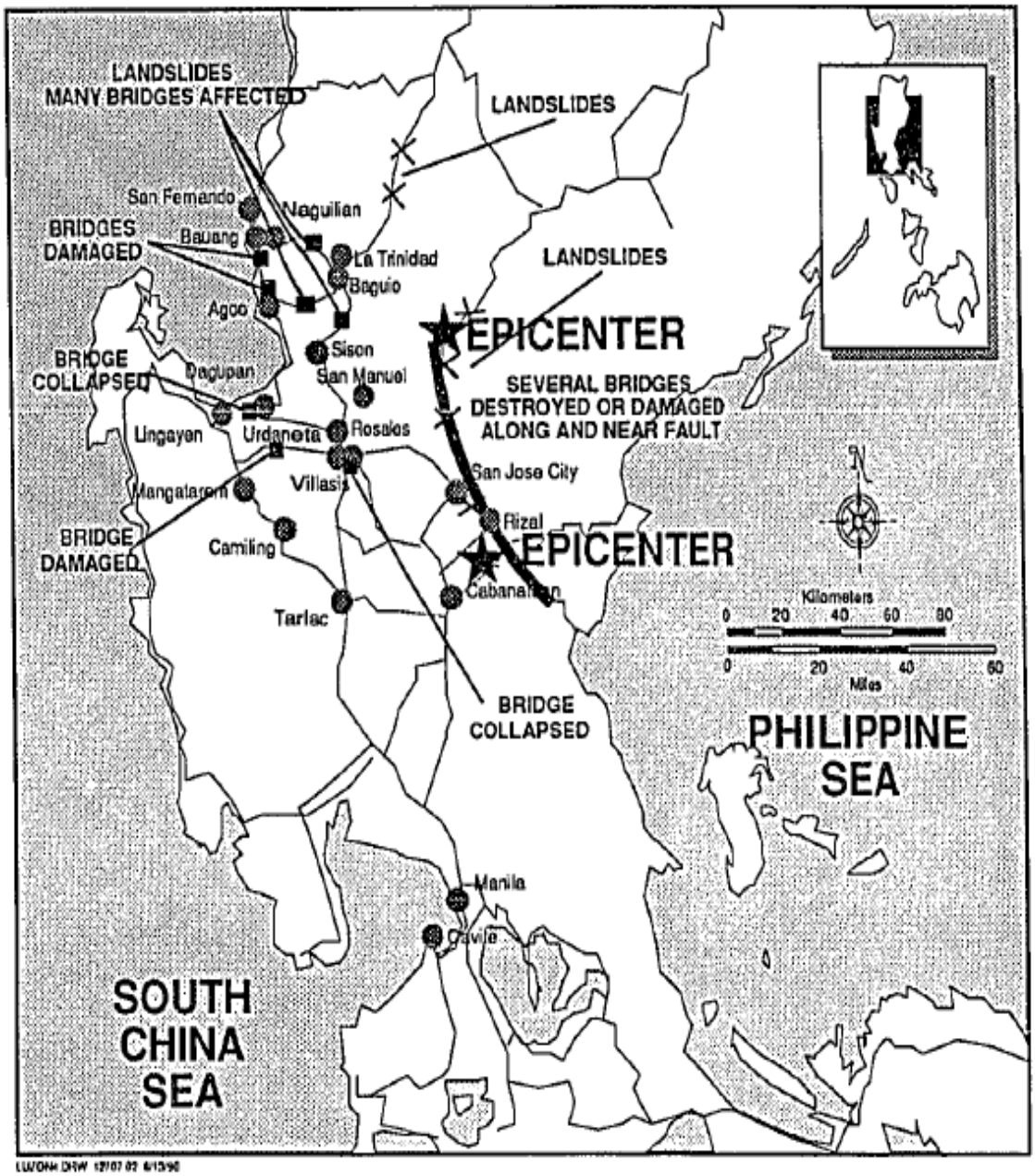
Table No. 24
Estimated Damage of the 16 July 1990 Northern Luzon Earthquake [1410]

	Total Amount (USD Million)		Estimated Amount in Philippine Pesos**
Agriculture		57.0	1,425,000,000
Crops	22.0		
Fisheries	16.3		
Livestock	1.6		
Irrigation	4.0		
Others	13.1		
Infrastructure		273.8	6,845,000,000
Roads/higways.bridges	138.9		
Schools/hospitals.government buildings	134.9		
Private Property		158.2	7,161,400,000
Industry and commerce, mining, and tourism		148	3,700,000,000
Industry and commerce	103		
Mining	21.1		
Tourism	22.9		
TOTAL		670	16,750,000,000

** Exchange Rate was at 1 $US = 25 Philippine Pesos

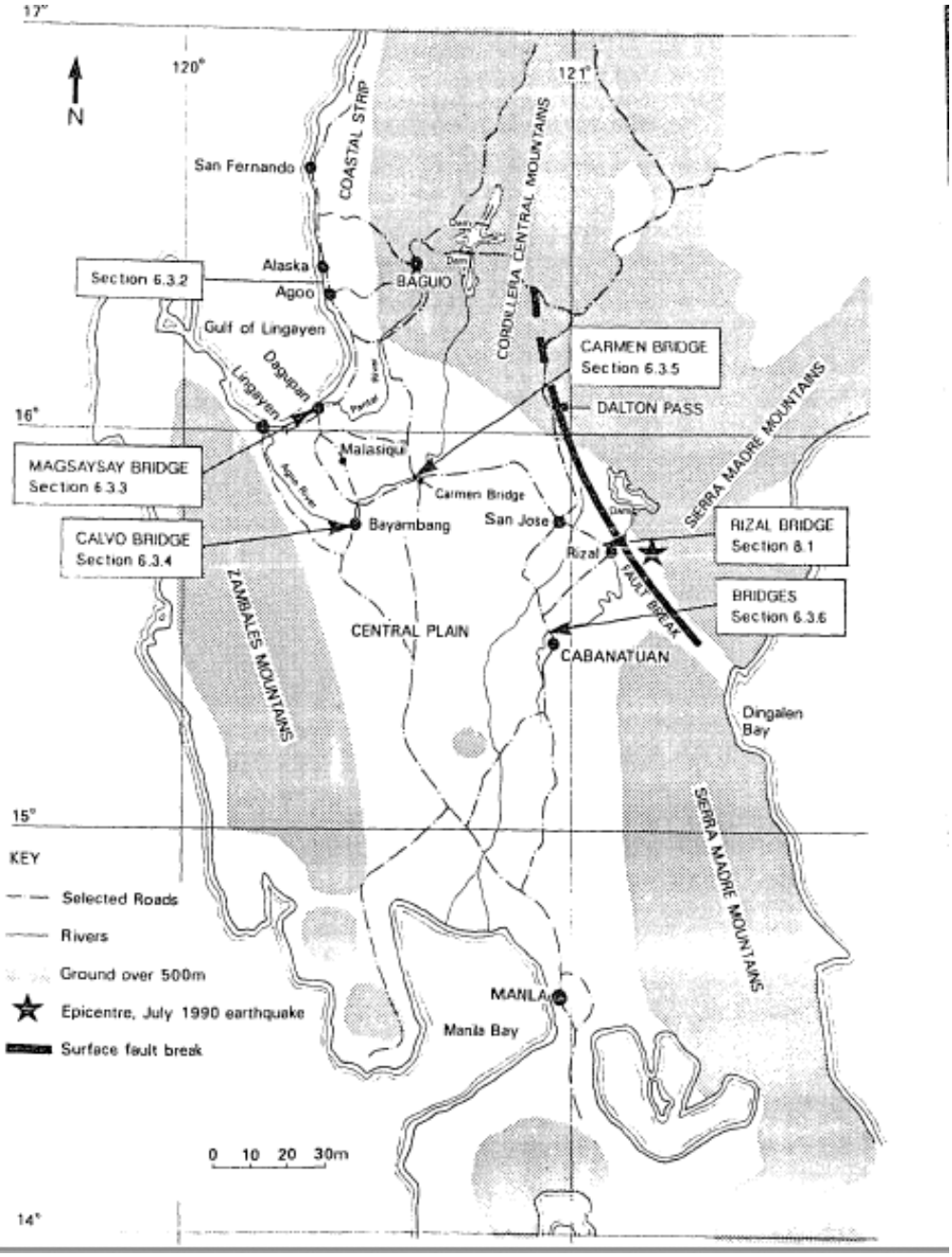
[1408] Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo*, p. 59.
[1409] Ibid., p. 41.
[1410] Ibid., p. 125.

Map No. 11
Damaged roads and bridges in northern and central Luzon after the 16 July 1990 earthquake[1411]



Map 11.1: A map from the report *The July 16, 1990 Philippines Earthquake*

[1411] *The July 16, 1990 Philippines Earthquake, California: EQE Engineering, 1990*; E. D. Booth, A. M. Chandler, P. K. C. Wong, and A. W. Coburn, *The Luzon, Philippines Earthquake of 16 July 1990: A Field Report by EEFIT*. London: Earthquake Engineering Field Investigation Team, 1991.



Map 11.2: a map from the report *The Luzon, Philippines Earthquake of 16 July 1990: A Field Report by EEFIT*

e.1.2 The situation in Baguio and Cabanatuan after the earthquake

The earthquake hit the cities of Baguio in Benguet and Cabanatuan in Nueva Ecija. The two cities turned to be warzone after the first major shock – buildings collapsed, authorities were responding but with a clear direction who to prioritize, and the people were clueless an in trauma. It was doomsday in the two cities upon realizing the extent of the destruction the earthquake had caused.

One journalist expounds: "The picture of the country's picture pretty summer capital is now a picture of helplessness and horror…Oldtimers say the city looks uglier today than after the carpet-bombing before Liberation in 1945. What's worse is the horror of death and the sense of helplessness that now grip its residents."[1412]All initials reports considered the July 1990 Baguio earthquake destruction to Baguio city as the worst in its history. The city was cut off from direct traffic flow due to landslides. All roads leading to and from Baguio, such as Kennon Road, and Naguilian and Marcos Highways, up to the interior of upland Cordillera, were rendered impassable.[1413] Aside from landslides, authorities reported accidents in these thoroughfares. A Dangwa bus carrying 41 passengers fell off a ravine along Kennon Road, while other vehicles may have been under the massive pile of rock and land that covered the roads.[1414] Communications network in between cities, in Baguio city specifically, was bogged down as almost all the lines of the Philippine Long Distance Telephone Company (PLDT) lines were all broken and damaged.[1415]

Major buildings, most of which were high-rise hotels and large infrastructures, collapsed. Initial reports indicate that the main skyscrapers of the mountain city either collapsed severely damaged. These include the hotels Hyatt Terraces Hotel, Nevada Hotel, Baguio Park Hotels, FRB Hotel, Hilltop Hotel, Skyworld Building, Aurora Theater the University of Baguio, and the almost two dozens of facilities of the Baguio Export Processing Zone (BEPZ).[1416] Authorities closed half of Session Road to traffic due to collapsed buildings.[1417] The quake damaged private homes estimated in more than two hundred.

Thousands of residents were reluctant to spend the night in their homes or in high-rise structures where they stay; this caused a panic that drove tens of thousands of residents to tents and makeshift beds at Burnham and Wright Parks, and other open spaces like the GSIS grounds.[1418] These people who camped out to open spaces also included almost 300 patients of the Baguio General Hospital.[1419] The Catholic Church in Baguio even held a Sunday mass in Burnham Park because of the volume of people asking for divine intervention to keep them safe in those perilous times.[1420] Tourists and conference attendees flocked the Loakan Airport hoping that there would be flights that can fly them out of the city, but the airport's runway was damaged heavily, preventing from aircraft

[1412] Bex Viñaviles, “Baguio in Ruins.” *Philippine Graphic* 1.7 (30 July 1990): 10.
[1413] Isidro M. Chammag, “Baguio suffers its worst quake.” *Manila Bulletin* 211.18 (18 July 1990): 1, 11.
[1414] “Earthquake!” *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1415] Isidro M. Chammag, “Baguio suffers its worst quake.” *Manila Bulletin* 211.18 (18 July 1990): 1, 11; Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1416] Ibid.
[1417] Dana Batnag, “After the Big Quake.” *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1418] Ibid.; “Earthquake!” *Philippine Graphic* 1.7 (30 July 1990): 4-5; Bex Viñaviles, “Baguio in Ruins.” *Philippine Graphic* 1.7 (30 July 1990): 10; Dana Batnag, “After the Big Quake.” *Philippine Graphic* 1.8 (6 August 1990): 4-5; Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1419] Isidro M. Chammag, “Baguio suffers its worst quake.” *Manila Bulletin* 211.18 (18 July 1990): 1, 11; Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1420] Dana Batnag, “After the Big Quake.” *Philippine Graphic* 1.8 (6 August 1990): 4-5.

landings.[1421] Those who have reached Poro Point in La Union could only cry in happiness after escaping the nightmare that Baguio City had become.[1422] Officials estimated it would take 20 years for the city's airport to fully recover as a fully functioning one.[1423] At the University of Baguio, students clamber down ropes to flee the damaged buildings as aftershocks continue to rock the ground.[1424]

Post-earthquake and aftershock induced accidents happened almost every succeeding day after the main tremor on 16 July. Two days after the earthquake struck, subsequent aftershocks caused the eventual collapse of the BEPZ plant, where 150 workers were trapped inside.[1425]Authorities reported that 16 people, 13 of them children, were killed in the gold mining area of Philex Mining Corporation in Benguet, in additional were several homes of miners caved in.[1426] Preliminary reports gathered by news outlets indicate 800-1000 people were trapped in 21 hotels and other buildings and rescue operations was hampered by lack of equipment's, resulting in a slow recovery of bodies and rescue of survivors.

Cabanatuan, same as Baguio, was in severe chaos as the earthquake heavily damaged the city. The city registered an Intensity VIII[1427] and magnitude 8.2 earthquake.[1428]Some experts likened the situation to the 1645 earthquake in Luzon.[1429] One journalist describes as situation as: "The stretch of rotting flesh fills the air of a city that weeps of its children and cannot be comforted, because they are no more."[1430]

School buildings, movie theaters, and commercial establishments such of Christian Colleges of the Philippines (CCP) and Central Luzon State University, Jade Theater, and business infrastructures in the downtown area of the city collapsed. A total of 65 people were reported dead in the province of Nueva Ecija, 45 were from Cabanatuan City.[1431] In the town of San Jose, nine people were reported killed, and a collapsed bridge cause partial disruption in the movement inside the city.[1432]

The focus of the attention in Nueva Ecija was on the collapsed CCP. Initial reports say that an estimated 250 to 300 students and teachers were trapped inside the building.[1433] Survivors were sent to Paulino J. Garcia Memorial Research and Medical Center

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[1421] Bex Viñaviles, "Baguio in Ruins." *Philippine Graphic* 1.7 (30 July 1990): 10; Dana Batnag, "After the Big Quake." *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1422] Ibid.
[1423] "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1424] Dana Batnag, "After the Big Quake." *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1425] "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1426] Ibid.
[1427] "68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1, 6.
[1428] Dante Solano, "It was 8.2 in Cabanatuan." *Manila Bulletin* 211.18 (18 July 1990): 1, 21.
[1429] Cesar M. Carpio, "Earthquake Country." *Philippine Graphic* 1.7 (30 July 1990): 11.
[1430] Ody Fabian, "Cabanatuan's Nightmare." *Philippine Graphic* 1.7 (30 July 1990): 6.
[1431] "68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1, 6.
[1432] Owen Masaganda and Nick Sagmit, "250 students trapped in rubble. Over 40 confirmed dead." *Manila Bulletin* 211.17 (17 July 1990): 5.
[1433] Ibid.; Ody Fabian, "Cabanatuan's Nightmare." *Philippine Graphic* 1.7 (30 July 1990): 6-8.

(PJGMRMC) and to the Good Samaritan Hospital.[1434] The grounds of the PJGMRMC became a virtual campsite, to accommodate injured survivors. First to respond was the military teams from nearby Fort Magsaysay in Laur town rushed to help the city.[1435] After her visit to Cabanatuan and checking on the status of the rescue operations at the CCP, President Aquino, declared a state of calamity in Central Luzon and Ilocos regions.[1436] Engineers, constables, police, and firefighters from the region, as well as from Manila – government, private, and military, were mobilized to help in the operations.[1437]

Photo Nos. 21 and 22 show the destruction of the major buildings in Baguio and Cabanatuan cities respectively, after the 17 July 1990 earthquake.

Photo No. 21
Collapsed in Baguio after the 16 July 1990 earthquake[1438]

Photo No. 21.1: Hyatt Terraces Hotel

[1434] Ody Fabian, “Cabanatuan’s Nightmare.” *Philippine Graphic* 1.7 (30 July 1990): 6-8; Owen Masaganda and Nick Sagmit, "250 students trapped in the rubble. Over 40 confirmed dead." *Manila Bulletin* 211.17 (17 July 1990): 5.
[1435] Dante Solano, “It was 8.2 in Cabanatuan.” *Manila Bulletin* 211.18 (18 July 1990): 1, 21.
[1436] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5; Owen Masaganda and Nick Sagmit. “250 students trapped in rubble. Over 40 confirmed dead.” *Manila Bulletin* 211.17 (17 July 1990): 5.
[1437] Dante Solano, “It was 8.2 in Cabanatuan.” *Manila Bulletin* 211.18 (18 July 1990): 1, 21.
[1438] Google Images <google.com>; Philippine Central Info Negros <https://bit.ly/2FAG2tI>, Date accessed: 31 October 2018

Photo No. 21.2: Hyatt Terraces Hotel

Photo No. 21.3: Baguio Hilltop Hotel

Photo No. 21.4: Hotel Nevada

Photo No. 21.5: Baguio City Public Market

Photo No. 21.6: People flocking the Session Road after the earthquake

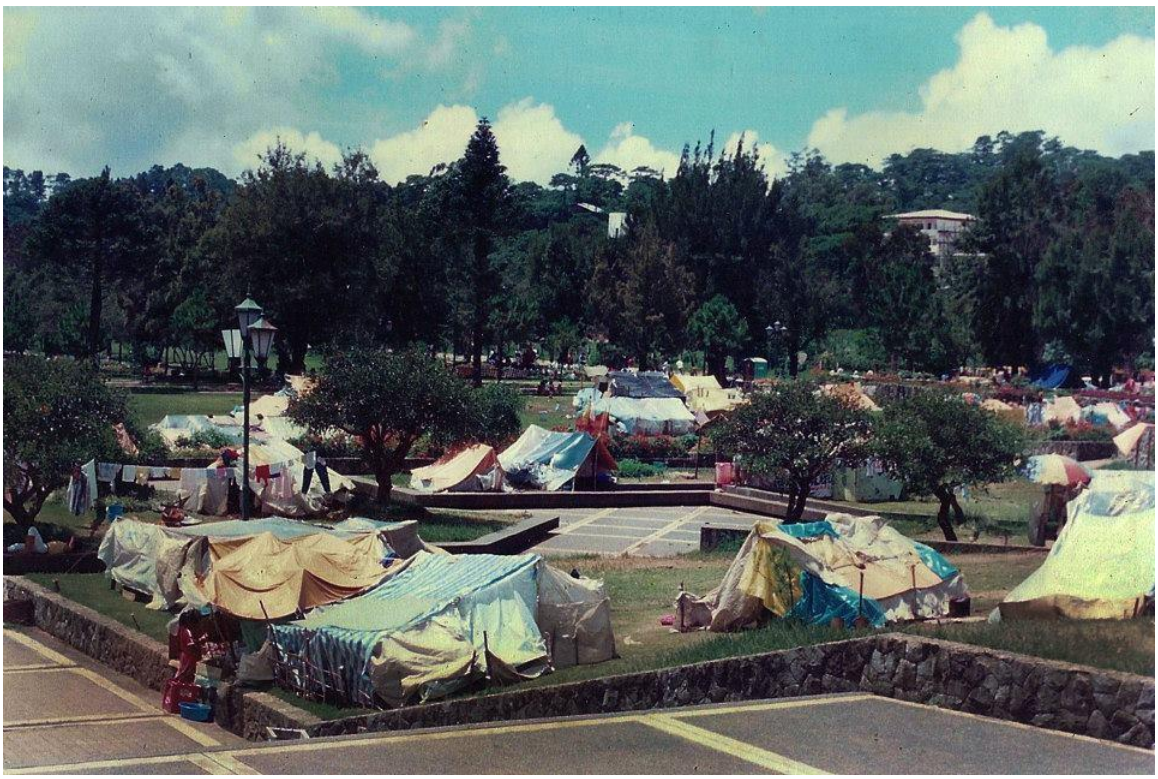
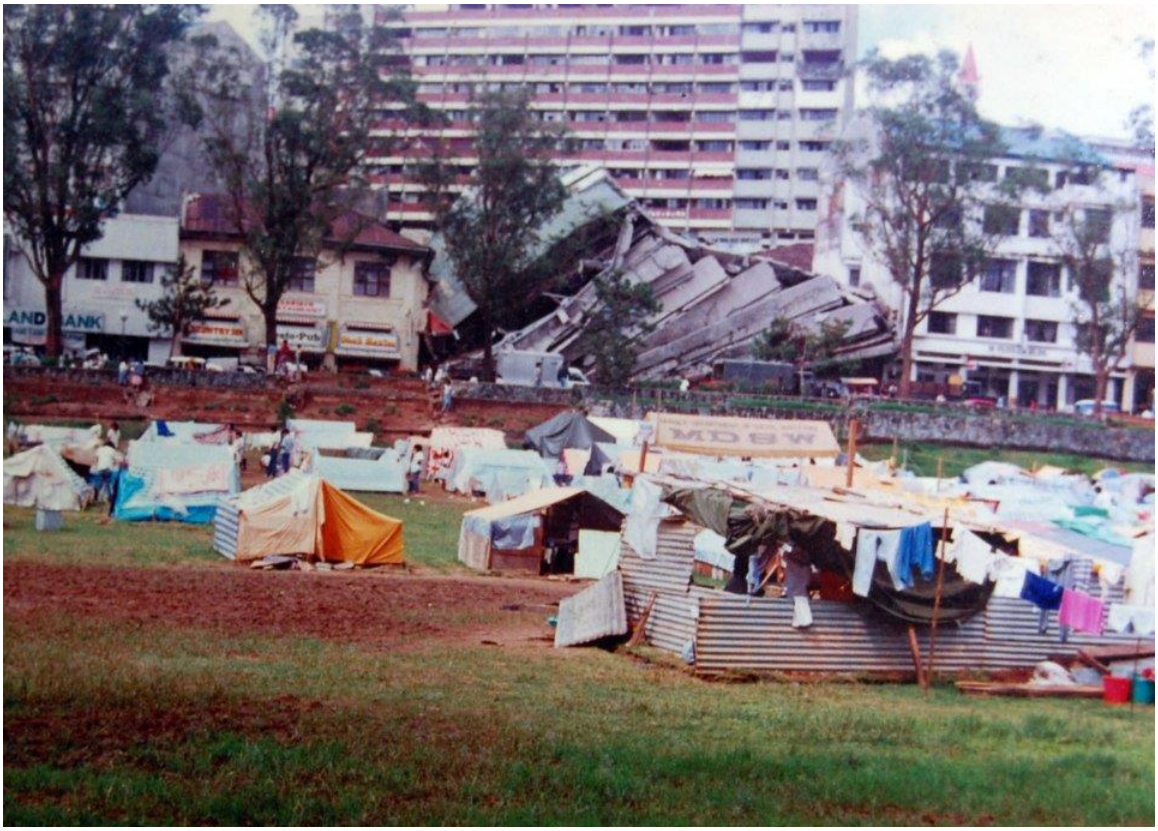


Photo No. 21.7: People set up tents in Burnham Park after their houses were destroyed by the earthquake



hoto No. 21.8: People set up tents in Burnham Park after their houses were destroyed by the earthquake

Photo No. 22

The Christian Colleges of the Philippines (CCP) in Cabanatuan after the 16 July 1990 Earthquake[1439]

Photo No. 22.1: Aerial view of the collapsed CCP Building

[1439] Google Images <google.com>; "1990 Great Earthquake remembered" Nueva Ecija Journal No. 270 <https://bit.ly/2DJqG3r>, Date accessed: 31 October 2018; Ody Fabian, "Cabanatuan's Nightmare." *Philippine Graphic* 1.7 (30 July 1990): 6-8

Photo No. 22.2: Closer view of the collapsed CCP Building

Photo No. 22.3: A closer of the collapsed CCP Building

e.1.3 The situation in Pangasinan, La Union, and Metro Manila after the earthquake

The earthquake hit the city of Dagupan City physiologically. The Pangasinan-La Union area suffered liquefaction that caused the lowering of certain land mass.[1440]The tremor-induced liquefaction caused the collapse of almost 90% of its buildings in Dagupan, totaling to almost 6 billion pesos.[1441]Newspapers described that Dagupan was turned into an "Atlantis"[1442], most parts of the city were submerged in water. Buildings along Fernandez and Perez avenues, the cities commercial area, sank.[1443] The main bridge in the city, the Magsaysay Bridge collapsed, and the drainage and water system in the city was heavily destroyed, causing massive water outage in the whole city.[1444]The President, upon knowing about this fundamental resource problem, immediately ordered the release of 1 million pesos to build artesian wells as an alternative water source.[1445]

In La Union, the people suffered both the destruction of collapsed houses and buildings and the submerging of their land due to liquefaction. The towns of Agoo, Sto. Tomas, Tubao, Aringay, Caba, Banang, and Naguilian, 75 people were reported dead, almost a hundred were injured, more than 3000 houses damaged, and nearly ten thousand, partially; 300 kilometers of roads were wrecked, with a total of almost 2 billion pesos in overall damages.[1446] Due to liquefaction, Narvacan, an islet in Sto. Tomas town was "reclaimed in reverse"; the islet became part of the sea, displacing 700 households.[1447]

Aftershocks were felt in Pangsinan and La Union days after the main quake on 16 July. Authorities recorded a total of ten aftershocks: roads from Agoo, la Union to San Fabian, Pangasinan were under water; Rosales Bridge and the municipal hall of Agoo were wrecked, and even Dagupan bridge and Aringay church in La Union were damaged due to these aftershocks.[1448]

Though far from the epicenter of the earthquake, Metro Manila suffered correspondingly from the tremor. Strong movements rocked main urban areas, power supplies went out, and people panicked and went out of their offices. Over 100,000 workers in the region were forced to cancel work due to possible building damages.[1449] Government agencies started evacuating 4000 informal settlers from reclamation areas in Roxas Boulevard, Parañaque, and Las Piñas.[1450]Large buildings were seen to have cracks, such as the Philippine International Convention Center. Authorities reported stampedes were reported shopping malls from the north to south of Metro Manila, such as in Gotesco Grand Central Shopping Center in Caloocan City, SM City Edsa-West Avenue in

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[1440] Sannie Patinio, "Why Dagupan sank", *Philippine Graphic* 1.8 (6 August 1990): 5
[1441] "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1442] Frank A. Evaristo, "On the eve of change". *Manila Bulletin* 211.25 (25 July 1990): 32.
[1443] Sannie Patinio, "Why Dagupan sank", *Philippine Graphic* 1.8 (6 August 1990): 5
[1444] "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1445] Ibid.
[1446] Noemi Balingit-Reyes, "Earthquake rendered people landless in La Union." *Philippine Panorama* (2 September 1990): 44-46.
[1447] Ibid.
[1448] Marcia Rodriguez, "200 sill trapped; death reach 311; Baguio toll is 142
Manila Bulletin 211.19 (19 July 1990): 1, 22.
[1449] "No classes indefinitely." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1450] Ibid.

Quezon City, Holiday Plaza in Pasay and Greenbelt in Makati.[1451]The Light Railway Transit (LRT) suspended their operations; traffic snarled in main Metro Manila thoroughfare.[1452]A fire razed four buildings; three deaths were recorded: two from heart attack while inside the East Avenue Medical Center (EAMC), and one, a condominium worker, jumped to his death in Alexandra Condominium, Pasig City.[1453]

Map No. 12 and Photo No. 23 show the maps and actualy photos of Dagupan City in Pangasinan, as it suffered liquefaction after the 16 July 1990 earthquake. Photo No. 24 shows the similar effects of liquesfaction in a town in La Union province.

Map No. 12

Maps showing the areas in Pangasinan and La Union that were affected by liquefaction after the 16 July 1990 Earthquake[1454]

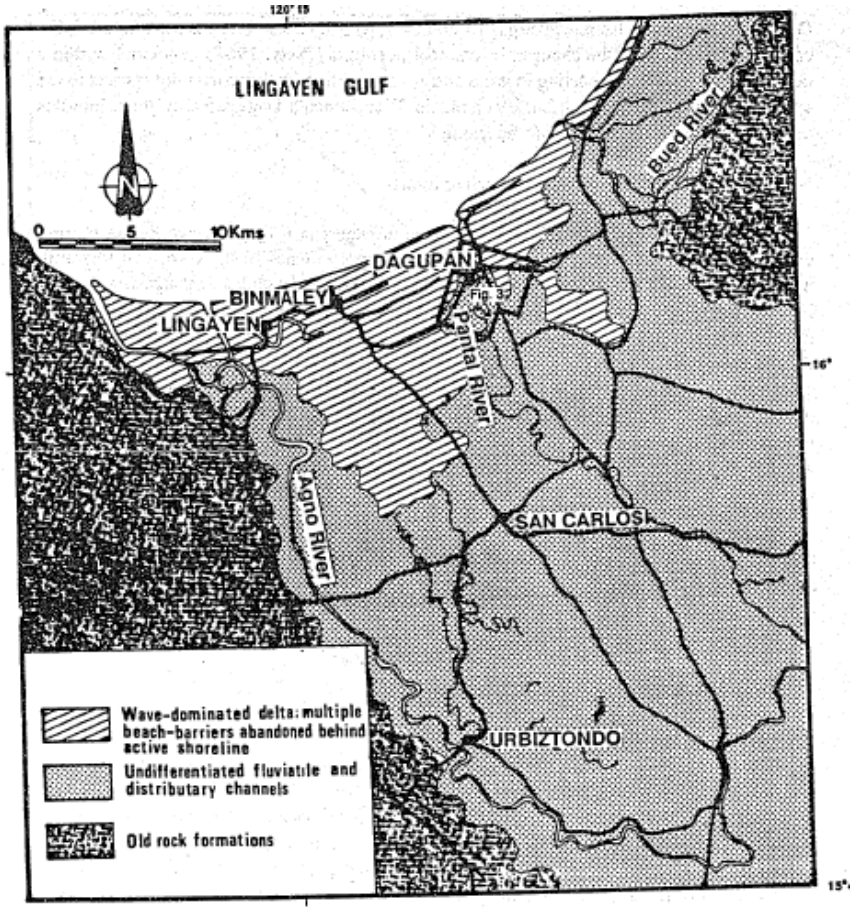

Fig. 7. Agno River delta-fluvial complex. Strong fluvial sedimentation along the active channels of Agno and Pantal Rivers covers the abandoned coastal ridges. Sedimentation from Bued River encroaches the eastern margin of the delta. (after Punongbayan and Torres, 1990).

[1451] "68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1, 6.
[1452] Ibid.
[1453] Ibid.
[1454] *The July 16, 1990 Luzon Earthquake: A Technical Monograph. Inter-Agency Committee for* Documenting and Establishing Database on the July 1990 Earthquake, 1992

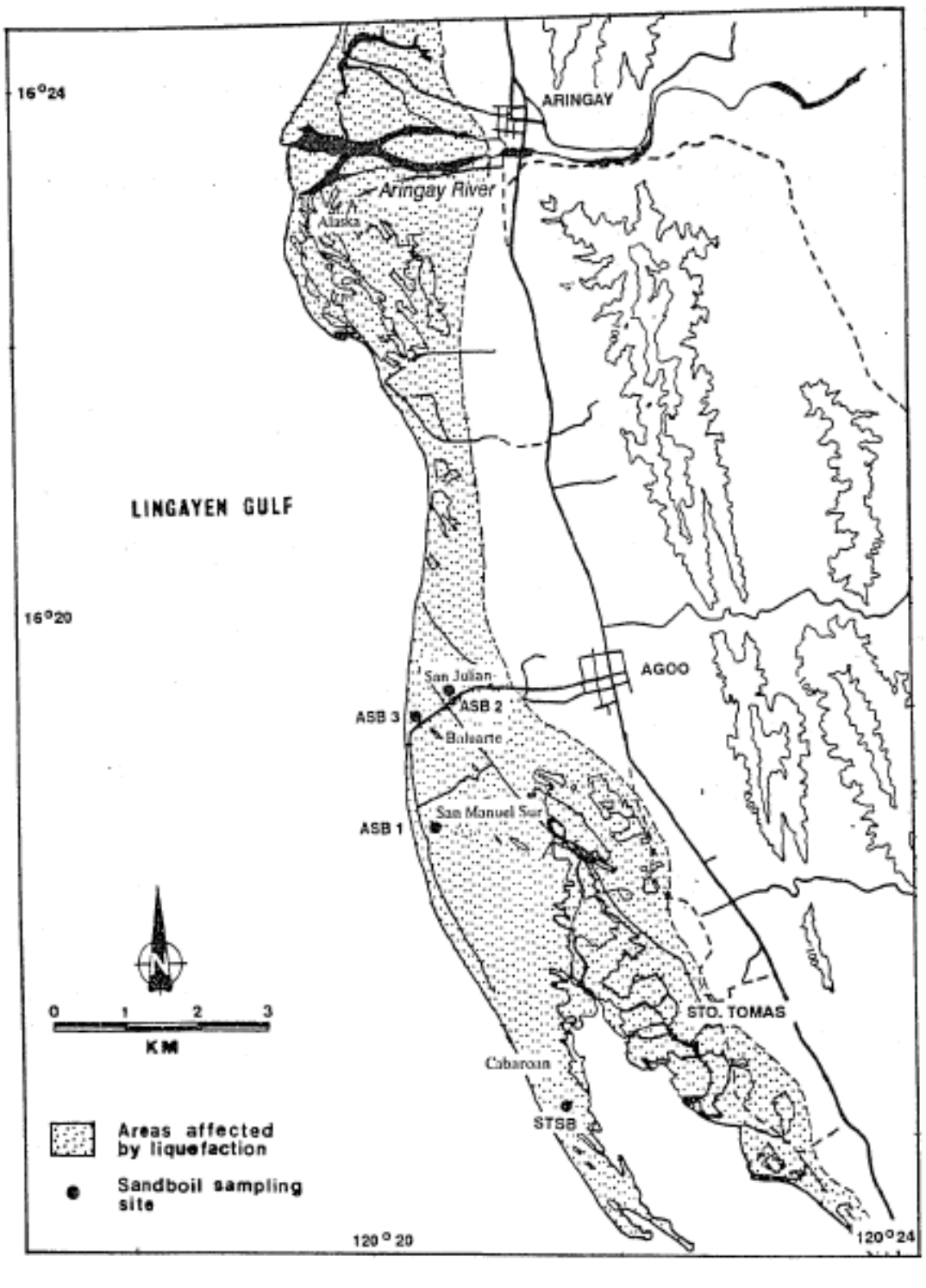
16°24
16°20
ARINGAY
Aringay River
Alaska
LINGAYEN GULF
AGOO
San Julian
ASB 3
ASB 2
Balsarte
San Manuel Sur
ASB 1
STO. TOMAS
Cabaroan
STSB
0 1 2 3
KM
Areas affected by liquefaction
Sandboil sampling site
120°20
120°24

Photo No. 23
Dagupan, Pangasinan after the 16 July 1990 Earthquake[1455]

Photo No. 23.1: A photo showing vehicles eaten up by roads that suffered liquefaction

Photo No. 23.2: A photo showing roads with cracks

[1455] "A look back at the 16 July 1990 Earthquake" <https://bit.ly/2FCzEIP>, Date accessed: 31 October 2018.

Photo No. 23.3: A photo showing the damaged buildings in Dagupan

Photo No. 23.4: A photo showing a destroyed bridge

Photo No. 24

Photos of submerged areas in Narvacan, La Union due to liquefaction caused by the 16 July 1990 Earthquake[1456]

Earthquake rendered people landless in La Union

At the temporary site in a vacant land across the submerged islet, Navacan evacuees subsist on relief food. Top photo shows what's left of Alaska: seawater everywhere.

[1456] Noemi Balingit-Reyes, "Earthquake rendered people landless in La Union." *Philippine Panorama* (2 September 1990): 44-46.

e.2 Government Response

The "highlight" of the 1990 North Luzon earthquake disaster, besides the gravity and extent of the destruction it caused, was the varying levels and manifestations of responses the government, the private sector, and the people after the tragedy. The kind of responses not only prolonged the supposed agony of victims and towns, but also surfaced a latent and unresolved problem of incapacity and misdirection of the state, and the society itself, in times of calamities. Moreover, the responses reveal the never-ending fascination to associate the tragedy, and the failure to act on it immediately, as a wrath of God, and the perennial projection of stories of hope, as template and emblem of for a society in need of a "national feeling" to recover from such calamities. The failure of society level awareness and preparation on the destruction natural hazards can cause lead to the creation of parochial and problematic sentiments of resiliency and strength, thus leading to systematic dismissal of the need for better disaster risk management and response to alleviate adverse effects of such hazards.

e.2.1 Responses of the national and local governments, and problems encountered

Reports from the ground indicate that the initial responses of the government units that acted on to the needs of earthquake-devastated areas include rescue operations, and fiscal decisions made by the national government to operationalize relief operations for the victims and survivors, as well as some infrastructural and human capital needs. The rescue operations and financial releases were concentrated on two of the most severely hit cities - Baguio and Cabanatuan. On the one hand, the military and the government engineering units, the private sector, as well as foreign military support teams were the first groups of people to respond to the disaster areas. On the other hand, the national government used its disposable financial resources, particularly from the executive branch, the Office of the President and its budget and finance departments to allocate and release funds for the immediate use in the relief initiatives in the calamity/stricken cities and towns.

e.2.1.1 Initial rescue and relief operations in Baguio and Cabanatuan

Rescue operations were immediately started, sans direct national government instructions. Local governments and regional agencies of national departments acted on because of the seen gravity of the situation. Rescue and relief operations were time to save almost 1000 survivors entombed in collapsed buildings and homes in Baguio City, La Union, Pangasinan, and Nueva Ecija.[1457]

In Baguio City, authorities most of the rescue operation in the downtown area were concentrated at the UB-FRB vicinity, where volunteers Philippine Military Academy (PMA) cadets have established a control zone; at the 4th floor of the UB Commerce Building is reported to have ten classrooms so the number of trapped students could reach 400.[1458] Scores of rescuers were immediately on site to do the rescue work, but

[1457] "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1458] Isidro M. Chammag, "Baguio suffers its worst quake." *Manila Bulletin* 211.18 (18 July 1990): 1, 11.

the lack of equipment hampered their work. A captain from the PMA, Jeff Tamayo, who headed a rescue team of 43 cadets, got so frustrated that they could only watch in despair as a woman pleaded to be saved from under the rubble of Baguio Park Hotel on Session Road, as they were equipped with nothing but a jackhammer, and that they could hardly move the columns of steel and concrete that blocked the way to where some survivors remained trapped.[1459] Many rescuers were practically using bare hands in rescue operations.[1460] The incident isolated Baguio from the rest of the province for several days; cranes, tractors and other heavy equipment can't reach the city because of landslides.[1461] Officials said that it might take up to 6 months to clear the highway linking Baguio with the rest of the country.[1462] Foreign teams augmented the low number of local rescue teams; groups from Japan, US, and England arrived, but they came a little late, as rescuers gave up in their search for survivors in Nevada Hotel and Hyatt Terraces.[1463] Two days after the earthquake, helicopters from PAF and Subic Naval base airlifted relief goods and equipment; some people tried to ride the choppers.[1464]

In Cabanatuan, the same problems that hounded Baguio were also observed. Instantaneously, the city government formed a rescue team, but the lack of heavy equipment hampered their work.[1465] The collapsed CCP building in the city was a huge task, and it needed not only additional workforce, but big machines to move pillars and walls of a collapsed structure. Nueva Ecija Governor Narciso Nario sought the help of Olongapo Mayor Richard Gordon, who immediately formed a rescue team and had direct access to the facilities at the US Naval Base in Subic.[1466] The US Navy Seabees from Subic Naval Base arrived to help in the retrieval operations.[1467] As of Tuesday night, 17 July, 167 were pulled out alive, five died in the rubble.[1468] These numbers were too much for the available hospitals and doctors in the city. , and the volume of casualties lead to the shortage of even basic needs such as anesthesia. Cabanatuan City Health Officer Jose Evangelista immediately communicated with the network of city doctors, both public and private, to respond to emergencies; a total of 500 doctors arrived in Cabanatuan, most from the Central Luzon region, and the Clark Air Base Hospital.[1469]

After the third day of rescue operations in Cabanatuan on 18 July, rescuers composed of the joined forces of the AFP, and the groups from Subic and Clark, recovered 64.[1470] A total of 164 people were injured; workers suspended the rescue several times as fear of another collapse due to aftershocks were seen.[1471]Authorities reported that residents had complained about the fouls smell coming from the building, and the city health

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[1459] Bex Viñaviles, “Baguio in Ruins.” *Philippine Graphic* 1.7 (30 July 1990): 10.
[1460] Ibid.
[1461] “Severe food, water, power shortages hit Baguio city.” *Manila Bulletin* 211.19 (19 July 1990): 7, 17.
[1462] Ibid.
[1463] Ibid.
[1464] Ibid.
[1465] Owen Masaganda and Nick Sagmit. “250 students trapped in rubble. Over 40 confirmed dead.” *Manila Bulletin* 211.17 (17 July 1990): 5.
[1466] Dante Solano, “It was 8.2 in Cabanatuan.” *Manila Bulletin* 211.18 (18 July 1990): 1, 21.
[1467] Ody Fabian, “Cabanatuan’s Nightmare.” *Philippine Graphic* 1.7 (30 July 1990): 6-8.
[1468] Ibid.
[1469] Ibid.
[1470] Ecija teams find 64 bodies.” *Manila Bulletin* 211.19 (19 July 1990): 1, 21.
[1471] Ibid.

department implemented some measures to prevent any possible outbreak of disease.[1472] By Wednesday, rescue operations in CCP were stopped; one journalist laments, "but the bitter memory of Monday's earthquake will long remain in the minds of the residents as they start to reconstruct their lives."[1473]

Photo No. 25

Dick Gordon in Cabanatuan, PMA cadet volunteers in Baguio[1474]

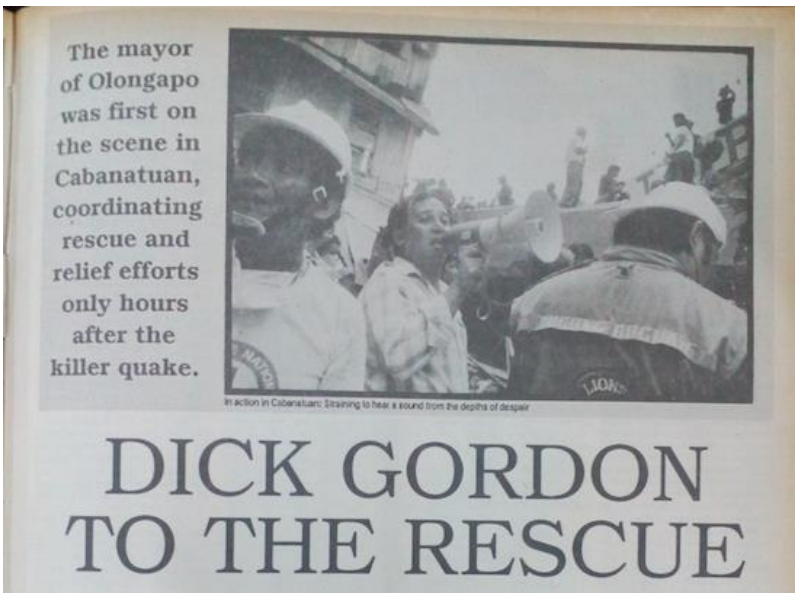

Photo No. 25.1: A photo showing Dick Gordon leading the rescue operations in Cabanatuan

Photo No. 25.2: A photo showing Dick Gordon leading the rescue operations in Cabanatuan

[1472] Ibid.

[1473] Ody Fabian, "Cabanatuan's Nightmare." *Philippine Graphic* 1.7 (30 July 1990): 6-8; Emilio Juan, "Dick Gordon to the Rescue." *Philippine Graphic* 1.9 (13 August 1990): 9-10.

[1474] A helping hand for victims." *Manila Bulletin* 211.19 (19 July 1990): 16; "An outpouring of help." *Manila Bulletin* 211.19 (19 July 1990): 17.

Photo No. 25.3: A photo showing the PMA cadet volunteers rescuers in Baguio

e.2.1.2 The National Government acted on: Proclamations and initial fiscal decisions

The first set of decisions made by the Aquino government was placing towns and provinces under a state of calamity, to enable the use of extra-bureaucratic powers of the executive branch, as well as the lawful use of calamity funds of the government. The President issued Proclamation No. 613 on 17 July 1990, placing vital areas in regions 1, 2, and three under state of calamity: the cities of Dagupan and San Carlos in Pangasinan in Region 1, Baguio City and the whole Benguet province in Region 2, and

the cities of Cabanatuan, Palayan, and San Jose in Nueva Ecjia, located at Region 3.[1475] The following day, she issued Proclamation No. 615 declaring a state of calamity in La Union, in addition to the first three provinces.[1476] On 20 July, the President added the provinces of Tarlac and Nueva Vizcaya in the list of provinces under calamity state, totaling all to six provinces.[1477]

The President formed an overall committee to coordinate all forms of assistance: headed by Defense Secretary Fidel Ramos as Chairman of NDCC, Secretary Jose de Jesus as coordinator in Baguio, Secretary Cesar Bengzon as coordinator in Pangasinan, and Brig. Gen. Ernesto Calupig, Division Commander of the Army 7th Infantry Division, to take in charge of the rescue operations in the CCP building in Cabanatuan City.[1478] An Earthquake Assistance Center at the Bahay Ugnayan, near Malacañang was set up under the Office of the President; will serve as a link up to the different agencies working ton disaster relief operations.[1479]

President Aquino immediately did an ocular inspection to devastated cities the day after the quake struck the country. On 17 July, she went to Cabanatuan and personally sympathized with the families of the earthquake victims, and assured all the families of the victims that the government would shoulder all the burial and hospitalization costs, through the President's Social and Calamity Fund.[1480] She watched over the rescue operations, and visited the survivors in the hospital, and in Ilagan Funeral Homes to commiserate with the families of victims.[1481] Cabanatuan City Mayor Honorato Perez then reported to the President that there were 30 students trapped inside the building.[1482] The President then proceeded to Baguio City to do an ocular inspection of the operations in the city. She urgently ordered the clearing of Naguilian Road for the city to be accessible since the Marcos Highway and Kennon Road remained blocked due to landslides.[1483] She went to the site of the collapsed Hyatt Terraces HotelI and conferred with national and local officials in charge of the rescue and relief operations.[1484] In a press briefing, she spoke with some survivors of the earthquake in the said city, namely Debbie Carandang and Ellie and Leonie dela Cruz.[1485] Upon acknowledging the extent of devastation that happened in Baguio and Dagupan, President Aquino ordered the release of 22.4 million pesos on 18 July, to speed up the relief and rescue operations, apart from the 140 million Quick Response Fund (QRF) for calamities signed for releasing by the Department of Budget and Management

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[1475] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1476] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1477] Fred M Lobo, “Calamity area widened. Aquino adds Tarlac, Vizcaya.” *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1478] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1479] Ibid.
[1480] Ibid.
[1481] Ibid.
[1482] Ibid.
[1483] “Earthquake!” *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1484] Bex Viñaviles, “Baguio in Ruins.” *Philippine Graphic* 1.7 (30 July 1990): 10.
[1485] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.

(DBM).[1486] The additional 22.4 million budget was divided to frontline departments and agencies: DSWD, DPWH, DECS, DOH, RCAT agencies, and the local government of Dagupan for the construction of artesian wells.[1487] She also declared the suspension of classes in Baguio at least for a month; asked the students to "decongest Baguio immediately, as 1/3 of the city's population are students.[1488] Moreover, the President also issued Memorandum No. 306 on the importation of donations to victims: P10,000 to the family of every dead person, and P5,000 for those who were seriously injured.[1489] Furthermore, the President commended the work of the Benguet miners and PMA cadets, as well as the US military contingent, in their immediate response to the victims of collapsed structures.[1490] Lastly, President Aquino left behind a team to coordinate the rescue activities in Baguio: Jose de Jesus, Defense Undersecretary Eduardo Ermita, Health Undersecretaries Mario Taguiwalo and Antonio Priquet.[1491]

A day after the disastrous earthquake that hit Northern Luzon, the Philippine lawmakers acted swiftly to legislate the financial aspect of the disaster recovery plan of the government. The House of Representatives, headed by Speaker Ramon Mitra, proposed the P8 billion for the government's recovery and rehabilitation program.[1492] The proposal House, of course, needed the approval of the Philippine Senate, another branch of the Philippine Legislature. Rep. Rolando Andaya, head of the House's Appropriations Committee, said that they gave President Aquino the discretion on the release of the disaster recovery allotment, which will come from several previously approved and available government budget: P6B from reserves from the enforced savings from all government offices, P1B from the government's contingency plan, and P1B from the increased calamity fund.[1493] The said proposal was only initial, as Malacañang made a much formal, and higher amount of recommendation to the Congress later on, after the President's State of the Nation Address on 23 July 1990.

Following the announcements of fund allotment and releases, the reports all indicate that the first fund released by the government was the P3 million pesos authorized by the Department of Budget and Management (DBM) for Baguio, Cabanatuan, and Dagupan.[1494] Almost a week after the disaster, the DBM reported that the government released P16.5 million to fund relief and rehabilitation efforts in the regions affected; P9 million to affected areas (Benguet, La Union, Pangasinan, Nueva Ecija, Nueva Vizcaya, and Tarlac), P7.5 million to national agencies involved in the relief and rescue operations (DOH, DSWD, DOTC, DND, DECS), and the P16.5 million, which was part of the 1 billion calamity fund of the government for year 1990.[1495]

[1486] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142, *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1487] Ibid.
[1488] Ibid.
[1489] Ibid.; Fred M. Lobo, "Senate okays P10 B". *Manila Bulletin* 211.27 (27 July 1990): 1, 37.
[1490] Ibid.
[1491] Ibid.
[1492] "Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1493] Ibid.
[1494] "P12.5 M out for relief aid." *Manila Bulletin* 211.20 (20 July 1990): 1, 35.
[1495] Joel Palacios, "P16.5 M released for relief efforts." *Manila Bulletin* 211.22 (22 July 1990): 1, 16.

e.2.2 Work of other government branches and departments

Mobilizing the resources of the national government was indeed a must given the gravity of destruction the earthquake caused, the vast extent of rescue and relief work to be done, and the huge task of laying down immediate rehabilitation plans for the cities and towns heavily hit by the July 1990 disaster. Different national government offices also did their share of own relief activities for the victims of the earthquake disaster. By their mandate, two agencies were to be the prime coordinating force in times of disasters. The National Disaster Coordinating Council (NDCC) and the Office of Civil Defense (OCD) were the agencies tasked to lead and facilitate disaster response system and mechanism of the government. But for this particular tragedy in northern Luzon on July 1990, it was observed that the OCD and the NDCC existed, but failed in their primary purpose, and had a shorthand and a lot of shortcomings in dealing with the disaster. Different government offices worked independently from one another, sometimes side by side, but lacked the proper coordination between each other.

The Office of Vice President Salvador P. Laurel mobilized medical and paramedical volunteer teams to help in the rescue and quake victims in Metro Manila, and Regions 2 and 3.[1496]The People's Welfare Foundation, led by Mrs. Celia Diaz Laurel, the Vice President's wife, sent trucks of relief goods to disaster-afflicted areas.[1497]

The Department of Social Work and Development (DSWD) was the prime agency that handled the preparation and distribution of relief goods for the affected population. Together with the Armed Forces of the Philippines (AFP), the DSWD sent and flown out relief goods to Baguio, Cabanatuan, Dagupan, and Agoo in La Union starting the day after the earthquake hit northern Luzon. The Department of Interior and Local Government (DILG) instructed local government units (LGUs) to activate their respective Disaster Coordinating Councils (DCC) to help monitor situations and help victims in other areas.[1498] Moreover, DOTC Secretary Oscar Orbos headed the Cabinet Coordinating Officer on Rural Development (CORD) that responsible for the delivery of basic needs to affected areas.[1499] Initial assessment reported to the media by DSWD Secretary Mita Pardo de Tavera, an estimated 4,768 families or almost 26,000 people needed immediate food support.[1500] Stranded commuters were also monitored and given relief goods, such as motorists in Naguillian and Kennon roads.[1501] Concerning funds, the DSWD was first in the frontline in receiving calamity fund releases. Moreover, at first, the DSWD headed by financial assistance program previously mentioned by President Aquino, wherein an amount between P5,000 to P10,000 pesos can be availed by victims and families, for hospitalization and burial expenses.[1502] The Social Security System (SSS), the country's government-owned corporation facilitating social security services for the private sector industry, sent medical and benefits and loans processing teams to Cabanatuan, Baguio, and Pangasinan to facilitate the release of calamity loans to SSS

[1496] "Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1497] Ibid.
[1498] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1499] Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1500] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. "Death toll: 223; calamity declared." *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1501] Roy C. Sinfiuego, "Official death toll: 332." *Manila Bulletin* 211.20 (20 July 1990): 1, 12.
[1502] Ibid.

members.[1503] The teams oversaw the immediate release of death and funeral claims of affected SSS members worth P2,000 and offered to members to avail calamity loans up to P6000, and housing repair loans up to P100,000.[1504] The SSS liberalized the terms of its house repair loans to enable its members to afford the loan, whose houses were destroyed by the quake, particularly the newly launched Kasapi Lending Program for small and medium enterprises to include rehabilitation and reconstruction as among the purposes of the loan.[1505] A week after, the agency expanded their loan program for and launched a P2 billion pesos housing repair program.[1506] Another government corporation, the Government Service Insurance System (GSIS) also stepped in into the fiscal initiatives to help the affected people and towns. The GSIS released 250 million out of the Property Replacement Fund for the construction or rehabilitation of government facilities damaged by the quake.[1507] President Aquino created an oversight committee through the Memorandum Order No. 308, to monitor the implementation of this directive by GSIS, composed of representatives from DPWH, DECS, DOH, and DBM.[1508] The National Housing Authority (NHA) also launched emergency housing assistance; urged construction firms, hardware, and lumber stores.[1509]

The engineers of the Department of Public Works and Highways (DPWH) worked non-stop to repair damaged bridges and roads in Northern and Central Luzon, to speed up the delivery of vital equipment needed by rescue teams in extricating earthquake victims.[1510] Twelve major bridges in La Union, Pangasinan, Tarlac, and Nueva Ecija were heavily damaged making it difficult to conduct relief operations to devastated areas: Calvo, Gayaman, Magsaysay, Carmen, and Hector Mendoza in Pangasinan, Moncada in Tarlac, Caba, Agoo, Aringay, and Bauang in La Union, Mariclab, Bagabag, and Dalton bridges in Nueva Ecija.[1511]To immediately reconstruct of damaged infrstuctures, the public works department vehemently asked the DBM for the proper release of funds, and the latter assured them correspondingly about its issuance.[1512]

The DPWH was also tasked to deliver water to the city, as the city's pipelines were severely damaged; a team of engineers from the DPWH Rural Water Supply Office was airlifted to Baguio City, to help in looking for a solution where to get water supply for the city.[1513] The Local Water Utilities Administration (LWUA) who also participated in these efforts, reported that they restored the water systems in earthquake-stricken areas; Electricity in pumping stations were also restored – Benguet, La Union, Pangasinan, Tarlac, Nueva Ecija, and Pampanga; LWUA extended P200,000 worth of loan to Baguio Water District; Pangasinan Water District partially in operations.[1514] Aside from the

[1503] Ibid.
[1504] Ibid.; Joel Palacios, "P16.5 M released for relief efforts." *Manila Bulletin* 211.22 (22 July 1990): 1, 16.
[1505] Joel Palacios, "P16.5 M released for relief efforts." *Manila Bulletin* 211.22 (22 July 1990): 1, 16.
[1506] Fred M. Lobo, "Senate okays P10 B". *Manila Bulletin* 211.27 (27 July 1990): 1, 37.
[1507] Marcia M. Rodriguez, "Symbols of RP faith and spirit". *Manila Bulletin* 211.29 (29 July 1990): 1,17.
[1508] Ibid.
[1509] Ibid.
[1510] "Repair work on bridges on." *Manila Bulletin* 211.20 (20 July 1990): 1, 17.
[1511] Ibid.
[1512] Ibid.
[1513] Ibid.
[1514] "Quake-damaged water systems restored". *Manila Bulletin* 211.26 (26 July 1990): 9.

gigantic task on rebuilding the public infrastructures in devastated areas, the DPWH implemented quick structural assessment initiatives in public buildings, especially in areas that are densely populated, or have large and vulnerable public edifices, like the cities in Metro Manila. Metro Manila DPWH officials and engineers inspected buildings in the region.[1515] DPWH found out that 16 school buildings, two government offices, and a commercial building in Metro Manila was found by DPWH as severely damaged by the earthquake, out of 173 school buildings, 96 school buildings have minor damages.[1516] The buildings of several highly populated public schools in the region suffered damages and were immediately declared dangerous: Roxas High School, Torres High School, Quirino High School, Caloocan High School, Licerio Geronimo elementary School, and Albert Elementary School.[1517] The City Engineer's Office in Quezon City cleared government and commercial buildings in the city as structurally sound, such as the buildings of Philippine Science High School (PSHS), SSS Building, and Quezon City Hall, and the malls such as Framer's Plaza, SM City West, and Aurora Towers.[1518] The East Avenue Medical Center suffered damages, and it prompted the hospital's management to transfer its patients to the nearby Quezon City General Hospital.[1519] The buildings of the Philippine Veterans Bank, the Bano Filipino Condominium, and the National Library were also found to have minor damages.[1520] DPWH warned the public against entering condemned buildings: schools and commercial complexes; 110 buildings identified in Baguio and Cabanatuan.[1521]

The President directed the NAPOCOR to rush the repair of power lines despite its action to reduce the power supplies in the regions affected.[1522] The state-owned PNOC assured Malacañang that it would normalize the fuel supply situation in Baguio starting 21 July 1990.[1523] Immediately ordered the clearing of Naguilian road to make the city accessible; as well as the repair of Loakan Airport. Transportation and Communications Secretary Orbos reported the establishment of a communications antenna system, by the America Telephone and Telegraph Co. to link Metro Manila and Baguio.[1524] More than a week after the earthquake, the Pilipino Telephone Corporation (PilTel) has restored 50% of the local phone system in Baguio City.[1525]

The first decision made by the Department of Education, Culture, and Sports (DECS) was suspending all classes in Metro Manila and the whole of Luzon.[1526] Secretary Isidro Cariño of DECS extended the order of the President indefinitely, suspending classes indefinitely on all levels in Metro Manila, Central Luzon, and the CAR, and in Cavite, Laguna, and Rizal in Southern Tagalog, and gave regional directors the discretion in

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[1515] "Repair work on bridges on." *Manila Bulletin* 211.20 (20 July 1990): 1, 17.
[1516] "19 buildings damaged in city." *Manila Bulletin* 211.21 (21 July 1990): 1, 18.
[1517] No classes indefinitely." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1518] Ibid.
[1519] Ibid.
[1520] "19 buildings damaged in city." *Manila Bulletin* 211.21 (21 July 1990): 1, 18.
[1521] Chito Parazo, "Warning aired on buildings". *Manila Bulletin* 211.25 (25 July 1990): 1, 12.
[1522] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1523] Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1524] Ibid.
[1525] Wilma Yamzon, Castro, Eddee & Chammag I. S. "Rescuers declare: No more survivors: "Death toll now reaches 830", *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22.
[1526] "All classes suspended." *Manila Bulletin* 211.17 (17 July 1990): 1, 13.

determining when to resume classes.[1527] Secretary Cariño, who was also the president of Boy Scouts of the Philippines (BSP), announced the cancelation of the BSP's participation in World Scout Conference in Paris on 23-27 July 1990, as a practical decision after the disastrous 16 July 1990 earthquake.[1528]The education department also acted on the need to accommodate the displaced students of the CCP, by offering subsidiary programs to other educational institutions, but was a little bit short due to the number of students to be accommodated, which reached almost a thousand.[1529] Many parents urged the Commission on Higher Education (CHED) to suspend classes for at least a month due to the increasing number of building found to have severe damages after the 16 July earthquake.[1530] The Pamantasang Lungsod ng Maynila (PLM) in the Intramuros district of Manila had suspended classes, for one month, until 15 August, while repairs in the campus are ongoing.[1531] An association of private schools in Metro Manila also supported this recommendation, based on their own assessment of the situation.[1532]

The Department of Health (DOH) stepped in the relief efforts in two ways (1) for medical support to victims and casualties, and (2) sanitation efforts in disaster-stricken areas. On the first one, different government and private institutions send medical teams to Baguio and Cabanatuan to help in the medical needs of the victims. On the second, the DOH made an immediate action to prevent the spread of diseases, due to a large number of dead bodies left in the open.

Authorities conducted an information campaign on sanitation and cleanliness for residents in earthquake-affected areas; they implemented visits to households to check on toilets and other means for consolidated collection and disposal of human waste. [1533] The DOH in Central Luzon region started a sanitation campaign in the vicinities in the disaster area in Cabanatuan. Fogging, lime powder to prevent the spread of disease-causing-odors from decaying materials coming from human bodies.[1534] The local health department in Baguio made bold decisions and necessary moves, to avert possible sanitation problems related to the deaths and casualties in the city. The Baguio City Health Department buried and cremated unclaimed bodies of victims; they immediately denied reports that they did cremations due to lack of embalming materials.[1535] The government also got help from private organizations to maintain proper sanitation in the city. Fore example, a group of American and Filipino volunteers took measures to "sanitize" Burnham Park to avert the possible outbreak of diseases and unhealthful

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[1527] "No classes indefinitely." *Manila Bulletin* 211.18 (18 July 1990): 1, 18; Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. "Death toll: 223; calamity declared." *Manila Bulletin* 211.18 (18 July 1990): 1, 5.

[1528] Wilma Yamzon, Castro, Eddee & Chammag I. S. "Rescuers declare: No more survivors: "Death toll now reaches 830", *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22.

[1529] "Ecija teams find 64 bodies." *Manila Bulletin* 211.19 (19 July 1990): 1, 21.

[1530] "Suspension of classes urged". *Manila Bulletin* 211.26 (26 July 1990): 1,12.

[1531] Ibid.

[1532] Ibid.

[1533] "Epidemic may be the next problem". *Manila Bulletin* 211.27 (27 July 1990): 6.

[1534] Lino Sanchez, "DOH cleans up earthquake sites: Victims treated free". *Manila Bulletin* 211.25 (25 July 1990): 8

[1535] Wilma `Yamzon, "Quake death toll nears 1,000 mark". *Manila Bulletin* 211.24 (24 July 1990): 1, 15.

conditions in the "tent city' and asked the public to donate plastic bags and insecticides.[1536]

The Department of Tourism (DOT) established a 24-hour emergency center to continue, assisting residents and tourists stuck in Baguio and other places in Northern Luzon.[1537] There are also assistance centers for people who have passport or visa needs, in coordination with DFA.[1538] The DOT also facilitated the flow of donations from the Hotel and Restaurant Association of the Philippines, a member organization of the Tourism Council of the Philippines.[1539] The Department of Foreign Affairs (DFA), through Secretary Raul Manglapus and the department's staff, launched a fund drive for the victims of the earthquake.[1540] Employees offered weeks of their salary as donations, and the embassies and consulates abroad initiated respective fund campaigns, under a project call Philippine Earthquake Fund.[1541]

As soon as Baguio City became reachable through the usual means of transportation, the Philippine Institute for Volcanology and Seismology (PHIVOLCS), with its head Raymundo Punongbayan, sent a team of senior seismologists to study the effects of the earthquake in the city.[1542] The relative delay was due to the limited capacities of the agency to make an immediate scientific assessment of the situation in the areas hit by the earthquake.

When the President went back to Manila after touring the disaster-stricken areas, the initial problems of food and water shortage persisted. Its isolation from the usual economic activities in the region hounded the city and led to food supply problems days after the earthquake hit the city. Food and fuel supplies run out, people were in the streets begging for food, and additional police and soldiers were deployed to prevent looting and food/related chaos.[1543] One problem monitored during the post-earthquake period was the prices of basic commodities. Due to the destruction of commercial centers in major cities northern Luzon – Baguio, Cabanatuan, and Dagupan, the flow of goods was disrupted, and the supply and distribution decreased due to the destruction of roads and bridges from towns to cities. In Baguio, commercial life in the city has been "suspended"; business owners closed their stores, and the Baguio City Market was a deserted place.[1544] Gasoline prices in the city soared high, as supply and availability were cut short, and only 1/8 gas stations in the city were able to service the need of the Baguio city.[1545]

In response, to preempt the ballooning of prices, the President issued many directives, including the order for businessmen to maintain the prices of commodities – "pre-

[1536] "Volunteers 'sanitize' Burnham". *Manila Bulletin* 211.25 (25 July 1990): 1, 16.
[1537] "DOT maintains emergency centers". *Manila Bulletin* 211.28 (28 July 1990): 30.
[1538] Ibid.
[1539] Ibid.
[1540] "Manglapus to Jakarta; aid listed". *Manila Bulletin* 211.24 (24 July 1990): 11.
[1541] "DFA launches quake aid fund drive". *Manila Bulletin* 211.23 (23 July 1990): 15.
[1542] "Phivolcs assesses quake effects". *Manila Bulletin* 211.23 (23 July 1990): 1, 20.
[1543] "Severe food, water, power shortages hit Baguio city." *Manila Bulletin* 211.19 (19 July 1990): 7, 17.
[1544] "Severe food, water, power shortages hit Baguio city." *Manila Bulletin* 211.19 (19 July 1990): 7, 17; Bex Viñaviles, "Baguio in Ruins." *Philippine Graphic* 1.7 (30 July 1990): 10.
[1545] "Severe food, water, power shortages hit Baguio city." *Manila Bulletin* 211.19 (19 July 1990): 7, 17.

earthquake" rate.[1546] For example, President Aquino issued Executive Order No. 414, which imposed a price ceiling in prime commodities and ordered the rushing of food and other essentials to devastated areas.[1547] The Department of Trade and Industry (DTI) acted on based on the said executive order. The agency issued the prescribed price ceiling for prime and essential commodities and foodstuffs to take immediately.[1548] The DTI Order No. 37 put price ceiling on goods such as rice, milk, sugar, canned sardines, and hard flour.[1549] Moreover, the DTI, the food producers and manufacturers organized food caravans to ensure supply and stabilize the prices of basic goods such as rice, fish, dressed chicken, milk, sardines, coffee, sugar cooking oil, flour, noodles, kerosene, and cooking gas, as well as construction materials such as cement, galvanized iron sheets, steel bars, and plywood.[1550] Producers of sugar, coffee, milk and cooking oil, sardines said supplies and prices in areas outside the region affected by the earthquake remained stable.[1551] The DTI caravan run fin various routes: from Manila to Camiling, Tarlac, to San Fabian, Pangasinan, and Damortis, La Union; Manila to Baguio; Manila to Poro Point to Baguio via Naguilian Road; and from Manila to Cabanatuan.[1552] In Dagupan and Agoo, the food caravan was able to serve almost 20,000 people staying at evacuation centers.[1553] The DTI was able to tap the Metro Manila chapters of Rotary Club International for this project.[1554] Furthermore, the DTI warned the public against baseless predictions, rumormongering assailed by "evil" elements, to alleviate fear of food sustainability and prices.[1555] Also, a joint emergency task force composed of provincial governors and representatives of law enforcement agencies will enforce the price ceilings and act on violation thereof.[1556] The Philippine Federation of Bakers' Association, Inc. (PFBAI) and Metro Manila Bakers' Association (MMBA) called and supported the President's call for effective implementation of the price ceiling scheme, particularly to prevent bakers' to create an artificial shortage of four in the market.[1557]

e.2.3 Local governments' responses

The 1990 earthquake was a national tragedy. The extent of damage and loss of lives caught national attention and needed the response of different national government departments and agencies for the rescue, relief, and rehabilitation efforts to be implemented. But this disaster also showcased the proactive response and initiative of

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[1546] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1547] Fred M. Lobo, "Food Rushed to N. Luzon: Price controls on prime goods." *Manila Bulletin* 211.20 (20 July 1990): 1, 20.
[1548] Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1549] Ibid.
[1550] Food caravans to Baguio OK'd." *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1551] Ibid.
[1552] Ibid.
[1553] Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1554] Ibid.
[1555] Fred M. Lobo, "Food Rushed to N. Luzon: Price controls on prime goods." *Manila Bulletin* 211.20 (20 July 1990): 1, 20.
[1556] Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1557] "Bakers' groups cite aid to quake victims". *Manila Bulletin* 211.23 (23 July 1990): 15.

different local government units – cities and provincial governments outside the profoundly affected areas of the earthquake. The disaster projected the capacity of relatively large and wealthy cities to extend help and support to affected communities, and at the same time magnified the shortcomings, slowness, and failures of the national government.

One good example of this was the role played by Olongapo City in the province of Zambales, led by its Mayor, Richard "Dick" Gordon, in the early hours of the rescue operations in Cabanatuan. The city, and Mayor Gordon and his wife Representative Kate Gordon, were highly regarded by journalists, politicians, fellow local government unit heads, and ordinary citizens in their effort to help the hampered Nueva Ecija capital. Mayor Gordon, an opposition mayor of Olongapo and governor of PNRC, was the first to mount a relief and rescue effort in Cabanatuan.[1558] He received a call from Cabanatuan Mayor Perez, as well as from some radio anchors asking for help; he then phoned Admiral Roger Rich of the United States Naval Base in Subic, Zambales to ask for help.[1559] One journalist described, "The mayor of Olongapo was first in the scene in Cabanatuan, coordinating rescue and relief efforts only hours after the killer quake."; while one called the, as "guardian couple".[1560] The Gordons were able to communicate with the US Naval base military commanders in Subic, to help them, and the city of Cabanatuan, in the rescue operations in the collapsed CCP building, by sending heavy equipment and other military support to hasten the saving of lives in the heavily devastated city, as "time was the enemy".[1561] People were quick to compare the non-hesitance of Dick Gordon to contact the Americans, unlike the national government who had a dilly-dally moment asking for help. This observation was in clear contrast with how the government pleaded for American military support less than a year ago, when it almost lost to the rebel soldiers in the bloody December 1989 military coup d'etat.[1562] Newspaper columnist Julie Yap-Daza called Gordon a "hero", and journalist Jose L. Guevarra said a loaded statement, "The courage of Olongapo Mayor Gordon and his wife, Representative Kate Gordon, should be remembered…We should have more Americans bloods like the Gordons!"[1563] In response, Gordon said that" real heroes are 'the people out there, digging and clawing at rock on concrete, straining ears for sound from the depths of despair, hoping against hope, working without heeding the cost, without counting the hours."[1564] This eventual "stardom" of Gordon did not sit well with the supporters of the President. The Gordons "got berated by incensed Corystas for usurping the functions and responsibilities of the government that, in fact, was frozen in paralysis and ineptitude."[1565] The Gordons are known party-mates and vocal supporters of Eduardo "Danding" Cojuangco, chairperson of the opposition party Nationalist People's Coalition (NPC), the President's cousin, and a long/time Marcos crony.

The local government of the country's capital city also initiated its efforts to help the earthquake-devastated cities like Cabanatuan. Manila City Mayor Mel Lopez sent a 50-

[1558] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1559] Emilio Juan, "Dick Gordon to the Rescue." *Philippine Graphic* 1.9 (13 August 1990): 9-10; Lito A. Catapusan, "Beatwatch: Damaged structures." *Manila Bulletin* 211.22 (22 July 1990): 8
[1560] Emilio Juan, "Dick Gordon to the Rescue." *Philippine Graphic* 1.9 (13 August 1990): 9-10.
[1561] Ibid.
[1562] Ibid.
[1563] Ibid.
[1564] Ibid.
[1565] Ibid.

man rescue team composed doctors, nurses, engineers, and social workers, to Cabanatuan to help the victims of the killer quake.[1566] In a statement, he said, "Since God has been merciful by sparing us the agony of death and destruction, I believe we should be ready to help those in distress in other places."[1567] Moreover, the Manila city government also extended help in an unusual but grave concern that hounded the city in the days after the earthquake – the lack of enough embalming services due to the volume of casualties. The two funeral parlors in Baguio city have refused to service additional dead bodies; they lacked preservatives.[1568] Bodies were piled up outside funeral parlors, and the stench of deaths drifted across the disaster city.[1569] At the Naguilian Road, bodies pile up in Baguio's two funeral parlors covered only by tents.[1570] Upon knowing this problem, the Manila City Government offered to send morticians to Baguio City; Manila Mayor Mel Lopez solicited the assistance of six funeral parlors who are members of the Mortuary Association of Metro Manila.[1571] Manila City government sent funeral materials and equipment to Baguio to address the needs of the large backlog of dead people to be embalmed.[1572]

Another city in Metro Manila, Quezon City, also extended support to the city Cabanatuan. The city government of Quezon City pledged to donate P500,000 to for the rehabilitation of the said city; with a supplemental donation for Baguio City worth P150,000[1573] The nearby province of Pampanga did their share of charitable act. The Pampanga Provincial Disaster Coordinating Council, led by provincial Governor Bren Z. Guiao mobilized to help Cabanatuan through relief goods, rescue teams, medical personnel, and blood donation drives.[1574] Other large cities in Metro Manila also initiated their form of support to affected communities. Mayors of Metro Manila cities and municipalities launched the "Tulong Bayan" Project, wherein they adopted sitios, barangays, barrios, or municipalities affected by the earthquake.[1575] Makati Mayor Jejomar Binay "adopted" the city of Agoo, La Union, together with the Filipino community in Guam, USA, raising money for the said town through fund and donation drives; other cities in Metro Manila followed the act, such as Malabon, led by Mayor Peng Oreta.[1576] Negros Oriental Vice Governor Pelagio Villegas, Jr., president of Vice Governors and City Vice Mayors League, appealed to the 75 vice governors, and 65 city vice mayors of

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[1566] "Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1567] Ibid.
[1568] "Severe food, water, power shortages hit Baguio city." *Manila Bulletin* 211.19 (19 July 1990): 7, 17.
[1569] "Baguio rescue teams racing against time." *Manila Bulletin* 211.20 (20 July 1990): 1, 21.
[1570] Dana Batnag, "After the Big Quake." *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1571] Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1572] Jesus E. Bigornia, "Manila responds to Baguio's call for help". *Manila Bulletin* 211.27 (27 July 1990): 6, 37.
[1573] "No classes indefinitely." *Manila Bulletin* 211.18 (18 July 1990): 1, 18; "Ecija teams find 64 bodies." *Manila Bulletin* 211.19 (19 July 1990): 1, 21.
[1574] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1575] Wilma Yamzon, Castro, Eddee & Chammag I. S. "Rescuers declare: No more survivors: "Death toll now reaches 830", *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22
[1576] "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5; Lito A. Castapusan, "Beatwatch: Help for quake victims". *Manila Bulletin* 211.25 (25 July 1990): 8; "Quake victims get Guam aid". *Manila Bulletin* 211.27 (27 July 1990): 14.

the Philippines, to support the devastated areas.[1577] The Provincial government allotted P100,000 to the cities of Baguio, Cabanatuan, and Dagupan, as well as for the province of La Union; Governor Melvin Vargas personally donated P10,000, and said, “The people of Cagayan condoles with the families of earthquake victims for the untimely tragedy that befell them.”[1578]

Due to the fast and robust action and support offers of local government units, the executive and the House of Representatives agreed to pass a local government code, after the Malacañang decided to grant LGU officials the power to determine public works in their areas.[1579]

e.2.4 Larger fiscal “calamity”: National budget and foreign debt

The Philippine government, at the start of the decade of the 1990s, was experiencing major fiscal challenges such as problems arising from the massive debt servicing, inconsistent economic growth, and other global economic events. The tragedy of the northern Luzon earthquake during the first half of the decade's first year posed a colossal task to the government, manifested in several practical questions: how to rehabilitate the affected regions, physically and economically, and where to get the money? Following the reported events and actions of the government weeks after the 16 July 1990 earthquake, a more massive calamity was being managed and averted – how to deal with the need to obtain addition rehabilitation fund, without hampering the national budget, and what can be consider as President Aquino non-negotiable action – cutting the debt servicing obligation of the country to the international financial community.

On 18 July 1990, the idea of allocating a considerable amount to be called the "National Reconstruction Fund" was brought up, upon the realization of the national government of the grave extent of the earthquake's effects to major regions in the country, which was estimated to be more than 30,000 people.[1580] As a concrete measure to obtain the necessary government funds for this, Senator Aquilino Pimentel, Jr. pressed the immediate passage of a debt cap bill aimed at channeling the huge budget intended for debt servicing for the rehabilitation of the country from the killer quake.[1581] The senator estimated that the country needed almost P100 billion to the reconstruction project and given the situation, that the debt servicing allocation in the country's annual budget must be limited to 15% of the gross foreign exchange earnings.[1582] The senator cited that in the years of 1987 and 1988, debt servicing ate up 42% and 40% respectively; and for the current 1990 budget, debt servicing was allocated by 25%, which was P75.5 billion out of the P301.6 billion national appropriation.[1583]

[1577] “P12.5 M out for relief aid.” *Manila Bulletin* 211.20 (20 July 1990): 1, 35.
[1578] Fred M. Lobo, “Calamity area widened. Aquino adds Tarlac, Vizcaya.” *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1579] Rod L. Villar, Jr., “Local Gov’t Code pushed in House”. *Manila Bulletin* 211.27 (27 July 1990): 1, 21.
[1580] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1581] Ibid.
[1582] Ibid.
[1583] Ibid.

Coinciding with their previous allocation of immediate relief funds, the House of Representative also initiated their version of a measure to lessen the budget allotted for international debt servicing in the appropriations law for the 1991 fiscal year. The Lower House endorsed on 19 July a two-year suspension on the payment of $28-billion foreign debt, to allocate the budget for debt servicing to programs and projects for the disaster areas. [1584] House Appropriations committee Head Rep. Andaya said that the proposal was a force majeure to suspend the debt payment for two years.[1585] But the President had a strong, opposing stance on the idea of debt servicing budget cut and non-allocation. As a response to the proposal of the House of Representatives on suspending the payment of foreign debts, President Aquino cautioned legislators against taking any move to defer the payment of the country's 26-billion foreign debt despite the noble intention to channel it to the reconstruction and rehabilitation of affected areas.[1586] In a statement, the President raised her concern to measure cutting off or suspending foreign debt payments: "I can only hope that we do not rush into resolution into any action which can be misunderstood to a point where it undermines the goodwill and credibility we now enjoy as well as the already on-going efforts to mobilize external financial resources for our needs…The goodwill that has been shown all towards us in an hour of need has been very touching."[1587] She reiterated that in repercussion of this measure was that the country's credibility before the international financing community might be damaged.[1588] The President instead proposed other measures to co-opt with the financial need for the national rehabilitation. First, she cited that government-controlled banks and insurance institutions, such as the Philippine National Bank (PNB), Land Bank of the Philippines (LBP), and the Development Banks of the Philippines (DBP), and the GSIS and SSS, the Central Bank, and some associations of private banks Association of the Philippines, Inc. (BAPI) and the Chamber of Thrift Banks agreed to help government in financing loans and programs for the affected regions.[1589] Second, the President appealed to banks, business establishments, institutions and individuals to help the earthquake victims by buying “reconstruction bonds”.[1590] Initial P3 billion worth of reconstruction bonds will be issued in peso and dollar for Filipinos here and abroad.[1591] She appealed to overseas Filipinos to avail the “reconstruction bonds”; 100 denominations instead of 1000.[1592] Moreover, President Aquino also urged private organizations, schools, and local governments to "adopt' civic groups, schools, and municipalities in earthquake-ravaged areas by providing assistance to them.[1593] Several days, after, Rep. Jose de Venecia of Pangasinan proposed a new debt suspension scheme with 125 million pesos foreign debt payment to be suspended, wherein an 18 months “dispatch consensus” will be sought with the leaders of 300 foreign banks, the International Monetary Fund (IMF), and the Paris Club for 14 foreign governments.[1594]

[1584] Rod L. Villa, “Solons for debt payment freeze.” *Manila Bulletin* 211.20 (20 July 1990): 1, 17.
[1585] Ibid.
[1586] “Solons cautioned on debt.” *Manila Bulletin* 211.21 (21 July 1990): 1, 14.
[1587] Rod L. Villa, “Solons for debt payment freeze.” *Manila Bulletin* 211.20 (20 July 1990): 1, 17.
[1588] Ibid.
[1589] Ibid.
[1590] Marcia C. Rodriguez, “Gov’t to sell bonds for reconstruction.” *Manila Bulletin* 211.22 (22 July 1990): 1, 17.
[1591] Ibid.
[1592] Rod L. Villa, “Solons for debt payment freeze.” *Manila Bulletin* 211.20 (20 July 1990): 1, 17.
[1593] Marcia C. Rodriguez, “Gov’t to sell bonds for reconstruction.” *Manila Bulletin* 211.22 (22 July 1990): 1, 17; Priscila Arias, “Private sector bailed for aid”. *Manila Bulletin* 211.31 (31 July 1990): 1, 16.
[1594] Rod L. Villa, “New debt scheme sought.” *Manila Bulletin* 211.23 (23 July 1990): 1, 22.

But the House remained through to its first proposal despite the President's opposition to the measure. On 24 June 1990, the Lower House approved the proposal to suspend the payment of foreign debt for 30 months, amounting to 84 billion pesos; citing humanitarian consideration, and seeking compassion from foreign debtors would prevailed in the deliberations.[1595]

A day before the President's annual State of the Nation Address (SONA) on 23 June 1990, Malacañang partly revealed the important legislative requests of President Aquino in the opening of the th regular session of the 11th Congress: (1) To give full support to the government efforts in rehabilitation earthquake devastated areas, (2) the immediate passage of a P10-billion Rehabilitation Fund, in a form of a supplemental budget, as announced by the President in her regular TV/Radio program "Magtanong sa Pangulo", and (3) a visionary goal of adopting economic and political reforms to attain national progress.[1596] Moreover, Malacañang announced that government financial institutions (GFIs) are mobilizing a 1.5 billion rehabilitation fund for business and housing loans.[1597] In her actual SONA speech, these points were highlighted when she gave strong emphasis on the economic rehabilitation of the country from this particular calamity.[1598]

The leaders of the Lower House headed by House Speaker Mitra promised to act immediately to the financial requests of President Aquino. Speaker Mitra said that the opening session would be a "crisis session"; they will dedicate their time in addressing the national disaster that was the 16 July earthquake: "We have to come to a common urgent cause to act quickly and urgently to bring immediate assistance to casualties and reconstruct and rehabilitate up to 80% of public properties destroyed by the earthquake."[1599] The request of a P10-billion fund for reconstruction will be supplemental to the proposed P280-billion national budget for the year 1991.[1600] Further legislative measures initiated by several of the President's allies were also listed in the opening session's agenda, such as Rep. De Venecia's proposition for the immediate release of the 900 million pesos from the President's emergency fund for business and commercial sectors, and Cavite Rep. Leonardo Guerrero proposal of granting of emergency powers to the President to fast track rehabilitation and recovery efforts.[1601] But the session focused on the main item, which was the approval of the P10 billion calamity fund. The House of Representative and the Philippine Senate approved the said economic measure on the opening day of session after the President's SONA.[1602] The Senate made some revisions of the Lower House's version, after several days of debate.[1603] A

[1595] Rod L. Villa, "Foreign debt freed okayed". *Manila Bulletin* 211.25 (25 July 1990): 1, 14.
[1596] "Aquino to ask Congress help". *Manila Bulletin* 211.23 (23 July 1990): 1, 22; "Aquino seeks rehabilitation fund of P10 B: Appeals for nat'l unity". *Manila Bulletin* 211.24 (24 July 1990): 1, 17.
[1597] Ibid.
[1598] Corazon C. Aquino, *Fourth State of the Nation Address*, 23 July 1990, <http://www.officialgazette.gov.ph/1990/07/23/corazon-c-aquino-fourth-state-of-the-nation-address-july-23-1990/>; "State of the Nation Address 1990? Corazon Aquino", *Philippine Daily Inquirer*, 07 July 2015 <http://sona.inquirer.net/109/state-of-the-nation-address-1990-corazon-aquino/>
[1599]"Congress open session today". *Manila Bulletin* 211.23 (23 July 1990): 1, 19.
[1600] Ibid.
[1601] Ibid.
[1602] Rod L. Villa, "Bill OKd by House". *Manila Bulletin* 211.24 (24 July 1990): 1, 21; Olaf S. Giron, "Senate set to OK fund". *Manila Bulletin* 211.24 (24 July 1990): 1, 15.
[1603] Fred M. Lobo, "Senate okays P10 B". *Manila Bulletin* 211.27 (27 July 1990): 1, 37.

bicameral conference committee was set up to polish the versions of both chambers. The committee sent their report to the President for signing on 30 July 1990.[1604]

Upon the approval of the P10-billion calamity fund, President Aquino tapped the National Economic Development Authority (NEDA) to head the assessment and drafting of the allocation proposal on the use of the said funds. Malacañang said reconstruction assessment teams were already fielded to assess the damages of the earthquake; Economic Planning Secretary Cayetano Paderanga told that the reconstruction plan being drawn up speedily by reconstruction assessment teams to facilitate comprehensive rehabilitation of ravaged areas and will integrate regional plans.[1605] He added that the official development assistance (ODA) were to be released to help communities for their comprehensive rehabilitation.[1606]

Another mechanism sought by the national government to cope with the need for an additional budget for the reconstruction of regions affected by the earthquake was the tapping of unused and excess funds from various government agencies. The DBM said that funds from DPWH and DOTC could be used to the rehabilitation of affected areas.[1607] Over P30 billion can be used, P5 billion of which can be set aside for the DOTC for the repair of airports, communication facilities and other structures, and P25 billion for the DPWH for the reconstruction of roads, bridges, ports, and other facilities.[1608] To codify this initiative, on 28 July, President Aquino ordered all government offices to make available their mandatory 10% budget savings to boost funds for the rehabilitation of earthquake-devastated areas.[1609]

Of course, despite all the efforts to source out the needed funds locally, the Philippine government did ask foreign lending institutions for additional loans, despite plans of the Congress to slash out parts of the debt servicing budget to be able to compensate the needed rehabilitation of the regions devastated by the earthquake. Less than two weeks after the disaster, the President started talking to creditor governments for the temporary easing of loan terms and to go other creditors for further relief to free additional resources.[1610] The government has begun discussing with institutions for a $500 million emergency assistance fund for the rehabilitation of communities.[1611] The government is serious in raising $500 million in new funds to reduce the country's debt burden and hasten the rehabilitation and reconstruction of Luzon provinces.[1612] A proposal for a Philippine Aid Plan for international foreign lending institutions, for example, the World Bank and other financial institutions, was drafted for this separative budget-raising initiative.[1613] The approached proposed by the President's economic team was to

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[1604] Rod L. Villa, "P10-B rehab bill sent to Malacañang". *Manila Bulletin* 211.31 (31 July 1990): 1, 18.
[1605] Fred M. Lobo, "Teams to assess earthquake damage". *Manila Bulletin* 211.25 (25 July 1990): 1, 14.
[1606] Ibid.
[1607] "DOTC, DPWH funds to be tapped for rehabilitation work". *Manila Bulletin* 211.25 (25 July 1990): 30.
[1608] Ibid.
[1609] "Savings to boost quake fund". *Manila Bulletin* 211.29 (29 July 1990): 1, 14.
[1610] "RP starts aid, de (PNRC)bt talks". *Manila Bulletin* 211.27 (27 July 1990): 1, 18.
[1611] Ibid.
[1612] E. T. Suarez, "$500 M sought for debt, rehab: Bond drive readied". *Manila Bulletin* 211.30 (30 July 1990): 1, 17.
[1613] Ibid.; "Editorial: Prospects of foreign aid". *Manila Bulletin* 211.29 (29 July 1990): 6.

acquire new debt abroad and to encourage people to buy bonds.[1614] The President appealed for fresh financing from foreign creditors and asked them to support a new buy-back scheme to lessen the country's debt burden.[1615] Finance Secretary Estanislao re-echoed the previous position of President Aquino, saying that "no new money will be released for the Philippines if it will default its debt payment."[1616] One journalist analyzed the possible impact of the President's reluctance to suspend the current debt servicing mechanism: "On the whole, President Aquino's rejection of unilateral action on our foreign obligations should have a sobering effect on the outlook for adjustment of such obligations."[1617]

Photo No. 26

Editorial Cartoon: “Reconstruction and Rehabilitation”[1618]

(Shows that he reconstruction and rehabilitation efforts were slowed down by foreign debt)

[1614] E. T. Suarez, “$500 M sought for debt, rehab: Bond drive readied”. *Manila Bulletin* 211.30 (30 July 1990): 1, 17

[1615] Ibid.

[1616] Ibid.

[1617] “Editorial: Prospects of foreign aid”. *Manila Bulletin* 211.29 (29 July 1990): 6.

[1618] Editorial Cartoon: Reconstruction and Rehabilitation, Roni Santiago

e.3 Donation and Support

The July 1990 northern Luzon earthquake can also be considered a national calamity by the way various sectors of the society supported the cause for rescue, relief, and rehabilitation, through financial, medical, and human workforce support. The extent of donation and non-monetary support went beyond the not only domestically, but also from foreign governments and international organizations. Donations, fund drives, medical supplies, and other specific medical needs, rescue teams and equipment, and rehabilitation proposals and expert advice on matters of disaster rehabilitation were some of the support received by the national government agencies and local government units. Then flow of donations and support manifest several vital points: the Philippines is a prime destination and beneficiary of non-governmental sectors and foreign entities, primarily due to the extent of calamities that struck the country, and in a way, shows the inability of the national government in terms of resources.

e.3.1 Support from Non-Governmental Organizations (NGOs)

The earthquake disaster of July 1990 showed another avenue wherein the thriving sector of non-governmental organization (NGOs) was able to deliver its purposeful existence – help communities and fill/in the gaps of support that marginalized sectors usually do not enjoy from the existing government support system. In the study by Tayag and Insauriga (1992), NGOs and private organizations exhibited great initiatives, played active roles during the disaster, and filled in the shortcomings and work gap, as national and local governments' response left much to be desired.[1619]

In the local level, the Philippine National Red Cross (PNRC) was the most active and engaging NGO concerning their role in relief and rescue operations, as well as some bureaucratic and logistical aspect of the rehabilitation program, particularly on post-disaster assessment of casualties and damages to towns and communities. The PNRC worked side by side with the government; frequently it acted as if it is an official part of the government structure. The PNRC served as liaison to donations and pledges from private and foreign government entities. This service of the PNRC is a practical move in some ways: to avoid the tedious process in Philippine bureaucracy, and to ensure the utmost deliver of donations to the beneficiaries, given the track record of Red Cross as an international organization.

Various private organizations also did their share of extending help and support to the victims of the earthquake by initiating their own activities, whether through fund and donation drives. The table below is a summary of the organizations that pledge support and donations for the earthquake-devastated areas.

[1619] Jean Tayag and Sheila I. Insauriga, “Organization Response to the July 1990 Luzon Earthquake Disaster”, *The July 16, 1990 Luzon Earthquake: A Technical Monograph. Inter-Agency Committee for* Documenting and Establishing Database on the July 1990 Earthquake, 1992.

Table No. 25
Donations from local institutions, private companies and individuals[1620]

Name of Organization	Beneficiary	Donation/Pledge
Philippine National Bank	Victims of the CCP Building tragedy in Cabanatuan	P1.51 million
Philippine Judges Association	Baguio and Cabanatuan	Monetary assistance (Amount not mentioned)
National Prosecutors League of the Philippines		P150,000
Veterans Association of the Philippines and its auxiliary group, the VFP Sons and Daughters Associations; World Veterans Federation, Chinese Veterans of the Philippines Youth Council (CVP-YC)	Baguio and Cabanatuan	"Operation Balikatan"
Councils of Knights of Columbus		Relief donations to towns affected by the earthquake
Public Assistance and Civic Action in Media (PACAG-MEDIA)	Cabanatuan and San Jose, and Dagupan and Baguio	Foodstuff and other donations
Philippine Medical Association and UNILAB Laboratories		"Operation Bayanihan", a medical mission to affected communities
Philippine Construction Association		Equipment for rescue operations
Republic Flour Mills (RFM) Corporation	Pangasinan, La Union, Baguio and Cabanatuan	16-20 truckloads of cooked and ready to eat food items worth P3 million
Philippine Federation of Bakers' Association, Inc. (PFBAI) and Metro Manila Bakers' Association (MMBA)	Baker's Donations Center	Coursed through the PNRC
McDonalds Philippines		Coursed through the PNRC

[1620] Marcia Rodriguez, "200 sill trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22; "P12.5 M out for relief aid." *Manila Bulletin* 211.20 (20 July 1990): 1, 35; Lito. "Neutral Corner: More aid to victims of earthquake." *Manila Bulletin* 211.20 (20 July 1990): 22; Joel Palacios, "P16.5 M released for relief efforts." *Manila Bulletin* 211.22 (22 July 1990): 1, 16; Wilma Yamzon, Castro, Eddee & Chammag I. S. "Rescuers declare: No more survivors: "Death toll now reaches 830", *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22; "Bakers' groups cite aid to quake victims". *Manila Bulletin* 211.23 (23 July 1990): 15; "PMA, Unilab boost drive for quake victims". *Manila Bulletin* 211.23 (23 July 1990): 23; "VFP's 'Operation Balikatan' on". *Manila Bulletin* 211.25 (25 July 1990): 14; "Knights are mobilized to aid quake victims". *Manila Bulletin* 211.27 (27 July 1990): 44; Marcia M. Rodriguez, "Symbols of RP faith and spirit". *Manila Bulletin* 211.29 (29 July 1990): 1,17; "Media group aids quake victims". *Manila Bulletin* 211.30 (30 July 1990); "Repair work on bridges on." *Manila Bulletin* 211.20 (20 July 1990): 1, 17.

Jollibee Foods Corporation		Coursed through the PNRC
University of the Philippines (UP) Diliman	UP Baguio and Central Luzon State University (CLSU)	“Lindol Fund Campaign”
Polytechnic University of the Philippines (PUP)		Fund Drive
Imelda Marcos		Clothes and shoes left in Malacañang, to be coursed through the PNRC

One should note that the delivery of goods was not a sole task of the military. The official Philippine carrier, the Philippine Airlines (PAL) made a significant contribution in the efforts to bring in relief goods and to fly out passengers from the isolated Baguio City. There were PAL flights to San Fernando and Poro Point in La Union, the designated area where the military will carry relief goods to Baguio; the company dedicated 2 Fokker flights for this.[1621] The PAL also opened flights to Tuguegarao, Cagayan province, and Cauayan, in Isabela to bring out stranded passengers in the eastern side of Luzon because of impassable roads and destructed bridges.[1622] From flights coming from Manila, NAIA had set up a section of the airport for the airlifting of relief goods from Manila to affected communities.[1623] On 28 July, 12 days after the earthquake damaged Baguio's Loakan Airport, PAL resumed flights to Baguio and continued to deliver relief goods, most of which from international donors, from US, Japan, France, West Germany, Bangladesh, Denmark, and Saudi Arabia.[1624]

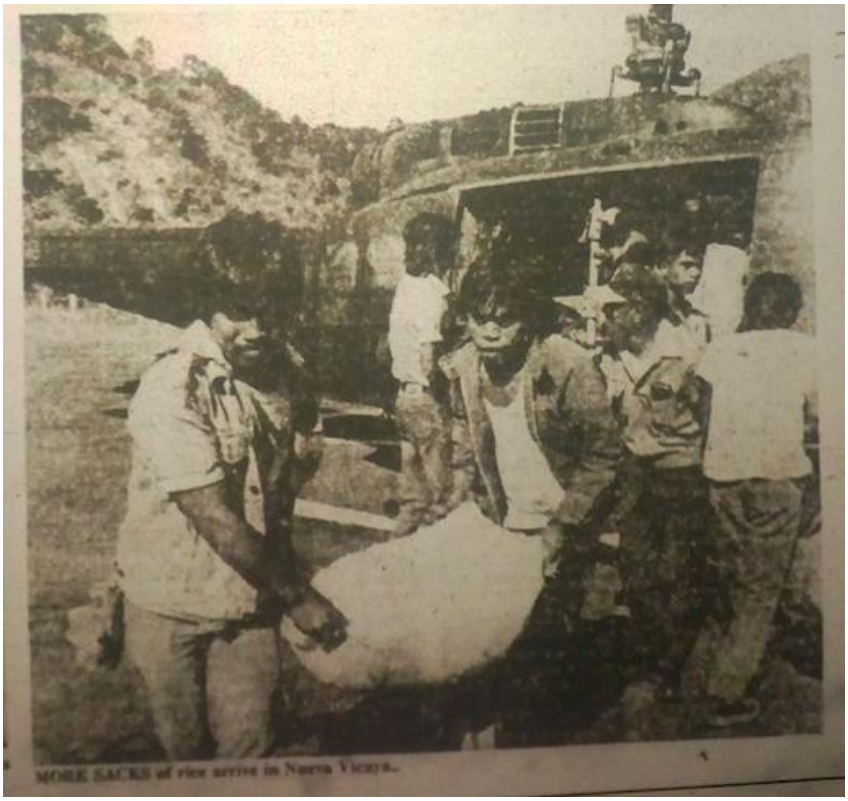
An infamous character in Philippine politics also had her share of support to the victims even though she was out of the country. The former First Lady, Imelda Marcos said that she had personally communicated with President Aquino, and offered to donate to the earthquake victims anyone of her family's assets sequestered by the Aquino government, through the Philippine Commission on Good Governance (PCGG).[1625] In a message relayed to the media by her spokespersons conveyed by Oliver Lozano and Carlos Salazar via overseas call, she said: "I grieve over the loss of lives and destruction of properties caused by the recent earthquake. I only regret that I cannot be with you to personally comfort you and extend a helping hand. Although I am not with you, you have always been in my mind, heart, and soul. I have called upon our friends to extend all possible assistance. Always remember, God will take care."[1626] Mrs. Marcos' other properties kept in Malacañang were slightly damages – statues of saints and her well/kept racks of shoes.[1627]

[1621] Fred M. Lobo, “Calamity area widened. Aquino adds Tarlac, Vizcaya.” *Manila Bulletin* 211.21 (21 July 1990): 1,13.
[1622] Ibid.
[1623] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1624] “PAL resumes Baguio service”. *Manila Bulletin* 211.29 (29 July 1990): 7.
[1625] “Imelda offers assets to victims”. *Manila Bulletin* 211.24 (24 July 1990): 21.
[1626] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1627] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.

The following photos show newspaper photographs of the rescue operations in Nueva Vizcaya, days after the 16 July 1990 earthquake.

Photo No. 27
Relief for victims"[1628]
Photos of relief goods being delivered to different disaster stricken-areas in Nueva Vizcaya

[1628] "Relief for victims". *Manila Bulletin* 211.23 (23 July 1990): 53.



MORE SACKS of rice arrive in Nueva Vizcaya.

The Manila Bulletin Corporation, led by Chairman Emilio T. Yap, started a fund drive that will run for several days.[1629] Starting from 1 million pesos donated by Mr. Pap, encouraged businesses and private individuals to send their donations through their office; the donations and proceeds will be turned over to the Philippine National Red Cross (PNRC) and the Department of Social Welfare and Development (DSWD).[1630] Their offices in Intramuros, Makati, and Cubao accepted donations; names of donors were published in the Manila Bulletin on the issue the day after they made their contributions.

Table No. 26
Donations gathered by the Manila Bulletin Fund Drive, 17-30 July 1990[1631]

Date	Amount (In Pesos)	Highest Amount of Donation and Name of Donor (in pesos)
17 July	1,000,000	1,000,000/Manila Bulletin Corporation
18 July	3,063,775	1,000,000/A.Y. Foundation
19 July	3,014,726	500,000/Philtrust Bank
20 July	3,117,073	500,000/Philippine National Bank
21 July	2,387,867.05	250,000/Liwayway Publishing
22 July	2,386,344.7	500,000/La Suerte Foundation
23 July	6,159,520.08	3,000,000/Kuok Group of Companies
24 July	4,249,233.02	1,000,000/Philbanking
25 July	2,732,100.75	300,000/Philippine Automotive Manufacturing Corporation
26 July	1,294,238.45	100,000/Mr. and Mrs. Francis Solco and Family

[1629] "Manila Bulletin starts fund drive with P 1 million for quake victims." *Manila Bulletin* 211.18 (18 July 1990): 1.
[1630] Ibid.
[1631] "Manila Bulletin starts fund drive with P 1 million for quake victims." *Manila Bulletin* 211.18 (18 July 1990): 1; "A. Y. Foundation gives P 1 M to Bulletin fund drive for quake victims: total now P 3,063,775." *Manila Bulletin* 211.19 (19 July 1990): 1, 14; "Philtrust Bank gives P500,000 to Bulletin fund drive for quake victims; Thursday nets P3,014,726; total on 2nd day is P 6,075,501." *Manila Bulletin* 211.20 (20 July 1990): 1, 4; "PNB donation of P500,000 swells Bulletin fund drive for quake victims to P9,255,575. Third day nets P3,177,073." *Manila Bulletin* 211.21 (21 July 1990): 1, 21; "Manila Bulletin fund drive for quake victims reaches P11,640,742. Also open today to receive donations." *Manila Bulletin* 211.22 (22 July 1990): 1, 14; "La Suerte donates P500,000 to Manila Bulletin Fund Drive for earthquake victims; total now P14,027,087.26". *Manila Bulletin* 211.23 *(23 July 1990*): 1, 52; "Kuok group donates P3 million to Manila Bulletin Fund Drive for earthquake victims; total now P20,186,607.34". *Manila Bulletin* 211.24 (24 July 1990): 1, 20-21; "Philbanking donates P1 million to Manila Bulletin Fund Drive for earthquake victims; total has now reached P24,435,830.36". *Manila Bulletin* 211.25 (25 July 1990): 1, 19; "Manila Bulletin fund drive for earthquake victims; now total P27,167,931.15". *Manila Bulletin* 211.26 (26 July 1990): 1, 12; "Manila Bulletin fund drive for earthquake victims; now total of P28, 462,169.60". *Manila Bulletin* 211.27 (27 July 1990): 1, 20-21; "Manila Bulletin fund drive for earthquake victims; total now P29,619,917.70". *Manila Bulletin* 211.28 (28 July 1990): 1, 14-15; "Manila Bulletin fund drive for earthquake victims passes P30-million mark". *Manila Bulletin* 211.29 (29 July 1990): 1, 17; "Manila Bulletin fund drive gets biggest response from readers, advertisers and general public; now totals P31,018,942.95". *Manila Bulletin* 211.30 (30 July 1990): 1, 23; "Biggest response from readers, advertisers and general public to Manila Bulletin fund drive now reaches P32,298,028.30". *Manila Bulletin* 211.31 (31 July 1990): 1, 18; "Lions aid quake victims". *Manila Bulletin* 211.30 (30 July 1990)

27 July	1,157,746.1	77,525/ Provident Group of Companies Pillars Sales Force & Employees
28 July	785,003.45	104,161/ Employees of Batangas Provincial Capitol (one day salary of employees)
29 July	614,021.8	60,000/ Chemfields Inc. and its employees
30 July	1,270,085.35	500,000/Isetann Group of Companies
	33,231,734.8	

The first trance of fund donation, amounting to P9,255,575.51, was forwarded on 21 July 1990. The PNRC, represented by Chairman General Romeo Espino, and the DSWD by Undersecretary Flora Eufemia, each received P4,627,787.76 worth of donations from the Manila Bulletin Fund Drive.[1632] The second turnover was on 28 July 1990, with each beneficiary organization receiving P10,182,171.09. The remaining amount was turnover in the first week of August 1990. An estimated combined number of 7000 individuals, families, banks and commercial companies, organizations, charity foundations, and corporations gave their donations in this particular fund drive.

e.3.2 Support from foreign governments and organizations

Amongst the foreign governments, the United States led the legion of foreign countries that pledged support, through rescue teams and donations, both financial and other valuable resources such as medicine and food supply. The aid that the US provided to the devastated areas were in the form of rescue and medical teams from the existing US bases in the archipelago, and through financial aid programs for relief and long-term rehabilitation of earthquake-stricken communities. Medics and engineers from Clark Air Force helped PH rescue workers sift through the rubbles in Baguio City; one engineering team composed of 63 civil engineers and 3 Seabees Naval Construction Battalion teams, each with 50 civil engineers deployed from Clark Air Base to Cabanatuan.[1633]The US also sent to Cabanatuan several medical teams, equipment, and supplies: a medical supply airlift with more than 100 pounds of supplies from Clark; a triage contingency response team with 2 medical technicians and full tactical and deployable hospital with 54 beds, 2 ICUs, two interns, 4 surgeons (2 for orthopedic and 2 for general medicine) from Subic 800 to 100 pounds of medical supplies and equipment and 12-15 containers of shelters, clothing, and related supplies from Subic.[1634] US Ambassador Nicolas Pratt, who went to Baguio to check on the faith of some 2,000 Americans visiting or living in Baguio, and upon knowing that there were Americans trapped inside the buildings that collapsed, especially at the Hyatt Terraces, pledged more than P500,000 ($25,000) as donation to the relief efforts, coursed through the PNRC.[1635] AFP Chief of Staff Renato de Villa also said that they immediately used the 6 CH-3 and three H-3 helicopters from

[1632] "Manila Bulletin fund drive for quake victims reaches P11,640,742. Also open today to receive donations." *Manila Bulletin* 211.22 (22 July 1990): 1, 14.
[1633] Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1634] Ibid.
[1635] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. "Death toll: 223; calamity declared." *Manila Bulletin* 211.18 (18 July 1990): 1, 5; Isidro M. "Baguio suffers its worst quake." *Manila Bulletin* 211.18 (18 July 1990): 1, 11; "Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.

Subic Naval Base for airlifting tasking helicopters provided by the Americans in the early days of the rescue operations.[1636] Rescue groups from France, Singapore, US, and Japan arrived and set up a coordinating post at Poro Point in La Union.[1637]

Several governments also handed over their support and donations: Japan, US, France, the European Community, Thailand, Switzerland, Singapore, Nauru, Bangladesh, India, New Zealand, UK, Spain, Germany, Netherlands, Denmark, Canada, Guam, Indonesia, among others.[1638] The Pontiff of the Roman Catholic Church also pleaded for support to the Philippines. Pope John Paul II appealed to the world to send aid to the victims of an earthquake in the Philippines: "I ask for aid to be sent to the wounded, to all those left homeless. I encourage the multiplication of gestures of solidarity that aim to bring help, comfort, and aid to people, in this moment of such suffering for them…We are close in our hearts and in our prayers to all those who have been affected by this tragic event."[1639]

Almost a week long since the rescue operations started, international rescue team added in their work and equipment support in the operations the use of dogs to locate bodies and survivors in collapsed structures. The US DART released a tracker, complemented with four dogs; this heat-seeking equipment determines in the vicinity live victims, and the dogs take off to find possible passageways in the rubble or identify the location of the dead bodies.[1640]Other foreign teams followed this initiative: the 16-man British team had their own dogs, as well as a team from Seattle King Country in Washington, USA, the German Dog Association, and the Rescue Dogs Association of Holland.[1641] The Filipino workers likewise used locally trained dogs in their respective rescue operations areas.[1642]

The table below is a summary of the donations and support sent by various countries to the Philippines concerning the July 1990 earthquake tragedy.

[1636] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. "Death toll: 223; calamity declared." *Manila Bulletin* 211.18 (18 July 1990): 1, 5; "Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1637] Roy C. Sinfuego, "2 aliens among dead." *Manila Bulletin* 211.19 (19 July 1990): 1, 20.
[1638] Marcia C. Rodriguez, "Gov't to sell bonds for reconstruction." *Manila Bulletin* 211.22 (22 July 1990): 1, 17.
[1639] "Pope appeals to world for RP". *Manila Bulletin* 211.24 (24 July 1990): 1, 22.
[1640] Romy V. Mapile, "Dogs seek quake victims." *Manila Bulletin* 211.21 (21 July 1990): 1, 13.
[1641] Ibid.
[1642] Ibid.

Table No. 27
Donations from Foreign Governments and International Organizations[1643]

Country	Specific Agency	Amount of Pledge/Donation
United States of America	US Embassy	$25,000 Initial Donation Rescue and medical teams - Disaster and Response Team (DART) from Clark Air Base and Subic Naval Base Philippine Assistance Program (PAP) USAID Donations
	AmeriCare Foundation	56-bed mobile hospital, contingent of paramedics and food supply
	American Foundation of New Canaan in Connecticut	A shipment of 20,000 pounds of Nutvern, a nutritious drink
	"Operation USA"	$650,000 worth of relief goods
Japan	National Government	$300,000 and medical team
	Marubeni Corporation	P500,000
West Germany (Federal Republic of Germany)	West Germany Embassy	P1.5 million worth of antibiotics and other medical needs, and P1.5 million worth of plasma blood donation
United Kingdom		16-man international rescue corps, and a planeload of relief goods and medical supplies worth P800,000
Australia		$200,000

[1643] "Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18; Marcia Rodriguez, "200 sill trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22; Roy C. "2 aliens among dead." *Manila Bulletin* 211.19 (19 July 1990): 1, 20; "Baguio rescue teams racing against time." *Manila Bulletin* 211.20 (20 July 1990): 1, 21; Fred M. "Food Rushed to N. Luzon: Price controls on prime goods." *Manila Bulletin* 211.20 (20 July 1990): 1, 20; Rod L. Villa, "Solons for debt payment freeze." *Manila Bulletin* 211.20 (20 July 1990): 1, 17; Gaspar Baltazar, "Quake shows gov't problems." *Manila Bulletin* 211.21 (21 July 1990): 11; Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13; Aris R. Ilagan, "Rescuers move to Vizcaya, Ecija. Official death toll now 738." *Manila Bulletin* 211.22 (22 July 1990): 1, 22; "Aquino to ask Congress help". *Manila Bulletin* 211.23 (23 July 1990): 1, 22; Patrick Apostol, "US Filipinos raising $2 M". *Manila Bulletin* 211.24 (24 July 1990): 13; "Editorial: Encouraging sign". *Manila Bulletin* 211.25 (25 July 1990): 6; "Quake victims get Guam aid". *Manila Bulletin* 211.27 (27 July 1990): 14; Marcia M. Rodriguez, "Symbols of RP faith and spirit". *Manila Bulletin* 211.29 (29 July 1990): 1,17.

Thailand	National Government	500 metric tons of rice worth $95,000 from Thailand
France	National Government	1 million Francs (est. P4.27 million)
Canada	Canadian International Development Agency (CIDA)	$100,000 Canadian
Taiwan (Republic of China)		$200,000
New Zealand		$50,000
Indonesia		Planeload of medicines, blanket, and food items
Kingdom of Saudi Arabia	International Islamic Relief Office	P230,000 and 38 tons of foodstuff
Denmark		250,000 Danish Krone
South Korea		$50,000 Sent the South Korea Crisis and Disaster Team (SKCDT)
Papua New Guinea		Technical Cooperation Agreement
Asian Development Bank		Pledged Loan Grants
Child International	FPAL	P10,000
Humedica		2.5 tons of medicines, disinfectants, and blood substitutes
Filipino Community in Washington, D.C. and Los Angeles, USA	“Operation US Aid”	$50,000 initial donation; $2 million peso followed; United Airlines airlifted relief goods
Philippine Consulate in Los Angeles, USA		$30,000
Filipino community in Guam		2 plane-loads of relief goods for Agoo and Aringay in La Union

Photo No. 28
Editorial Cartoon: "Helping Hand From The Outside"[1644]
(Shows countries such as Spain, US, Japan, UK, Canada, Switzerland and Sweden symbolically helping the Philippines)

[1644] [Editorial cartoon by Norman Isaac]. *Manila Bulletin* 211.22 (22 July 1990): 6.

Photo No. 29
Editorial Cartoon: "KABISIG-POST QUAKE"
World, Government, and Citizenry join hands to help the victims[1645]

The flow of support from outside the country did not escape the problematic bureaucracy in the Philippines. There were a lot of problems encountered and observed by foreign entities and international rescue teams when they tried to hasten the arrival of the workforce, equipment, and donations to the Philippines. Foreign rescue teams had a hard time bringing in their apparatus, equipment, and supplies due to stringent rules and

[1645] [Editorial Cartoon by Norman Isaac]. *Manila Bulletin* 211.21 (21 July 1990): 6.

regulation in the bureau of customs and "guidelines" promulgated by an ad hoc body.[1646]Moreover, the usual “red tape” hampered the foreign rescue teams sending of equipment to the country; one journalist commented on this issue: “It would seem that it is incumbent upon the Philippines to ensure at least hospital treatment for the aid materials and personnel that were sent to the country.”[1647]Another new correspondent argued, "Let us not be squealed, finicky or embarrassed about receiving aid from foreign governments. It stands to reason that were we sufficient, we would not need help from the outside world. Yet, in an increasingly interdependent global neighborhood, self-sufficiency is fast becoming an idle reverie."

e.3.3 Benefit concerts and shows to raise funds for the victims of the earthquake

The Philippine entertainment industry initiated several fundraising activities to gather financial donations for the victims if the July 1990 earthquake. Concerts and airing of concert show abroad in primetime television networks were some of the activities done to raise funds for the earthquake victims. Thousands of relief donors heeded TV and newspaper campaigns for a cause and food donations; one TV station raised close to P40 million.[1648]

On 22 July 1990, the Organisasyon ng mga Pilipinong Mangaawit (OPM) organized a 6-hour concert “Malasakit! Alay ng Artistang Pilipino sa mga Nasalanta ng Lindol”, held at the Folk Arts Theater.[1649] OPM stars who performed in the concerned include Regine Velasquez, Martin Nievera, Pops Fernandez, Zsa Zsa Padilla, Mitch Valdez, the Apo Hiking Society, Jose Marie Chan, Celeste Legaspi, Janno Gibs, Bimbo Cerrudo, Dulce, Jamie Rivera, Francis Magalona, Smokey Mountain, Ryan Cayabyab, Joey Albert, Ramon Jacinto, The Dawn, Marco Sison, Louie Reyes, Ivy Violan, Louie Reyes, and other big stars; CCP artists accompanied them, including Ballet Philippines, Bayanihan Dancers, Philippine Philharmonic Orchestra, Philippine Ballet with Lisa Macuja, and other performing organizations.[1650] OPM President Mitch Valdez and Maria Teresa Roas, CCP President, urged all lovers of Filipino music to go to the concert; the tickets in the show were purchased through the form of cash and P1,000 worth of donations sent someone in the front seat of the theater.[1651] Unfortunately, poor attendance marred the concert and collected only P100,000.[1652]

Television networks such as the PTV, GMA, and RPN 9 spearheaded concert events to gather funds for the victims of the earthquake. On 30 June, RPN 9 organized “Rescue 9”, at a full house Music Museum that featured top artists who performed for free, most belonging to the OPM, such as Verni Varga, Manilyn Reynes, Kuh Ledesma, Pinky Marquez, Mitch Valdes, Tessie Tomas, Ivy Violan, Dulce, Jamie Rivera, Sharon Cuneta, Pilita Corales, Regine Velasquez, Martin Nievera and Pops Fernandez, Ray-An Fuentes,

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[1646] “Editorial: Relax rules during disasters.” *Manila Bulletin* 211.22 (22 July 1990): 6.

[1647] Gaspar Baltazar, “Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake.” *Philippine Graphic* 1.9 (13 August 1990): 7-8. Baltazar, "Quake shows gov't problems." *Manila Bulletin* 211.21 (21 July 1990): 11.

[1648]

[1649] “Quake aid concert today.” *Manila Bulletin* 211.22 (22 July 1990): 5.

[1650] Ibid.

[1651] Ibid.

[1652] “Song, Dance & Quake Aid.” *Philippine Graphic* 1.9 (13 August 1990): 12-13.

Nonoy Zuniga, Bimbo Cerrudo, Apo, Mon David, Gary Valenciano, Janno Gibbs, and Ogie Alcasid.[1653] One characterized the concert as, "They were singing with a conscience at last."[1654] The said TV network, hoping to raise funds for quake victims, also aired concerts late evenings, such as that of “Tux Ate” the CCP, “Regine 1990”, “Sharon Cuneta US Concert 1990”, “Airborne”, Martin Nievera’s concert, and Gary Vs’ “Heart and Soul,” and OPM’s “Awit a la Carte”.[1655] Meanwhile, PTV and GMA 7 organized “Sing for a Cause…Give to a Cause”, also, a fundraising concert.[1656]

A fashion show-concert titled "Project Payanig" dedicated for the victims of earthquake in Dagupan City and Agoo and Aringay in La Union was held on 31 July 1990 at the Hotel Intercontinental Manila, wherein 63 models of the PMAP, Profile and John Robert Powers and almost twenty fashion designers including Robert Tongko, Wanda Louwallien, Joey Espino, Jan Garcia, and Oskar Atendido were featured.[1657] Rico J. Puno, Mitch Valdes, OPM members, Ben Farrales, Marco Sison, Roeder, Miguel Vera, Dulce, Ivy Violan, Bimbo Cerrudo, Donna, and Pinky Marquez, starred the event.[1658]

A free concert titled “Solid, the Rock that Doesn't Roll” was held at the Ultra on 04 August, which featured local and foreign artists including Flashback (USA) and the Convertibles with the special participation of Genesis artists, Gary V., Ray An Fuentes, Audie Gemora, Carla Martinez, Felici Pangilinan, and the Powerplay Band, also for the benefit of the earthquake victims.[1659] Visiting foreign artists also made significant contributions by donating proceeds of their performances, including Howard and Anthony Aibel, who performed with the APO, and illusionist Andre Kole who performed at the PICC.[1660]

Radio commentators also helped in boosting donating and urgent support for the victims and in the rescue operations. Radio anchors and reporters such as Francis Calzado and Rey Langit of DZNL, who made live reports from the ground in Baguio, and others radio anchormen Bert Silva, Cesar Chavez, Dick Sinchongco, Andy Vital, and Loy Caliwan.[1661]

Other organizations such as the Center for Pop Music and the UP Madrigal singers both held their benefit concerts for the victims of the earthquake in Cabanatuan and Baguio City.[1662] The proceeds of the successful play “Madame Butterfly”, starring Behn Cervantes and R.S. Francisco also went to the quake victims.[1663] A benefit concert by the Ateneo Scholarship Fund, “One Big Fight” sponsored by Ateneo High School Class of ’65, donated proceeds to quake victims.[1664] Ateneo alumni who performed for free were members of the APO, Dyords Javier, Fe de los Reyes, Jose Mari Chan, Louie Heredia, Jun Urbano, Leo Martines, and Noel Trinidad.

[1653] Ibid.
[1654] Ibid.
[1655] Ibid.
[1656] Ibid.
[1657] Ibid.
[1658] Ibid.
[1659] Ibid.
[1660] Ibid.
[1661] Chona S. Trinidad, “Help through the Airwaves.” *Philippine Graphic* 1.9 (13 August 1990): 11.
[1662] “Song, Dance & Quake Aid.” *Philippine Graphic* 1.9 (13 August 1990): 12-13.
[1663] Ibid.
[1664] Ibid.

e.4 Deaths and casualties

The 16 July 1990 north Luzon earthquake will always be remembered as one of the most devastating earthquakes that hit the country in its recent past because of the number of lives it took. The magnitude the destruction in the northern region of Luzon directly corresponded to a large number of reported and recorded mortalities and injuries. But the problems of the government in dealing with these fatalities went beyond statistics; the reporting, misreporting, and uncoordinated reporting scheme of casualties and injuries, and the cases of apparent "suffering pornography" during the almost a month-long rescue and relief operations in important cities where the earthquake caused the most devastation. As similar to previously tragic earthquake events in the archipelago's history, there was no definite number of deaths and casualties as far as the government and media were concerned. But behind these problems of casualty reporting, the stories of suffering and survival became the center of the whole rescue and relief operations. The accounts of survivors of the earthquake in Baguio and Cabanatuan were indicative of what is characterized as "Filipino" in times of tragedies and disasters, no matter how parochial or problematic those may seem: hope, resilience, and nationalism.

e.4.1 Deaths and survivors

It was an afternoon when the earthquake struck Luzon on 16 July 1990. Baguio and Cabanatuan were almost at the last stretch of their daily life, especially amongst workers, students, and tourists, when the tremor put the two cities into rubbles. The people were busy with their end day chores when the tragedy happened. People were caught off guard; the location and intensity of the earthquake made the situation even worse, and as if it was a disaster at the right place, at the right time, with everything that happened afterward totally wrong.

e.4.1.1 In Baguio

The earthquake turned the summer capital of the country into a chaotic wilderness, as it put into rubbles hotels, commercial establishments, and residential areas. Many people were trapped inside collapsed buildings, and for the next two weeks since the earthquake struck the city, rescue operations were done, but not all victims were lucky enough to be rescued. There were a lot of missing persons and unknown deaths. One journalist described the scenery in Baguio as, "For weeks to come the fog will creep through ruined buildings and the cold air will carry, not the scent of pines, but the munch of the dead." It was reported that "bodies were piled up outside funeral parlors and the stench of deaths drifted across the disaster city…" and bodies of passengers line up in Kennon Road after the quake buried the buses in a landslide and pushed one into the cliff, and that the recovery was arduous.[1665] The food situation also forced people into begging, an exodus out of the city. One man recounted: "36-year old man: "We are leaving Baguio because there is no food, there is no water, we are very hungry."[1666]

[1665] "Baguio rescue teams racing against time." *Manila Bulletin* 211.20 (20 July 1990): 1, 21.
[1666] Ibid.

Upon President Aquino's ocular visit in Baguio city, there were 142 reported deaths in the city, and many people were trapped in big buildings such as in Hyatt Terraces, 60; Nevada Hotel, 30, Baguio Park Hotel, 40, and Hilltop Hotel, 20.[1667] PMA cadets helped in the rescue operations; they were the first to do rescue work in Baguio Export Processing Zone, Hyatt Terraces and Nevada Hotel.[1668] Miners from mining companies such as Philex, Altas, Lepanto, and Benguet Mines helped in the operations as well.[1669] They helped not only in the collapsed hotels, but also to save fellow miners in other mining sites in Benguet.[1670]

One of the first reported casualties was Alice Laya, wife of Former Central Bank Director and Education Minister Jaime C. Laya, who was confirmed dead at the Nevada Hotel.[1671] Also in the list of recorded deaths were a group of foreigners composed of two Americans, a Japanese, a Chinese, and a Taiwanese.[1672] By 25 July 1990, authorities reported 379 de[1673]In Baguio city only, most of which were pronounced dead after rescue attempts in collapsed hotels and establishments. Sad stories of casualties were reported to the media by the media. Ronaldo Manlises and Flordeliza Poquiz went to Baguio and checked in the Baguio Park Hotel for their honeymoon.[1674] The hotel collapsed due to the earthquake; rescuers found the two tightly embracing one another.[1675] Two foreigners were identified in several collapsed buildings: a certain Mrs Pai from Taiwan and a certain Mr. Kim from Korea.[1676] During the rescue, an American pilot known as Captain Shannon, died after his plane crashed in a mountain near Loakan.[1677]

Table No. 28

List of casualties in Baguio City (Hyatt, University of Baguio, La Trinidad, EPZ), reported after a week of rescue operations, 22 July 1990[1678]

Paulino Arceo	Rufino Bustamante	Julieta Abulencia	Juan Seguia
Ma. Teresita Cauba	Arnel Pigao	Resty Amid	Josephine Sibay
Ma. Flordeliza San Juan	Charito Pabinicio	Agnes Annanayan	Alexander Singson
Manilyn Caures	George Cawi	Bernardo Anbion	Lita Sotto
Felix Taccad	Rosita Paceteng	Eva Ancheta	Abdul Rahim Sultan

[1667] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1668] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1669] Ibid.
[1670] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. "Death toll: 223; calamity declared." *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1671] "Baguio rescue teams racing against time." *Manila Bulletin* 211.20 (20 July 1990): 1, 21.
[1672] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1673]aths Roy Sinfuego, "Death toll now 1,597". *Manila Bulletin* 211.25 (25 July 1990): 1, 16.
[1674] "Honeymooners die in quake". *Manila Bulletin* 211.30 (30 July 1990)
[1675] Ibid.
[1676] Roy Sinfuego, "2 aliens among dead." *Manila Bulletin* 211.19 (19 July 1990): 1, 20.
[1677] Marcia C. Rodriguez, "Gov't to sell bonds for reconstruction." *Manila Bulletin* 211.22 (22 July 1990): 1, 17.
[1678] "List of quake fatalities here." *Manila Bulletin* 211.22 (22 July 1990): 1, 19.

Alexander Singson	Bernardo Mandawe, Sr.	Imelda Ancheta	Marlen Sultan
Benec Aquino	Petronilo Alfosto	Sonica Ansaan	Sraul Sultan
Rommel Daberinto	Lurecia Quimmayog	Benigni Aquino	Jose Sy
Mary Jane Cestora	Aida Roxas	Puline Arceo	Melchor Tabangora
Edlyn Gonzales	Ericson Esican	Benito Arriola	Felix Tacad
Daisy Maulbecker	Julius Bando	Leticia Cruz Reyes	Thema Tacaw
Bernardo Ofrasio	Policarpio B. Sandia, Jr.	Martin Joseph Reyes	Rosemarie Tadifa
Marciana Bacolong	Emma Mendoza	Jane Rinando	Rommie Tac-Tac
Jane Flores	Chang No Suk	Julia Rosing	Jennifer Talavera
Felimon Alejo	Nopomuceno Gomez	Paquita Rufieron	Paul Tanteco
Jose Perocho	Leticia C. Reyes	Rosemarie Saduin	Mercedez Tasciong
Jennifer Talavera	Donni R. Tagatag	Samuel Sad-o	Sacing Temas
Cora Canella	Locloc P. Bagsit	Resty Salazar	Imelda Yu
Abelardo Malaminion	Eden H. Cabbab	Ma. Flordeliza San Juan	
Reynado Cruz	Juliet de Jesus	Consuelo Salamanca	

Due to a large number of injuries and immediate survivor treatment operations, PNRC focused on collecting enough blood supply for the victims. They were able to collect blood from 5000 people from and outside Baguio City, including Vice President Salvador P. Laurel.[1679] Angelito Caponpon, 32, said in an interview after donating blood was the only thing he can do to help since he does not have money: “Maraming humihingi ng tulong. Wala naman tayong maibigay na cash. Kahit dugo lang ang maitulong.”[1680]

Stories of survival were also the center of the media coverage of the rescue operations in Baguio. One prominent person rescued was Sonia Roco, wife of then House of Representative Assistant Majority Floor Leader Raul S. Roco, was trapped in the Hyatt Terraces.[1681] She recounts, “It was dark,” she recalled. She started groping to get a feel of the things around her. “I felt the papers. The electric fan went inside the table. The chairs [also] went inside, so it sort of gave support. The vase was here, and then outside of the table frame, when you put out your legs, it’s already the ceiling that fell. Then at the back, I knew there was somebody who instantly died…”[1682]

On 22 July 1990, a week after the rescue operations started, the Presidential Task Force for Rescue and Relief Operations for Baguio and Benguet (PTDFB) declared that

[1679] “Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake.” *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1680] Ibid.
[1681] “Severe food, water, power shortages hit Baguio city.” *Manila Bulletin* 211.19 (19 July 1990): 7, 17.
[1682] “Sonia Roco: Eyewitness to the 1990 Luzon earthquake”, <https://bit.ly/2rbZdjL>, Date accessed: 31 October 2018.

chances are nil for finding more survivors.[1683] The PTDFBB said that if foreigners are still willing to come, they are welcome, but the chances to find survivors was almost zero.[1684] Local rescuers continued to work in Nevada Hotel, Hyatt Terraces, St. Vincent Church, University of Baguio, FRB Hotel, Aurora Theater, and Queen of Peace Church, as long as safety warranted them.[1685]

A casino employee of Hyatt Terraces, Harvey de la Cruz, was rescued from ruins of a hotel, after nine days of being trapped. He said he survived by praying to St. Anne and eating tissue paper until rescuers found him: "I remember what my grandmother told me when I was a child: Pray to her when you are in peril. I did. Every time it shook, I called out her name."[1686] At the 11th day of the rescue, when the rescuers lost hope that there are no more survivors, two people were recovered at the Hyatt Terraces, between 9 to 11 in the evening of 27 July.[1687] They were Eliza Mallorca, 23, a hotel cleaner, and Arnold Calabia, 27, a security guard both employees of the Philippine Amusement and Government Corporation (PAGCOR) that had a branch at the said hotel.[1688]Authorities said that houseflies buzzing led the, to the survivors.[1689] In an interview, the two survivors said that they "owed their second lives to the Almighty, their inner strength, and to their rescuers, who refused to accept that there was no longer hope for any survivors."[1690] One rescue team head said, "They had no food and drank urine for the first six days…when it started to rain, they managed to gather the water and used that to survive until they were rescued."[1691]President Aquino also praised the two survivors. She said that Mallorca and Calabia were "shining examples of the indomitable Filipino spirit…symbolize our people's unswerving faith, determination to rise from this disaster, and aspirations for a much brighter future."[1692] Two days after the rescue of the two, a fire caused the halting of the rescue operations at the Hyatt Terraces.[1693] But this didn't stop the rescuers; instead, after the recovery of the two survivors, local rescuers boosted further hopes to continue the search and rescue to recover possible additional survivors, after day 13 of the operations.[1694] Two weeks after the earthquake, some miners from Philex Mining saved a certain Pedrito Dy, 27, from Aringay, La Union, and an assistant cook in Hyatt Terraces; he was running low in blood and sugar.[1695] Dy was entombed for almost 14 days. He said in an interview, "I ate nothing, But I drank rainwater and urine. My pillows were the broken arms and corpses of my dead companions. You could say

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[1683] Wilma Yamzon, Castro, Eddee & Chammag I. S. "Rescuers declare: No more survivors: "Death toll now reaches 830", *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22

[1684] Ibid.

[1685] Ibid.

[1686] "A survivor's story". *Manila Bulletin* 211.25 (25 July 1990): 9.

[1687] "Two survive 11 days in Baguio ruins". *Manila Bulletin* 211.28 (28 July 1990): 1, 21.

[1688] "Quake victims survived 11 days in hotel lift shaft amid rubble". *Manila Bulletin* 211.29 (29 July 1990): 7.

[1689] "Fire halts Hyatt search". *Manila Bulletin* 211.29 (29 July 1990): 1, 18.

[1690] Marcia M. Rodriguez, "Symbols of RP faith and spirit". *Manila Bulletin* 211.29 (29 July 1990): 1,17.

[1691] "Quake victims survived 11 days in hotel lift shaft amid rubble". *Manila Bulletin* 211.29 (29 July 1990): 7.

[1692] Ibid.

[1693] "Fire halts Hyatt search". *Manila Bulletin* 211.29 (29 July 1990): 1, 18.

[1694] "Baguio rescue pressed". *Manila Bulletin* 211.30 (30 July 1990): 1.

[1695] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8; Isidoro Chammag, "1 more saved from Hyatt ruins". *Manila Bulletin* 211.31 (31 July 1990): 1, 17.

this is a miracle because he had no food for two weeks and yet survived."[1696] A journalist who covered the rescue operations at the Hyatt Terraces witnessed relatives of missing individuals, believed to be trapped inside the collapsed hotel: "At the Hyatt, relatives of those trapped inside cry softly as they hold a Mass for their loved ones on the sixth day of their vigil, their silent grief more eloquent than any prayer can ever be."[1697]

Photo No. 30
President Aquino's ocular visit at the Hyatt Terraces in Baguio[1698]


President Aquino visits the Hyatt Terraces in Baguio & confers with national & local officials in charge of rescue & relief operations

Many students from UP Baguio, many of whom were dormers and rentees in boarding houses in the state university's campus in Baguio City, were listed safe from the earthquake. A newspaper published their names so that their families and relatives would be informed of their situation: they were Pocholo Davalsantos and Ryan Sebastian (Cavite), Luvy Butler (Zamboanga City), Ethel Parulan (San Miguel, Manila), Teresita Serrano (Legazpi City, Albay), Lorena Bantoig, Mia Marte and Joji Sembrano (Quezon City), Gina Panlilio and Clarita Sagun (Pampanga), Michelle Fajardo and Rea Detabali (Las Piñas), Beverlyn Navarro (Tarlac, Tarlac), Jess Tuguero (Tarlac), Miguon Jewelle Italarde (Puerto Princesa, Palawan), Jane Yo (Caloocan City), Mr. Barbu (Zamboanga), Henry Silva (Davao City), Joel Chutan (Pangasinan), Medi Rodriguez

[1696] "Cook trapped in earthquake ruins for 14 days rescued". *Manila Bulletin* 211.31 (31 July 1990): 7.
[1697] Dana Batnag, "After the Big Quake." *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1698]

(Mandaluyong), Mariette Tumbali (Pasig), and Marilyn Salonga (Dagupan).[1699]

In a study made in 1994, comparing the July 1990 north Luzon earthquake, Baguio and its surroundings had thelargest part of the 1666 reported casualties.[1700]

e.4.1.2 In Cabanatuan

Next to Baguio, Cabanatuan followed in the tally of the most devastated and the highest number of reported casualties and injuries. Of the 84 reported deaths in the whole province of Nueva Ecija during the first day of the rescue operations, almost all were from Cabanatuan and San Jose; 45 deaths happened in a college building and a movie theater in the former.[1701] By the second day, it reached 100, 60 of which came from Cabanatuan.[1702]

The collapse of the Christian Colleges of the Philippines (CCP) was the center of the rescue operations in Cabanatuan City. It was one single tragedy in the whole earthquake disaster of 16 July 1990, described as "a harrowing ordeal that would forever be etched in the psyche of the residents, both victims and survivors, and in the history of the country."[1703] The building's collapse was due to vertical ground movement near the epicenter that registered 7.7 intensity scale and magnitude eight both in Cabanatuan and nearby areas.[1704] The flow of rescue support from the Central Luzon region headed towards Nueva Ecija. Unlike Baguio, the situation did not isolate Cabanatuan from the transportation network. American servicemen from Subic rushed to the city; Japanese and British rescue teams went with their gears and equipment, sending an elite group of disaster responders.[1705] Rescue efforts hasted as telescopic craned arrived.[1706] The people of Olongapo, led by Mayor Gordon, also mobilized themselves – donating whatever is needed for Cabanatuan.[1707]

For most survivors at the CCP, the earthquake of 16 July was a terrible end of their day in school. Loida Gabwat, a 14-year-old high school student, said that they just finished their Math examination when the earthquake.[1708] She recounted she had said while being trapped inside the collapsed building the following: "Mommy, mommy come here. I can't go through this alone,my friends are dead inside."[1709] Students as young as seven

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[1699] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1700] Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo. Descriptions, effects, and lessons learned*, p. 58.
[1701] "68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1, 6; "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1702] Marcia Rodriguez, "200 sill trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1703] Ody Fabian, "Cabanatuan's Nightmare." *Philippine Graphic* 1.7 (30 July 1990): 6-8.
[1704] Cesar M. Carpio, "Earthquake Country." *Philippine Graphic* 1.7 (30 July 1990): 11.
[1705] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1706] "Ecija teams find 64 bodies." *Manila Bulletin* 211.19 (19 July 1990): 1, 21.
[1707] Emilio Juan, "Dick Gordon to the Rescue." *Philippine Graphic* 1.9 (13 August 1990): 9-10.
[1708] Eillen Guerrero, "Earth quakes… then there was silence." *Manila Bulletin* 211.18 (18 July 1990): 7.
[1709] Ibid.

years old were scrambled in between slabs of concrete; Cenando Memping, 14, said some of his friends were trapped inside the building.[1710] Memping survived, but most of his friends died after being brought to the hospital.[1711] Debbie Manalo, 14, 2nd-year high student, said that she wrote a note in her notebook and put it outside in between the concrete slabs; that piece of paper served as a guide for rescuers sifting through the debris, and it led to Debbie's rescue three hours later.[1712] Orly Tungala, 15, 4th-year high school student, said that some of his fellow students strengthened their hopes by praying and singing church songs since most of them were members of a nearby San Nicolas Parish.[1713] Some boys slipped through cracks of the collapsed building to give food and water to trapped individuals inside; one boy, Florencio Alana, found his brother Cesario dead inside the building, while another one, Marlon Magpayo, 13, were able to go inside the buildings five times.[1714] Leonidez Cabico, 18 years old, whose leg was cut off, wrote down their names and hurled it in a hole; the rescuers gave her a microphone and to guide them where they were.[1715]

There were also reported deaths outside the CCP area. Victor Guinto, 49, a farmer survived after a structure in a market collapsed; but his companions, Crispin Almeda, a barangay captain of barangay Zaragoza, and Maximiniano Bautista, another barangay official, were not as fortunate as him.[1716] In Caranglan, Nueva Ecija, it was said that 14 families were buried alive in a landslide.[1717]

The following were the other rescued individuals from the CCP, mostly students, during the first hours of rescue operations: Robin Padilla, Joel Candelaria, Christopher Pablo, Ricardo Segovia, Divina Miguel, Rosalie Santos, Menandro Reyes, Marivic Itorsano, Gloria Santos, Albert Pareni, Sominador Andres, Teofilo Tecson, Maribel Aquino, Rosario de los Reyes, Diosa Santos, a teacher, and another unnamed faculty of CCP.[1718]

Several days after the search and rescue operations, relatives and friends of trapped victims in the CCP in Cabanatuan are still hoping despite the statements that there are no more survivors.[1719] Furthermore, parents of students trapped in the CCP building will seek government investigation about the collapse of the building.[1720]

[1710] Ibid.
[1711] Ibid.
[1712] Ody Fabian, “Cabanatuan’s Nightmare.” *Philippine Graphic* 1.7 (30 July 1990): 8.
[1713] Ibid.
[1714] “Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake.” *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1715] Ibid.
[1716] Ody Fabian, “Cabanatuan’s Nightmare.” *Philippine Graphic* 1.7 (30 July 1990): 8.
[1717] Wilma Yamzon, Castro, Eddee & Chammag I. S. “Rescuers declare: No more survivors: “Death toll now reaches 830”, *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22
[1718] Ibid.; Owen Masaganda and Nick Sagmit. “250 students trapped in rubble. Over 40 confirmed dead.” *Manila Bulletin* 211.17 (17 July 1990): 5.
[1719] Emily Peña, “Relatives still hope for survivors.” *Manila Bulletin* 211.22 (22 July 1990): 1, 20.
[1720] Dante Solano, “It was 8.2 in Cabanatuan.” *Manila Bulletin* 211.18 (18 July 1990): 1, 21.

e.4.1.3 In Pangasinan, La Union, Nueva Vizcaya, and Tarlac

Aside from Benguet and Nueva Ecija, four other provinces were put into a state of calamity by the national government to address the needs for rescue, relief, and rehabilitation measures. Several towns in the provinces of Pangasinan, La Union, Nueva Ecija, and Tarlac were severely hit by the earthquake as well. Compared to Baguio and Cabanatuan, Dagupan in Pangasinan, the towns in La Union, and other parts of Luzon affected by the earthquake, such as Nueva Ecija, Tarlac, and even Metro Manila, suffered fewer casualties. But the numbers were still significant; and these mortalities piled up with the massive economic loss that these provinces, especially Pangasinan and La Union.

In Pangasinan, by the third day of relief operations, authorities reported over a dozen casualties of the earthquake, 11 from Dagupan City and one from one town at the eastern side of the province.[1721] On 30 July, DSWD reported that Pangasinan incurred 34 deaths.[1722]

In Binalonan, Pangasinan, many houses, including the Philippine Independent Church collapsed, killing several persons. [1723] The earthquake force at least five private beach resorts catering to foreigners to close shop; It will probably take a year or two before these beach resorts can be restored.[1724] An estimated 200 million was needed to restore destroyed concrete revetments, riprapped dikes, riverbanks, and other flood control systems in Pangasinan and Tarlac.[1725] In Tarlac, 29 were reported injured and brought to the hospital; authorities established evacuation centers in Gerona, Pura, Ramos, Concepcion, and Paniqui. [1726]

In La Union, the gradual release of reports indicated that the province had a total of 56 mortalities, after two weeks of relief operations in the whole province.[1727] The apparent focus of government to Baguio and Cabanatuan partly left La Union towns for weeks with no flow of support reaching the province. “We have been at a loss since that killer quake hit this town”, Father Pandilo R. Milo, 62 years old, parish priest of Aringay town in La Union.[1728] Navy Commander Amado Sanglay, president of La Union Civic League also appealed for donations during the first week since the earthquake struck the province.[1729]

[1721] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22.
[1722] “Earthquake!” *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1723] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1724] “San Fabian beach defaced by quake”. *Manila Bulletin* 211.28 (28 July 1990): 30.
[1725] Charlie B. Abagat, “Quake damage to flood control reaches P200M”. *Manila Bulletin* 211.27 (27 July 1990): 47.
[1726] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1727] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22; Wilma N. Yamzon, “Death toll up to 438.” *Manila Bulletin* 211.21 (21 July 1990): 1, 18; “Earthquake!” *Philippine Graphic* 1.7 (30 July 1990): 4-5.
[1728] Lulu. Principe, “La Union victims ask for help.” *Manila Bulletin* 211.20 (20 July 1990): 1, 21.
[1729] Marcia Rodriguez, "200 still trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22

In Manila, deaths and injuries were cases by minor structural collapses and stampede. Chaos broke out in major urban areas when the tremor began, and that resulted in injuries in the capital region despite it being hundreds of kilometers away from the earthquake's epicenter. An estimated number of 100 people were injured.[1730]

In Nueva Vizcaya, partial isolation due to landslides resulted in late rescue and relief operations in the area, as well as delayed media reporting of the situation in the said province. The AFP confirmed that 100 motorists and commuters were buried alive in a landslide in Santa Fe Trail.[1731] Besides, 40 bus passengers were killed and 83 more died in Cayapa town when tons of soils covered a highway in the province.[1732] After gathering enough reports about the situation in Nueva Vizcaya, the NDCC urged the president to release the additional 70M in calamity funds for government line agencies' relief work and the said province.[1733] The DPWH has started to bulldoze their way in Dalton Pass in Nueva Vizcaya, resulting in vehicular traffic in Cagayan Region opened again two weeks after a landslide blocked it.[1734]

e.4.2 Statistics and reporting of deaths and injuries

Critically browsing of reports from news outlets, as well as the government published official reports and scientific studies about the July 1990 earthquake, one can observe that there was no consistent number relayed to the public; there were various sources of data, and there was no centralized information dissemination. Inconsistent transmitting of information about deaths and casualties

The first reports of the partial count of casualties released by authorities on 17 July 1990 show different numbers: the PNRC, NDCC, OCD, and the DSWD released different statistical reports.[1735] This pattern of varying numbers was expected during the first days of the rescue operations. Media have pointed out that the military and civilian authorities involved in the operations, such as the AFP, NDCC, DND, DSWD, PNRC, etc., could not even agree on the number of fatalities.[1736] But it continued until the weeks of operations that followed.

[1730] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1731] Roy Sinfuego, “Official death toll: 332.” *Manila Bulletin* 211.20 (20 July 1990): 1, 12.
[1732] Wilma N. Yamzon, “Death toll up to 438.” *Manila Bulletin* 211.21 (21 July 1990): 1, 18.
[1733] Marcia M. Rodriguez, “Symbols of RP faith and spirit”. *Manila Bulletin* 211.29 (29 July 1990): 1,17.
[1734] “19 buildings damaged in city.” *Manila Bulletin* 211.21 (21 July 1990): 1, 18.
[1735] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.
[1736] Gaspar Baltazar, “Quake shows gov’t problems.” *Manila Bulletin* 211.21 (21 July 1990): 11.

Table No. 29
Numbers of deaths and casualties as reported by different agencies that worked on the rescue and relief operation in earthquake devastated areas after the 16 July 1990 north Luzon earthquake, from newspapers and magazines[1737]

DATE	DSWD		NDCC		OCD		PNRC		AFP	
	D	C	C	D	D	C	D	C	D	C
18 July	149	223	--	193	223	--	193	--	--	--
19 July	225	781	311	682	--	--	--	--	142	363
20 July	--	--	322	820	--	--	--	--	600	--
21 July	550	1803	437	--	--	--	--	--	--	--
22 July	735	2004	830	--	738	2951				
23 July	--	--	899	3061	938	--	--	--	--	--
24 July	--	--	--	--	--	--	--	--	--	--
25 July	--	--	1597	2935	--	--	--	--	--	--
26 July	--	--	1609	3214	--	--	--	--	--	--
30 July	--	--	1650	3300	--	--	--	--	--	--

D – Deaths, C – Casualties, missing individuals not included.

Since the early days of the rescue operations, it was consistent that Baguio, Dagupan, and Cabanatuan recorded the highest number of deaths and injuries; La Union, Tarlac, and Manila also had casualties but minimal compared to the three main cities hit by the tragedy.

e.5 "*Lindol sa loob ng lindol*"[1738]: Criticism to the national and local governments

Unlike other hazards, an earthquake is the most unlikely to be detected. It occurs rapidly and instantaneously; destructs properties and claims lives on a massive scale. In the case of the Philippines, with a long history of earthquakes events, it is an underlying assumption that the government is well prepared to deal with its effect most proactively and responsively. But until the last decade of the 20th century, it seems that every earthquake is a wake-up call to every government in the archipelago to enhance the country's capacity to more resilient to the effects of such geological tremors. The 1990

[1737] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. "Death toll: 223; calamity declared." *Manila Bulletin* 211.18 (18 July 1990): 1, 5; Marcia Rodriguez, "200 sill trapped; death reach 311; Baguio toll is 142", *Manila Bulletin* 211.19 (19 July 1990): 1, 22; Roy C. "2 aliens among dead." *Manila Bulletin* 211.19 (19 July 1990): 1, 20; Roy C. Sinfuego, "Official death toll: 332." *Manila Bulletin* 211.20 (20 July 1990): 1, 12; Fred M. Lobo, "Calamity area widened. Aquino adds Tarlac, Vizcaya." *Manila Bulletin* 211.21 (21 July 1990): 1,13; Wilma N. Yamzon, "Death toll up to 438." *Manila Bulletin* 211.21 (21 July 1990): 1, 18; Aris R. Ilagan, "Rescuers move to Vizcaya, Ecija. Official death toll now 738." *Manila Bulletin* 211.22 (22 July 1990): 1, 22; Wilma Yamzon, Castro, Eddee & Chammag I. S. "Rescuers declare: No more survivors: "Death toll now reaches 830", *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22; Wilma. "Quake death toll nears 1,000 mark". *Manila Bulletin* 211.24 (24 July 1990): 1, 15; Roy Sinfuego, "Death toll now 1,597". *Manila Bulletin* 211.25 (25 July 1990): 1, 16; "Quake death toll rises to 1,609". *Manila Bulletin* 211.26 (26 July 1990): 1, 14; "Baguio rescue pressed". *Manila Bulletin* 211.30 (30 July 1990): 1; "Earthquake!" *Philippine Graphic* 1.7 (30 July 1990): 4-5; "State of the Nation Address 1990: Corazon Aquino", <https://bit.ly/2Sd2MBz>, Date accessed: 31 October 2018.

[1738] Luis Beltran, "Lindol sa loob ng lindol." *Philippine Graphic* 1.8 (6 August 1990): 18-19.

north Luzon earthquake is unique, yet an enduring example of the government's lack of a comprehensive disaster management plan and a continuity of the cycle of reactive policies that proved to be ineffective in terms of responding to a massive disaster such as the 16 July 1990 earthquake. Despite the many "saving graces" and hampered financial resources of the Aquino government, it manifested an active approach to the calamity, but still, there were still a lot of issues that hounded the government's response to the said earthquake.

e.5.1 The NDCC and the OCD: Disastrous agencies?

It can be told that the overall response of the Philippine society after the tragic earthquake of 16 July 1990 is commendable; different sectors of the nation took part in the overall efforts needed by initiating their own rescue and relief operations, fund drives, and other mechanisms to extend support to the people and towns affected by the killer quake.

But the overwhelming support and action of the local and international non-governmental organizations and foreign governments to the Philippines reveal the shortcomings and inadequate measures of the lead agencies of the government in disaster response and management. The heavily criticized NDCC and OCD, revealed from politicians' and journalists' negative assessment of their work and performance during the post-earthquake period, were labeled as ineffective and incompetent government agencies.
Many journalists who have been in the press business in the past decades have noticed the apparent shortcomings of the national government in dealing with the problems caused by the July 1990 earthquakes. It was understandable that the strength and extent of damaged hampered the quick response of agencies involved. Many have similar sentiments that the recent earthquake was a call for “a reexamination of the capacity of the government to deal with calamities and disasters.”[1739]Moreover, the July 1990 earthquake “revealed the government’s and society’s unpreparedness for a state of calamity or emergency like this one”, and the government “took time to assemble personnel and apparatus for the collection of data on damage to properties, families affected, etc.”[1740] The NDCC and OCD, as supposedly the agencies that are many steps ahead in disaster preparedness and management, were the ones struggling to get things done during the early days of the rescue and relief operations in disaster-hit areas. They earned the ire of some journalists critical of the government. One made a series of straightforward and sarcastic commentaries about them: (1) "It appears that the OCD and National Relief Coordinating Council (sic Disaster) are not enough to cope with disasters which are frequent in the Philippines. At best, they are palliative agencies, with few resources and capabilities. How about a permanent and fully equipped and funded National Disaster Agency? The coming Congress session should consider this very seriously. Top priority."[1741], (2) “NDCC living true to its name. It’s a disaster.”; “After the dead have been buried and the damages to crops and properties have been estimated, how long will the people’s patience endure the feeling of utter helplessness in coping

[1739] “Editorial: Another killer earthquake calls for closer supervision.” *Manila Bulletin* 211.18 (18 July 1990): 6.
[1740] Gaspar Balthazar, “Quake shows gov’t problems.” *Manila Bulletin* 211.21 (21 July 1990): 11.
[1741] Jose L. Guevara, “Point of Order: Delayed call for US help cost more lives.” *Manila Bulletin* 211.19 (19 July 1990): 6.

with a disaster of this magnitude?"[1742],(3) "[The] Office of Civil Defense issues precautionary measures to take during and after quake, Now it tells us."[1743] Another journalist made a striking remark on the work of the two agencies. Based on the work of the government rescue teams, it's as if the July 1990 earthquake was a disaster of another kind because of the "images of disarray": rescuers using chisels and small hammers, or bare hands to dig our the buried; people standing on fallen slabs that pinned down victims; government people going in all directions.[1744]Experts suggested that "a rescue agency run by professionals" must be established, wherein "a permanent, professionalized disaster relief agency, composed of specialists in rescue procedures and preparedness, nobody will be in charge of any disaster control operations."[1745] This suggestion was a direct criticism to the OCD, which was labeled as an outdated World War II idea, and was described as "dumping ground for political protégées."[1746]

The government was aware of these criticisms and at a certain extent self-reflexive about their inadequacies. AFP Chief de Villa said in a statement, "Our capability for relief operations appears to be adequate, but that of rescue and recovery is not good enough"[1747] In a study by Rantucci (1994), he pointed out that the proneness of disasters in the archipelago should be a primary framework on social responses concerning mitigation and other measures, concretely manifested through systematic risk assessment of the situation, and rigorous planning and decision making.[1748] This suggestion sprung up not only from the overall assessment of the government's response on the July 1990 earthquake but also to another subsequent national tragedy that hit the archipelago less than a year later, the June 1991 Mt. Pinatubo eruption, wherein the government was again caught off guard with the extent of disaster the volcanic eruption caused.

e.5.2 Estuar in hot water: The Public Works chief was accused of corruption

Another issue that hounded the national government during the crucial weeks of the rescue operations in northern Luzon was the controversy that involved Public Works Secretary Fiorello Estuar and his association with the collapsed Hyatt Terraces in Baguio City. The issue revolves around Estuar's direct association with an engineering firm that built the Hyatt Terraces in Baguio City.[1749] On 22 July 1990, a structural engineer, Octavio A. Kalalo, recalled that he was commissioned to assess the structural integrity of the Hyatt Terraces after the 1985 earthquake, and attested that he made a recommendation that the hotel should not have been reconstructed because of structural defects.[1750] Kalalo added that their report was submitted to the Commission on Appointments (CA) on 11 December 1988 which was then doing hearings on the

[1742] Jose L. Guevara, "Frightful sights everywhere". *Manila Bulletin* 211.24 (24 July 1990): 6.
[1743] Jose L. Guevara, "Point of Order: Delayed call for US help cost more lives." *Manila Bulletin* 211.19 (19 July 1990): 6.
[1744] N. G. Rama, "Editorial: Tale of two disasters – Killer earthquake & the aftershock of inept rescue operations". *Philippine Panorama* (29 July 1990): 3.
[1745] Ibid.
[1746] Ibid.
[1747] Wilma N. "Death toll up to 438." *Manila Bulletin* 211.21 (21 July 1990): 1, 18.
[1748] Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo. Descriptions, effects, and lessons learned*, pp. 128/132.
[1749] Sannie D. Patinio, "Estuar in Hot Water", *Philippine Graphic* 1.9 (13 August 1990): 11.
[1750] "Engineer recalls Hyatt report in '85." *Manila Bulletin* 211.22 (22 July 1990): 1, 13.

approval of Estuar's appointment as DPWH Secretary, to show that Estuar had mishandled the construction of the Hyatt Terraces.[1751] Moreover, he said that Estuar's credibility is dubious in two costly mistakes: the botched inquiry in the Ruby Tower Citizen's Committee in 1968, where Estuar was the lead engineer, and the Hyatt Terraces design in 1984.[1752]Reports indicated that Estuar was heard to have said that no earthquake can put the Hytatt Terraces down.[1753] The media also discovered that no available copy of the design calculation of the hotel from Estuar's engineering firm and the Baguio City Engineer's Office.[1754]

Critics of the government called for Estuar resignation, arguing that his resignation "will restore, partially, public's faith in delicadeza in the government."[1755] The engineering sector called for the secretary's resignation and leave, as DOJ started their preliminary investigation, and as the relatives of the victims at the Hyatt Terraces were ready to file charges against the said hotel.[1756]

Two days after, Estuar tendered his resignation after the news reports of his involvement in the collapsed building emerged. He denied the reports, saying that his resignation was a way not to delay the rehabilitation programs.[1757] This controversy that focused on neglect and apparent incompetence is a complete irony, as was during the earlier part of 1990, Estuar was awarded by the University of the Philippines Alumni Engineers (UPAE), the alumni organization of the UP College Engineering, as the Most Distinguished Alumnus, due to his expertise in engineering repair and structural engineering.[1758] But President Aquino didn't let the Estuar go. For the President, to accept Estuar's resignation and look for his replacement in a crucial period will hamper the rehabilitation efforts, despite Estuar offering to resign.[1759] The President retained him, despite doubts of him heading the post-disaster earthquake rehabilitation efforts, involving billions of pesos.[1760] One journalist that Estaur's case was another "Joe Con Affair"[1761] an issue in the Aquino cabinet, wherein Jose Concepcion, the head of the Department of Trade and Industry (DTI), was allegedly benefited from government contracts to favor his company, the Republic Flour Mills (RFM).[1762] But some journalist sided with the President argument, saying that the cabinet must stay on as one, as the task of recovery and rehabilitation was a vast, gigantic task for the government.[1763]

This issue was more than one government official. The problem is a mere tip of an iceberg of larger bureaucratic dilemma such as conflict of interest, government neglect,

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[1751] Ibid.
[1752] Jesus E. Bigornia, "It's a matter of delicadeza now for Estuar". *Manila Bulletin* 211.25 (25 July 1990): 6, 12.
[1753] Luis Beltran, "Lindol sa loob ng lindol." *Philippine Graphic* 1.8 (6 August 1990): 18-19.
[1754] Engineer recalls Hyatt report in '85." *Manila Bulletin* 211.22 (22 July 1990): 1, 13.
[1755] Ibid.
[1756] Sannie D. Patinio, "Estuar in Hot Water", *Philippine Graphic* 1.9 (13 August 1990): 11.
[1757] Chito. Parazo, "Estuar giving up post?" *Manila Bulletin* 211.24 (24 July 1990): 1, 22.
[1758] Ibid.; <www.upae.org/upae-awardees/>
[1759] Sannie D. Patinio, "Estuar in Hot Water", *Philippine Graphic* 1.9 (13 August 1990): 11.
[1760] Ibid.
[1761] Ibid.
[1762] Greg Ogle, "Profile: Jose Concepcion", *Asian Left Review* (August 1990), p. 7. <https://bit.ly/2DIfgNr>, Date accessed>, 31 October 2018.
[1763] Lito A. Catapusan, "Beatwatch: The case of a shattered window glass". *Manila Bulletin* 211.24 (24 July 1990): 8.

and at a certain extent, irregularities and corruption in the engineering sector. The Estuar issue touched a sensitive problem in government public engineering sector; it was the "first time", again, since the 1968 Ruby Tower incident that there were a massive call and initiative to reexamine the National Building Code, less two decades since it's passage; as well as an assessment of the use of materials in public constructions, types of buildings that are safe, etc.[1764] One argued that there should be revisions in the existing National Building Code and the National Structural Code, it must be beyond the rules, but more on establishing accountability.[1765] A quick survey of the 1992 Building code focuses on verbose provisions and lacks the tooth to go after violators, and in a broader sense, making sound urban structural policies across the board.

Miriam Defensor Santiago, a former Immigration Commissioner and Agrarian Secretary of the Aquino government, and a popular figuring presidential frontrunner for the 1992 elections urged the investigation and prosecution of public officials charged with the implementation of building code in calamity areas.[1766] Problems in infrastructure insurance also surfaced. Insurance Commission chief Adelita Vergel de Dios said that almost all the big buildings in Baguio City that collapsed and that were flattened by the earthquake were not covered by earthquake insurance.[1767] This issue prompted the Senate to summon the Department of Finance (DOF) to order insurance companies to submit data about insured buildings in the country, after being discovered that only Hyatt Terraces was covered by insurance amounting to P407 million.[1768]

e.5.3 Criticisms from the "Opposition"

The media and the "handful" of opposition politicians made strong commentaries about the work of the Aquino government in the post/earthquake rescue and rehabilitation efforts and projects in Northern Luzon. Their criticism focused on the slow, disorganized, apparent hardheadedness of the President, as well as the inaction, exhausting finger pointing, and blame-game amongst national politicians, cabinet members, and local government officials during the critical days of the rescue and relief efforts. Many said that the calamity was an opportune time for politicians to showcase their innate concern for the needy. One journalist said that it was the "season for politicians to have their photos taken while pointing to cracks or holes created by the earthquake in the inspection of affected government buildings and facilities. Some get their hired photographers to shoot just as they hand out the relief goods to the poor victims."[1769]

Critics had observed that during the first week of the operations, many politicians, local and national, tend to put political colors, party politics, and politicking in the rescue and relief efforts. When Mayor Gordon of Olongapo get things, and the media portrayed him as a "hero", partisans of the President immediately called him as grandstanding to get

[1764] "Editorial: Another killer earthquake calls for closer supervision." *Manila Bulletin* 211.18 (18 July 1990): 6.
[1765] Sunday Times Magazine, 06 August 1990.
[1766] "Probe urged on building violations". *Manila Bulletin* 211.26 (26 July 1990): 1, 17.
[1767] "Baguio buildings found not insured". *Manila Bulletin* 211.25 (25 July 1990): 31.
[1768] Ibid.
[1769] Vicente B. Foz, "Not in the News: Quake's serious effects; politicians at it again." *Manila Bulletin* 211.20 (20 July 1990): 7.

attention.[1770] Centralized leadership in Cabanatuan was paralyzed as the mayor of the city, Honorato Perez, was a political foe of the vice governor of Nueva Ecija, and a stalwart in the province's powerful political family, Tomas Joson III.[1771] Perez and the Josons have a history of bloody political rivalry, which intensified after the dictatorial regime of Marcos was dismantled, causing political families to fight ferociously for local political dominance. Perez was a member of the Laban ng Demokrating Pilipino, which was headed by Jose "Peping" Cojuangco, one of the President's cousins.[1772] The Cabanatuan Mayor's affiliations with the Cojuangco's was a clear connection to his immediate call for help to Mayor Gordon. That probably caught the ire of Josons, aside from their previous political encounters.
Furthermore, progressive groups working on communities in Nueva Ecija criticized the local government officials in the province. Raquel Agapito of the League of Filipino Students (LFS) that the officials where only after media attention, did not lead in the rescue operations, and were the first ones to have lost hope that there might probably be more survivors at the collapsed CCP.[1773]

But the capsule sentiment and overarching call were to at least, "government officials act up together after blaming each other.'[1774] Many called to cut or suspend lengthy debates about the release of pertinent budget and acrimonious issues, set aside the things that divide the nation, and act only following the requirements of the national interest.[1775] People voiced out that the executive and the legislative branches of the government must stop throwing mud at each other, and start working together to speed up the delivery of assistance to the victims of the earthquake.[1776]

After President Aquino's annual report of the nation's state on 23 June 1990, it gained varying reactions from her allies and critics. Pampanga Gov. Brem Z. Guiao, a party mate of the President said that her speech "meaningful, honest, and substantive, done in a straightforward fashion."[1777] Meanwhile, Vice President Laurel, Aquino's running mate in the 1986 Snap Elections, who turned out to be one of her most vocal critics, said, "People were still waiting to the promise of good, honest, and efficient government which she promised in EDSA. The bottom line is we were better of now that we were four years ago."[1778]Many noticed that the whole speech reflected the lukewarm relations of Malacañang and the two chambers of Congress.[1779] The implementation of the P10 billion rehabilitation fund asked from the Congress was criticized as it had no safeguard for corruption. The Cabinet wanted it to be a negotiated contract, meaning they can award projects to anyone, to limit neck bottles in the process and make the rehabilitation

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[1770] Emilio Juan, "Dick Gordon to the Rescue." *Philippine Graphic* 1.9 (13 August 1990): 9-10
[1771] Jose L. Guevara, "No quacking in a calamity". *Manila Bulletin* 211.25 (25 July 1990): 6
[1772] William Branigin, "A Deadly Brand of Politics", The Washington Post, 25 December 1990. <https://www.washingtonpost/com/archive/politics/1990/12/25/a-deadly-brand-of-politics/>
[1773] Elizabeth Lolarga,"The Tourtous Journey of the relief and rehabilitation Efforts", *Sunday Times Magazine*, 06 August 1990, pp. 11-13.
[1774] Dana Batnag, "After the Big Quake." *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1775] "Editorial: No time for comedy." *Manila Bulletin* 211.20 (20 July 1990): 6.
[1776] Editorial: Joint efforts needed for crisis situation". *Manila Bulletin* 211.23 (23 July 1990): 6; "Congress has P 8-B aid fund." *Manila Bulletin* 211.18 (18 July 1990): 1, 18.
[1777] Fred M. Lobo, "Aquino seeks rehabilitation fund of P10 B: Appeals for nat'l unity". *Manila Bulletin* 211.24 (24 July 1990): 1, 17.
[1778] Fred M. Lobo, "Aquino seeks rehabilitation fund of P10 B: Appeals for nat'l unity". *Manila Bulletin* 211.24 (24 July 1990): 1, 17.
[1779] Luis Beltran, "Lindol sa loob ng lindol." *Philippine Graphic* 1.8 (6 August 1990): 18-19

faster.[1780] The President also received hard words from the militant sector. Teddy Arellano of the People's Cooperation for Socioeconomic Solutions of the National Council of Churches in the Philippines (NCCP) said that without the earthquake in her speech, "she wouldn't have much to report."[1781]

Another issue that hounded the early days of the rescue and relief efforts was about a President's misinterpreted act and considered a display of insensitivity. In one video clip aired on TV, Aquino and cabinet members were seen laughing (naghahagikhikan) about five minutes after the quake.[1782] She said, in her television show, that she was laughing because they survived the earthquake while inside Malacañang, and by that time not aware of the extent of the quake. The President apologized; sayong it was a sign of relief after hiding under the table; she explained in her television show "Magtanong sa Pangulo", that she was laughing because they survived the earthquake while inside Malacañang, and by that time not aware of the extent of the earthquake.[1783] In front of the camera, she said: "*Kung mayroon mang mga nasaktan na mga ibang kababayan nating doon sa nangyaring iyon, ako'y humihingi ng paumanhin dahil wala po sa aking kalooban na pagtatawanan itong napakamasakit na pangyaysri dito sa atin."* (If anyone was offended by the incident. I apologize because it was not my intention to laugh at a very tragic incident.)[1784] Her media critics feasted upon the President and her Cabinet's rightful adrenalin response of hiding under the table. One said: "When the earthquake struck, Cory and her confreres ducked under the dining table. No, they didn't find Louie Beltran there...Actually the first to hide under the table was Executive Secretary Catalino Macaraig. As of this writing yesterday afternoon, there was no report if Mac had already stepped out from under the table."[1785] The Louie Beltran reference in this joke was based on the story told by Philippine Star columnist Louie Beltran that Aquino hid under the bed in Malacañang during the bloody December 1898 military coup. Malacañang just played with the joke; when asked what they talked about while under the table, they said it was taxes.[1786]

Politicians and the media also pointed out the bad relations between the President and the Americans. The absence of coordination and immediate call for support and assistance from the President to the US, particularly from the latter's military bases in Subic and Clark was noticed not only by the government's critics but also of the ordinary citizens. This incident was in direct contrast to the actions of the government half a year ago, when it asked for military assistance when the rebel soldiers almost succeeded in topping the government in the infamous December 1989 coup attempt. The Bad relations between the Aquino government and the Americans were out in the open, as seen in the President's hesitation to ask help from them. One journalist said: Actually, the American wanted to go all out to help, but they were waiting for the RP gov't to make

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[1780] Ibid.

[1781] Elizabeth Lolarga,"The Tourtous Journey of the relief and rehabilitation efforts", *Sunday Times Magazine*, 06 August 1990, pp. 11-13.

[1782] Luis Beltran, "Lindol sa loob ng lindol." *Philippine Graphic* 1.8 (6 August 1990): 18-19; Marcia C. Rodriguez, "Gov't to sell bonds for reconstruction." *Manila Bulletin* 211.22 (22 July 1990): 1, 17.

[1783] Luis Beltran, "Lindol sa loob ng lindol." *Philippine Graphic* 1.8 (6 August 1990): 18-19.

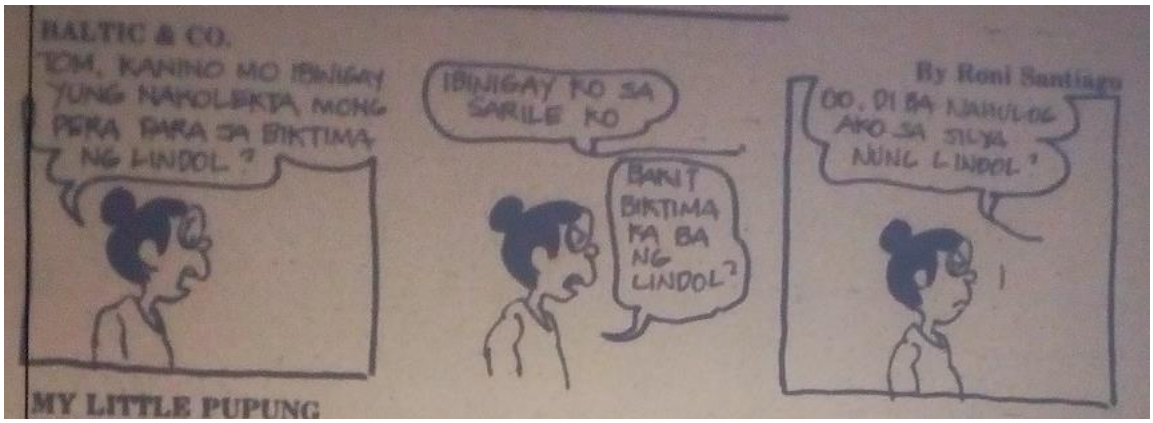
[1784] Marcia C. Rodriguez, "Gov't to sell bonds for reconstruction." *Manila Bulletin* 211.22 (22 July 1990): 1, 17.

[1785] Jose L. Guevarra, "Point of Order: Filipino Faults." *Manila Bulletin* 211.18 (18 July 1990): 6.

[1786] "68 killed in Luzon quake; 270 trapped in Cabanatuan." *Manila Times* XXXII.198 (17 July 1990): 1, 6.

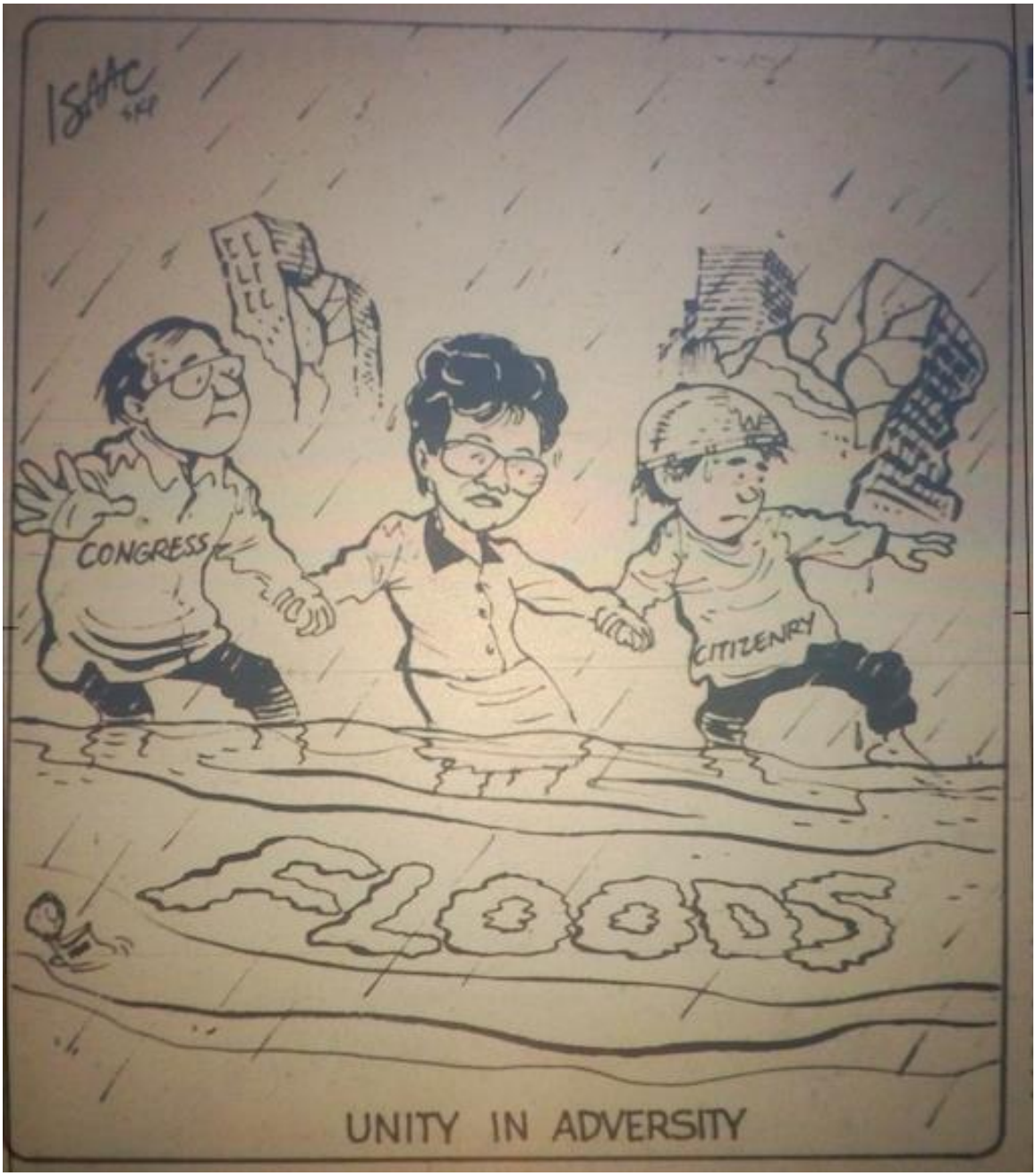
the request. But it came much longer that our request for Phantom jets during the failed December 1989 coup. The delay must have cost the lives of many collapsed buildings both in Baguio and Cabanatuan…The Americans were the first to arrive in Baguio and Cabanatuan to rescue and assist the quake victims. That's because the Filipinos were busy debating what to do, Politics of talk, according to Cory."[1787] Almost five dozens of helicopters was on stand by at the USS Okinawa in Subic Bay, waiting for an official request, and could have hastened the operation in the collapsed buildings and areas hit by landslides.[1788] In a display of proactive support to their Pacific "friends", the US Embassy in the Philippines suggested the use of their Philippine Assistance Program (PAP) for the recovery of disaster-stricken areas; it was considered an encouraging sign to maintain pragmatic and tenable relations with "friendly" countries such as the United States.[1789]

Photo No. 31
Cartoons: Donation Jokes[1790]



[1787] Jose L. Guevara, "Point of Order: Delayed call for US help cost more lives." *Manila Bulletin* 211.19 (19 July 1990): 6.
[1788] Luis Beltran, "Lindol sa loob ng lindol." *Philippine Graphic* 1.8 (6 August 1990): 18-19.
[1789] "Editorial: Encouraging sign". *Manila Bulletin* 211.25 (25 July 1990): 6.
[1790] [Comic Strips]. *Manila Bulletin* 211.24 (24 July 1990): 45; [Comic Strips]. *Manila Bulletin* 211.28 (28 July 1990): 42.

Photo No. 32
Editorial Cartoon: UNITY IN ADVERSITY: Congress-Cory-Citizenry amidst earthquake and floods[1791]



[1791] Editorial cartoon: *Manila Bulletin* 211.29 (29 July 1990): 31.

e.6 Other “problems” that surfaced after the earthquake

Disasters caused by natural hazards not only reveal the vulnerabilities of a community but also surfaces the social grammar of society. The post-earthquake situation wherein the social order is directed toward disorganized social structures or chaotic social dynamics, disclose the much-needed priorities, people's hopes, and the unwanted and out-of-character scenarios that somehow define people. As passé as it may seem, the latent character of a society is divulged in terms of disasters.

e.6.1 Rebuilding Baguio: Views of residents

Observers found the fallen statue of an Igorot in Camp John Hay in Baguio the symbol of the situation the city was facing after the earthquake – it was humbled by nature.[1792] One unnamed official said that it might take five years for Baguio to be rebuilt, or perhaps a decade before the city recaptures its appeal.[1793]

Despite the city being almost left in rubbles by the killer earthquake, there was sheer optimism about the future of the city amongst frequent visitors and city folks. One recounts that Baguio had survived the liberation campaigns in 1945: "Many people are wondering if Baguio will be the same after the last earthquake. To begin with, Baguio survived a greater disaster after the liberation in 1945. There is no reason why Baguio cannot rise like a phoenix from this recent disaster. People are traumatized because, unlike before, unlike the havoc of liberation, the earthquake was a natural disaster and took less than two minutes. On the score, it is the worst natural disaster in Baguio's history", says one newspaper columnist.[1794] He adds, it may take years, but Baguio will surely remain as the country's favorite summer destination.[1795]

Accounts from residents also reflect the same idealism of Baguio's resurrection. "Baguio has not lost its charm", said one community organizer and a survivor at the Nevada Hotel.[1796] Even though its skyscrapers collapsing and put into permanent destruction, one journalist says, "But the things that drew people to the City of Pines are still there – the blue skies, the cool air, the blazing sunsets, the mountains."[1797] Hopeful, one PMA Cade put it this way: “Maganda pa rin naman ang Baguio” (Baguio remains beautiful)[1798]

Six days after the earthquake, two rainbows form in the mountains at the back of the cathedral. As a Philippine Military Academy cadet puts it: ‘Maganda pa rin naman ang Baguio, ah.'" One market vendor named Marie said enthusiastically, "Now is the best time to set up a business in Baguio because many businessmen are leaving"[1799], making a fun twist of an alarming statement, finding opportunity in an obvious larger problem. While Maryan Velasco, 17 years old, said she is not leaving Baguio, manifesting the

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[1792] Dana Batnag, “After the Big Quake.” *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1793] “Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake.” *Philippine Graphic* 1.9 (13 August 1990): 7.
[1794] Editorial: Quake worst Baguio disaster since liberation”. *Manila Bulletin* 211.31 (31 July 1990): 6.
[1795] Ibid.
[1796] Dana Batnag, “After the Big Quake.” *Philippine Graphic* 1.8 (6 August 1990): 4-5.
[1797] Ibid.
[1798] Ibid.
[1799] Ibid.

latent idealism of her youth: "*Maganda rito eh*." (It is beautiful here), she said.[1800] Locals working as miners in private companies and small scale mining groups experienced massive deduction in work days that led to less income for their families. But for them, the effects of the earthquake was just an extension of the usual, inconsistent run of their work due to the nature of the mining industry. The life of a miner, which revolves around what they colloquially pertain to as the "cycle": "*Sabado, suweldo, Domingo, bagyo, Lunes, linis, Martes, utang.*" (Saturday, salary, Sunday, typhoon, Monday, work, Tuesday, loan).[1801]

The rehabilitation of the city also paved the way for previously thought of projects to be brought into the planning table again. Before the earthquake, the idea of a Metro Baguio was already planned, which was going to be composed of Baguio City, and its surrounding towns in the Benguet province, namely the provincial capital La Trinidad, and the towns of Itogon, Sablan, and Tuba, and to be formally called BLIST.[1802] The DOT was determined to rebuild Baguio, raised new mechanism of reinventing the city, aside from the new urban planning system badly needed, such as preference on inns and hostels instead of high rise buildings, creation of new travel and tours programs, and identifying target market to revive the flow of tourists due to the disaster and due to the rehabilitation of the city.[1803] Moreover, the earthquake yesterday has "provided a good opportunity to concerned government authorities to review the systems of awarding projects to qualified bidders enduring strict compliance of specifications and other requirements for such awarded work contract."[1804] The destructed Baguio Export Processing Zone (BEPZ), which was only a decade old when the earthquake hit, was considered to be relocated to other existing export processing zones run by the national government. The 18 enterprises being housed in the city considered transferring to Bataan, which the government financial institutions promised to fund.[1805] The plan did not materialize, and the BEPZ, now known as the Baguio City Economic Zone (BCEZ) under the Philippine Economic Zone Authority (PEZA) still functions as one of the manufacturing economic zones in northern Luzon.[1806]

e.6.2 False panic and "suffering porn": Lapses in the media's coverage of the tragedy

Media plays a vital role in post-disaster information flow. They tend to influence the government and people's actions and mentality towards tragedies and help in bridging the gap between state and non-state actors in post-disaster rehabilitation efforts. It also has a critical role in pointing out lapses and questionable actions of government departments concerning the rescue and relief operations. They provided a vital avenue

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[1800] Ibid.

[1801] Elizabeth Lalarge, "Buhay Minero", Sunday Times Magzine, 12 August 1990.

[1802] Juan B. Dale, "Metro Baguio planned before earthquake". *Manila Bulletin* 211.27 (27 July 1990): 45.

[1803] Louise Belle T. Baterna, "After killer quake DOT vows to rebuild Baguio". *Manila Bulletin* 211.26 (26 July 1990): 24.

[1804] Lito A. Catapusan, "Beatwatch: Quake is eye opener." *Manila Bulletin* 211.18 (18 July 1990): 8.

[1805] "Baguio plants to be relocated: Bataan, Angeles alternative sites". *Manila Bulletin* 211.25 (25 July 1990): 31.

[1806] "Operating Manufacturing Zones" <www.peza.gov.ph/index.php/economic-zones/list-of-economic-zones/operating-economic-zones>

for the whole country to be aware of the extent of the disaster, and how people can help them in their own limited capacities. But during the July 1990 disaster, the media manifested certain lapses that on the surface seemed to be a typical act of media personnel, but looking at it deeply, crossed the boundaries of ethical journalism.

A concerned citizen wrote to the editor of the Manila Bulletin to air his sentiment about a disturbing incident about a television network's coverage of the rescue operation at CCP in Cabanatuan City. A certain Michael L Trinidad wrote on 19 July 1990:

> "I was watching a TV station's special coverage on the earthquake, Tuesday afternoon at about 1pm when I saw something truly cruel and inhuman, They showed an "on the spot" interview of a young girl pinned down by a heavy slab of concrete in the rubble of the Christian College of the Philippines. She was totally immobile from her shoulders down. She was dying right before my eyes. In spite of her ordeal, the reporter conducted an interview, asking stupid questions like "Where does it hurt?" Why was this footage allowed to be shown? Thus is sensationalism at its worst. Are T.V ratings so important to the TV management that they would allow this totally insensitive material to be aired? My heart bleeds for the parents of this young girl. To that TV channel, *nakakasuklam kayo*! (you are disgusting!)"[1807]

This incident is a classic case of what can be called as "suffering pornography". The lack of sensitivity guards for media personnel to approach suffering, or almost dying victim, ask a wrong or stupid question, and force that person to answer was an apparent trend in broadcast media during that period. A child psychologist advised parents and concerned adults to be cautious on the things child see or had experienced, during the disaster and post-disaster situations as visuals and first-hand experiences might affect their views, fears, and fantasies. The "psychological fault line" by be observed as different kinds and manifestations of fear can be relinquished in times of disasters, instead of calmness and presence of mind in a child.[1808] Moreover, Perlas (1992) argues that psychological implications and consequences that necessarily accompany any sudden, significant disruption in the established relationship and activities of people must be monitored and taken into consideration.[1809]

Another incident of an apparent media lapse was the dubious information relayed to people, which caused panic in some urban areas in the capital region. Thousands of employees in Metro Manila poured out into the streets after hearing a TV news report that another strong earthquake will hit the region; in Makati, people clogged the streets of Ayala, Gil Puyat, Paseo de Roxas, and Makati avenues.[1810] Volcanologists of the DOST immediately issued a statement clarifying the matter. PHIVOLCS Director Punongbayan said that no one could predict earthquakes, what were felt were mere

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[1807] Letter to the Editor "Stupid" *Manila Bulletin* 211.19 (19 July 1990): 7.
[1808] Robert R. Butterworth, "Psychological earthquake trauma in children." *Manila Bulletin* 211.19 (19 July 1990): 7, 17; Sol Juvida, "Paano ang mga bata?", Sunday Times Magazine, 06 August 1990: 18-20.
[1809] Antonio Perlas, "Psychological Issues in Disasters", *The July 16, 1990 Luzon Earthquake: A Technical Monograph. Inter-Agency Committee for* Documenting and Establishing Database on the July 1990 Earthquake, 1992, p. 261.
[1810] "Quake jitters hit Metro." *Manila Bulletin* 211.20 (20 July 1990): 1, 14.

aftershocks, and the next big earthquake along the Philippine Fault will occur probably after 50 up to 300 years.[1811] Later on, it was pointed out that a Japanese seismologist was intervened and warned to possible aftershocks. Asked where they got the information, none of the five television stations – ABS-CBN 2, GMA 7, RPN 9, PTV 4, and ABC 5 admitted that they were the original source of information and that they just relayed it. [1812]

e.6.3. Disaster vultures: Opportunism, hoarders and profiteers, and lower-level corruption

Situations of disasters and tragedies were not exemptions when there was a dire need to take advantage of others' misery. Like vulture preying on dead bodies and the dying, some people did not let basic compassion prevailed and did unacceptable acts to benefit and gain profit, like "opportunists who found gold in misery and deprivation."[1813] In times of disaster, one journalist describes, "One stark lesson stood out: there are heroes, and there are vultures in every disaster as in everyday life."[1814]

Cases of opportunism, relief goods hoarding, and profiteering, and acts of corruption dogged the already criticized inept and slow action of the national government. In Santa Fe in Nueva Vizcaya residents sold water for 1-2 to hikers on their way to Manila, and other charged exorbitant fees for rides through cleared portions of the highway blocked by landslides.[1815] A hardware store owner in Baguio refused to lend shovels, picks, and other digging tools to rescuers.[1816]

Newspapers reported that a group of armed men hijacked a convoy of trucks carrying relief goods to Pangasinan and ordered volunteers to repack and label relief goods as coming from a local civic organization.[1817] There were also cases of bystanders robbing valuables of fleeing people and rescue volunteers going to disaster-stricken areas.[1818] The issue about workers selling relief goods to victims in Baguio City also caught the ire of the critical media.[1819] In response, the Constabulary Criminal and Investigation Service (CIS) have tightened their watch on civilians and government workers involved in the distribution of relief goods following reports of their mysterious disappearance in disaster-stricken areas.[1820] In Dagupan City, The Philippine Constabulary was commended for their work in rescue operations and maintenance of public order and safety, as crimes related to the looting of damaged residential and commercial areas in

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[1811] Ibid.
[1812] Ibid.
[1813] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1814] Chona S. Trinidad, "Help through the Airwaves." *Philippine Graphic* 1.9 (13 August 1990): 11.
[1815] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8; Bel R. San Luis, "Quake: Lesson vs 'crab mentality'". *Manila Bulletin* 211.23 (23 July 1990): 60.
[1816] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1817] Ibid.
[1818] Ibid.
[1819] Jose L. Guevara, "No quacking in a calamity". *Manila Bulletin* 211.25 (25 July 1990): 6
[1820] Lulu Principe, "CIS checks quake aid distribution". *Manila Bulletin* 211.30 (30 July 1990): 1, 20.

the city, which comprised almost 90% of the city establishment, were immediately controlled.[1821] House Speaker emotionally proposed theft of relief goods punishable by death.[1822]

Local politicians were caught doing unwarranted things during the disaster. When President Aquino visited Kayapa town in Nueva Vizcaya, the municipal mayor was nowhere to be found, and people said he was usually in his home in Baguio.[1823] Reports of local politicians stopped the immediate release of relief goods, as they needed to "verify" the list of people to be given, as quake victims survived with practically no decent food.

The outrageous behavior of people during calamities was also seen and documented by the media. A morbid caller warned a radio station about an earthquake, touching off a mad rush to the exits by thousand Metro Manila employees.[1824] Veteran broadcaster Rey Langit's radio program became an instant pleading avenue for victims and survivors of the earthquake. One of those was the despicable case of a student who from the province of Leyte who pled for financial support to obtain the body of a relative who died in Baguio City. [1825] Several people donated, notably Manila City Mayor Mel Lopez; but the funeral parlor "turned to be an asshole and disrespected the body by dumping it and mishandling it.", the Mayor said.[1826] Another one, which can be considered as one peak of heartlessness, was the case of a robber who tried to remove the wristwatch of a girl who was pinned down by a cement slab. [1827]

Photo Nos. 33 to 35 show some cartoon illustrations detailing the problems of vultures and hoarders in times of disasters, particularly, the corruption in the distribution of relief goods and the use of donation giving as an avenue for premature campaigning for the 1992 elections,

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[1821] Aris Ilagan, "Quake-proof technology spares Makati buildings". *Manila Bulletin* 211.25 (25 July 1990): 50, 54.
[1822] Jose L. Guevarra, "After quakes, the floods". *Manila Bulletin* 211.27 (27 July 1990): 6.
[1823] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1824] Ibid.
[1825] Chona S. Trinidad, "Help through the Airwaves." *Philippine Graphic* 1.9 (13 August 1990): 11.
[1826] Ibid.
[1827] Bel R. San Luis, "Quake: Lesson vs 'crab mentality'". *Manila Bulletin* 211.23 (23 July 1990): 60.

Photo No. 33
Cartoons: Relief goods and the Elections[1828]

Photo No. 34
Editorial cartoon: Hoarders and Profiteers[1829]

[1828] [Comic Strips]. *Manila Bulletin* 211.31 (31 July 1990): 44; [Comic Strips]. *Manila Bulletin* 211.28 (28 July 1990): 42.
[1829] [Editorial Cartoon by Roni Santiago]. *Manila Bulletin* 211.20 (20 July 1990): 6.

Photo No. 35
Cartoon: “Lost formalin for earthquake victims”[1830]

e.6.4 Dealing with the rebels: NPA and RAM

During the first weeks of the rescue operation, two of the Aquino government’s vicious “enemies”, the Communist armed group New People’s Army (NPA) and the rebel soldiers of the Reform the Armed Forces Movement (RAM).

On the one hand, On 16 July, the NPA declared a unilateral ceasefire against the government forces in Northern Luzon, Central Luzon, NCR, and ordered units in the disaster areas to participate in rescue and relief operations.[1831] In a statement, the NPA General Command said, “In this time of national tragedy, we must face with courage as one people our collective vows and take stock of ourselves in building a bright future”, and the units to exercise maximum restraint, but not when attacked by AFP, to effectively defend your areas and units.[1832] The NPA Northern Luzon Command said they gave started helping in the relief and rescue operations; while, the Southern Command of the rebels said that the "earthquake ceasefire" limited to those provinces and areas affected by the calamity, and not in territories such as theirs.[1833] On the other hand, The RAM, through infamous rebel soldier Colonel Gringo Honasan, called for a truce with the Philippine Government.[1834]This call was an act of trying to make peace with the Aquino government, seven months after the bloody December 1989 *coup d’etat* led by a coalition of RAM and soldiers loyal to the deposed Marcos regime. These calls of peace from the forces that wanted to topple down the government can be considered both a humanitarian consideration, given the extent of the devastation of the July 1990 earthquake, and an attempt to pose as extending "moral support" to the government they are fighting.

[1830] [Comic Strips]. *Manila Bulletin* 211.30 (30 July 1990): 66.
[1831] “NPA calls earthquake ceasefire.” *Manila Bulletin* 211.22 (22 July 1990): 1, 13.
[1832] Ibid.
[1833] Ibid.
[1834] Joel Palacios. “P16.5 M released for relief efforts.” *Manila Bulletin* 211.22 (22 July 1990): 1, 16.

But the President rejected the call of the NPA and the RAM. The President said that it would continue to hunt down extremist forces that are out to destabilize the government, and doubted the sincerity of the rebel groups: "That is good news if it is true and if they are really sincere. It is my wish, however, that a more meaningful move towards peace be taken by the CPP-BPA-NDF (and RAM) – a move that recognized the realities confronting the communist movement and the continuity of its armed struggle."[1835] Defense Secretary Ramos echoed the President's sentiment and told ultra-rightists groups to stop their attempts to destabilize the government in this time of disaster.[1836] There were accounts of the military blocking aid from suspected NPA sympathizers and military groups helping devastated communities.[1837]

e.7 "Meanings" and "effects" of the July 1990 earthquake

The July 1990 earthquake has always considered as a disaster with multilayered meaning and effects. The tragedy has surfaced the latent and predisposed cultural and social traits of Filipinos, manifested on how they see the earthquake in relations to their lives, how do they know the future based on how they interpret calamities, and how institutions see the disaster as an opportunity for the betterment of the lives of society, whether through science or socio-political idealist trajectories. The July 1990 earthquake was interpreted in various ways: (1) as a scientific phenomenon, (2) as a cultural phenomenon, through religion and humor, and (3) as a tool for nation building.

e.7.1 The July 1990 earthquake as a scientific phenomenon

As discussed in previous chapters, governments operationalized their scientific institutions and initiated scientific endeavors to study and understand the phenomenon from the lens of the natural and applied sciences. The appreciation the July 1990 earthquake from the point of view of seismology and geology did not only rest on the technical experts, but also with members of the print media who made their own sober but reliable take on the scientific issue at hand and made the supposedly highly intricate field of earthquake study be an issue of the ordinary layperson or newspaper reader.

Foreign scientific institutions funded the available comprehensive geological and seismological studies about the July 1990 earthquake. From 1990 to 1996, scientific teams from the United States, Japan, United Kingdom, and Italy went to the Philippines and corroborated with Philippine scientific institutions to make their own respective studies about the nature and effects of the July 1990 earthquake not only in the Philippines, but also in the field of geology and seismology. A month after the earthquake, a "quick look report" by an engineering firm from California was made and published, titled *The July 16, 1990 Philippines Earthquake: August 1990.*[1838] The study was a survey of the extent and source of damage, and the direct impacts of the

[1835] Marcia C. Rodriguez, "No ceasefire – Aquino: Gov't rejects CPP, RAM calls". *Manila Bulletin* 211.24 (24 July 1990): 1, 17.
[1836] Wilma Yamzon, Castro, Eddee & Chammag I. S. "Rescuers declare: No more survivors: "Death toll now reaches 830", *Manila Bulletin* 211.23 (23 July 1990): 1, 18, 21-22.
[1837] Elizabeth Lolarga, "The Tourtous Journey of the relief and rehabilitation Efforts", *Sunday Times Magazine*, 06 August 1990, pp. 11-13.
[1838] *The July 16, 1990 Philippines Earthquake: August 1990. California: EQE Engineering, 1990.*

earthquake in various urban sectors of the affected communities. The report concludes that "…the major lessons from it include the relationship of soft soils to building design practices, the vulnerability of multinational corporations to uncontrollable events across the globe, and the need for appropriate engineering and quality control in seismic areas."[1839]

The second study made about the earthquake the Earthquake Engineering Field Investigation Team from London, titled *The Luzon, Philippines Earthquake of 16 July 1990: A Field Report by EEFIT*.[1840] The report contains a more detailed study of the nature of the earthquake and provides a more detailed discussion of the economic losses caused by the earthquake to provinces in Luzon. Studies made possible through a collaboration of Filipino and Japanese seismologists namely *Reports on the Damage Investigation of the 1990 Luzon Earthquake*[1841] and *Surface Fault Ruptures of the 1990 Luzon Earthquake, Philippines*[1842] contain a detailed, technical geological and seismological analysis of the July 1990 earthquake.

Two years after the earthquake, an inter/agency committee composed almost of scientists from PHILVOCS and other academic institutions came up with their own report. Titled *The July 16, 1990 Luzon Earthquake: A Technical Monograph*[1843], the report was aimed at documenting and establishing a transparent database of studies made about the earthquake, not only from the point of view of geology and seismology, but also included studies made by sociologists, psychologists, social workers, and urban planners about the said earthquake. Particularly striking and important in this collection of studies is the study made by a team of sociologists led by Ricardo Zarco titled "Quantifying Spatial and Temporal Dimensions of Premonitory Animal Behavior of the July 16, 1990 Luzon Earthquake".[1844] Their study focused on analyzing the precursory and premonitory animal behaviors in relation to earthquakes. By interviewing locals in some towns in Nueva Ecija and Rizal provinces, the study concludes, "animal anomalies as short term earthquake predictor in areas near the fault line."[1845] This study somehow verified what has been popularly known amongst some people. One journalist detailed, "It is said that animals, equipped with senses a lot more accurate than those of human being, can feel an earthquake coming as early as a day or two before it actually happens."[1846]

[1839] Ibid., p. 46.

[1840] E. D. Booth, A. M. Chandler, P. K. C. Wong, and A. W. Coburn, *The Luzon, Philippines Earthquake of 16 July 1990: A Field Report by EEFIT*. London: Earthquake Engineering Field Investigation Team, 1991.

[1841] Reports on the Damage Investigation of the 1990 Luzon Earthquake. 1992. [Japanese]

[1842] Nakata, Takashi, Hiroyuki Tsutsumi, Raymundo S. Punongbayan, Rolley E. Rimando, Jessie A. Daligdig, Arturo S. Daag, and Glenda M. Besana. Surface Fault Ruptures of the 1990 Luzon Earthquake, Philippines. Hiroshima: Research Center for Regional Geography, March 1996.

[1843] *The July 16, 1990 Luzon Earthquake: A Technical Monograph. Inter-Agency Committee for* Documenting and Establishing Database on the July 1990 Earthquake, 1992.

[1844] Ricardo Zarco, et. al. "Quantifying Spatial and Temporal Dimensions of Premonitory Animal Behavior of the July 16, 1990 Luzon Earthquake", *The July 16, 1990 Luzon Earthquake: A Technical Monograph. Inter-Agency Committee for* Documenting and Establishing Database on the July 1990 Earthquake, 1992.

[1845] Ibid., p. 199.

[1846] Jamil Maidan Flores, "The best and the worst times". *Philippine Panorama* (29 July 1990): 10, 12, 32.

And lastly, a study funded by the Italian government, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo. Descriptions, effects, and lessons learned*[1847], discusses not only the July 1990 earthquake but also the infamous June 1991 Mt. Pinatubo Eruption. This study attempts to correlate the two large-scale geological phenomena that Luzon experienced for only a year.

The apparent reliance of local scientists for collaborations rested on the need for, no doubt, research funding, and additional technical support. PHILVOLCS Punongbabayn had directly, and indirectly lamented the lack of government interest in the further seismological study, especially after the San Francisco earthquake of 1989.[1848] He added that the PHIVOLCS before the earthquake only has 12 seismic stations, from a minimum ideal of 60; and only 1 percent of the 150 million (sic billion) national budget for 1990 was allotted to the said agency.[1849]

Another aspect that gained momentum after the earthquake was the interest in earthquake engineering and earthquake-resistant buildings. Like in previous large earthquakes, it was brought up as a form of a wake-up call for a more scientific and pragmatic approach to public engineering. Tapping the unnoticed and underfunded studies of PHIVOLCS and University of the Philippines (UP) on earthquake engineering was pointed out to be a good start for a long-term scientific initiative.[1850]Public discussions brought up that the government and local authorities should emulate the practice and system followed by Makati City business district buildings, as well as the Main Building of the University of Santo Tomas (UST) in their respective edifices regarding earthquake resistance of their structures.[1851] Most buildings in Makati were built in the 1960sand their strength lies on the fact that they used new technologies and strict compliance with international building code and standards.[1852]

The media helped in the appreciation of earthquakes through their short reports and information dissemination initiatives. Trivial as it may seem, and high-end experts in the field may consider this information as useless in the most elite sense, reports from journalists made the complicated field of seismology a matter of public literacy and should be toned down, and put into words the public can grasp and become more interested. Discussions or re-introduction of the "basics", such as plate tectonic theory, a short history of earthquake occurrences in the Philippines, and even the scales used (such as Rossi-Forel Scale, Richter Scale, and Modified Mercalli Scale) are some of the information made available through print media.[1853] Constructive and informed opinion from journalist also made sense, particularly on the issue of scientific communication. Some suggested that the government must improve domestic communication; as the

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[1847] Rantucci, Giovanni. *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo. Descriptions, effects, and lessons learned*. Presidenza del Consiglio del Ministri, 1994.

[1848] "Phivolcs assesses quake effects". *Manila Bulletin* 211.23 (23 July 1990): 1, 20.

[1849] Ibid.

[1850] Malou L. Sayson, "Earthquake engineering: Study of fault breaks, soil structure, building systems". *Manila Bulletin* 211.25 (25 July 1990): 52.

[1851] Aris Ilagan, "Quake-proof technology spares Makati buildings". *Manila Bulletin* 211.25 (25 July 1990): 50, 54.

[1852] Ibid.

[1853] Augusto Miranda, "All about earthquake". *Manila Bulletin* 211.23 (23 July 1990): 52; Editorial: Earthquakes and its magnitude measure." *Manila Bulletin* 211.21 (21 July 1990): 6.

recent earthquake tragedy proved to be: “In the national interest, it may be wise for the government to create a favorable climate for the introduction of modern technology into domestic communications industry.”[1854]

e.7.2 The July 1990 earthquake and Filipino religiosity

Spirituality and humor are the standing rocks of Filipinos during disasters. The reliance to prayers and devotion to the benevolent One, mixed up with comedic emotions and sentiments keep the will of them to survive and believe that the challenges brought about by nature will soon pass and everything will turn back to normal. Not in the absolutist or dismissive way, but religion and comicality ease the emotional and psychological burden of the people, and somehow open capacities to hope, idealize, and realize a better situation after a tragic experience. In President Aquino's 1990 SONA, the idea of high religiosity was represented in a microcosmic way by the president: "…By the grace of God and the unshakeable faith of the Filipino people, I am confident we will pull through…Earthquakes can destroy the strongest man-made structures, but they can never shatter the faith of the Filipino."[1855]

Treating a disaster, i.e. an earthquake, as a manifestation of God’s wrath, and associating it with the greater challenge (or purpose) from a Heavenly Being has been a default way of making a tragic experience knowledgeable and acceptable amongst many Filipinos. Bankoff (2004) argues that there is a strong tendency and leaning for Filipinos to socially construct environmental hazards and disasters, specifically related to climatic and seismic construction of the “God” in Philippine society.[1856] Azurin (1990) argues that disasters are as normal and customary as they seem, "…there are varied reasons ranging from the inadequacy of warning devices to the utter lack of damage-control capabilities, to a sense of fatalism that's more often fatal than anything else."[1857]

Various accounts, interviews, statements, and press releases of different individuals after the earthquake have a common thread, a unifying theme – the earthquake was related to a higher God's plan, manifested through acceptance of the facts that humans are and will always be humbled by God, and that people look at tragedies as God sending his believers of what should be done to ease the suffering. One columnist said: "Of all disasters you can think of, nothing seems to come more directly from God than an earthquake. In the middle of a tremor, you would inevitably feel that it was the hand of God literally shaking the foundations of the earth."[1858]

[1854] “Editorial: Improve domestic communication”. *Manila Bulletin* 211.24 (24 July 1990): 6; Jamil Maidan Flores, “The best and the worst times”. *Philippine Panorama* (29 July 1990): 10, 12, 32.

[1855] Corazon C. Aquino, *Fourth State of the Nation Address*, 23 July 1990, <https://bit.ly/2RiHW3q>, Date accessed: 31 October 2018; “State of the Nation Address 1990? Corazon Aquino”, *Philippine Daily Inquirer*, 07 July 2015 <https://bit.ly/2Sd2MBz>, Date accessed: 31 October 2018.

[1856] Greg Bankoff, “In the Eeye of Storm: The Social Construction of the Forces of Nature and the Climatic and Seismic Construction of God in the Philippines”, *Journal of Southeast Asian Studies* 35(1): 91-111.

[1857] Arnold Molina. Azurin, “Nature’s Fury, Human Folly.” *The Sunday Times Magazine* (22 July 1990): 5-8.

[1858] Jamil Maidan Flores, “The best and the worst times”. *Philippine Panorama* (29 July 1990): 10, 12, 32

“This is God’s punishment to us,” said a wailed a victim in Baguio City,[1859]; “*Ipagpapasadiyos na lang po namin ang nangyari*.” (We will leave it to God), said Romel Longalong 22, brother of Victor Longalong, 14 years old, who was trapped inside the CCP building in Cabanatuan.[1860] One journalist laments: "Natural calamities like earthquake is God-sent. It's like a father's stick to his erring little son. We need it to remind us that we are veering away and losing his love. Where have we been missing this? Isn't it perhaps by not loving our fellow men? Let's love them, even our enemies. It's also good for the peace and stability of our country."[1861] Fr, Jovito Cordero, Chaplain of Camp Aguinaldo, the headquarters of the AFP said, “…the killer quake was a “reminder that we should pray for repentance…for many times we have forgotten our duties to Him.”[1862]

People have resolved to the idea that the earthquake happened because it was abounding to happen. It was to take place because it is written in the scripture. Fe Cabreros, 63, whose son Dionisio was buried alive at the Hyatt Hotel, is staying on: "*Hindi mo pwede pagtaguan ang Diyos*," (You cannot hide from God) she rationalized.[1863]The end of all wickedness and wicked men of this world, and not the destruction of the earth will come at Armageddon, or Jehovah God of war.” says one newspaper columnist.[1864] People consume cataclysmic narratives from old religious texts, and those events are bound to happen in the present world. One journalist saw this connection with regards to the recent earthquake: "When Jesus told His followers to build their houses, not on the shifting sands, but firm bedrock, He was speaking allegorically. In the light of the July 16 earthquake, however, Christ's words also make sound engineering sense."[1865] Another one agrees, associating it with the other prevailing cultural traits, particularly on the Filipino's fondness to superstitious beliefs: "The superstitious folks said they are reminders that man despite his advanced technology, his wealth and power, is pitifully helpless against the forces of nature without God's care."[1866] A person from a town in Nueva Ecija drew a connection between the present earthquake and the 1983 Ilocos Norte earthquake": "Kung matatanda naman ang tatanungin, karaniwang paliwanag nila sa lindol ay ‘galit ito ng Diyos', sabi ng matatanda noong lumindol nang malakas sa Paoay, Ilocos, Norte, noong 1981, matapos ang mangyang kasal nina Irene Marcos at Greggy Araneta." (When you ask the old people, their usual explanation would be ‘wrath of God'; according to old folks, when a strong earthquake hit Paoay, Ilocos Norte in 1983, was because of the wedding of Irene Marcos and Greggy Araneta).[1867]

Aside from holy religious texts, people tend to look at history as a basis of how they justify why earthquakes happen. One argues, "…what we know is that the Philippines is

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[1859] Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake.” *Philippine Graphic* 1.9 (13 August 1990): 7-8.

[1860] Ody Fabian, “Cabanatuan’s Nightmare.” *Philippine Graphic* 1.7 (30 July 1990): 7.

[1861] Lito A. Catapusan, “Beatwatch: Quake is eye opener.” *Manila Bulletin* 211.18 (18 July 1990): 8. Dana Batnag, “After the Big Quake.” *Philippine Graphic* 1.8 (6 August 1990): 4-5.

[1862] Marcia Rodriguez, Eddee R. H. Castro, and Wilma N. Yamzon. “Death toll: 223; calamity declared.” *Manila Bulletin* 211.18 (18 July 1990): 1, 5.

[1863]

[1864] Vicente B. Foz, “Not in the News: Quake’s serious effects; politicians at it again.” *Manila Bulletin* 211.20 (20 July 1990): 7.

[1865] Sunday Times Magazine, 06 August 1990

[1866] Salvador D. Flor, “Biblical calamities recalled”. *Manila Bulletin* 211.29 (29 July 1990): 9.

[1867] Sunday Times Magazine, 06 August 1990.

Earthquake prone-earthquakes are part of our history."[1868] One arguably reminded that "…during the Spanish period, the Tagalogs believed that their legendary King himself from the prison cave…The Maranaws turned the earthquake experience to one of our most regal folk dances – the Singkil."[1869] Moreover, the material legacy of church architecture has some connections with the frequency of earthquake in the archipelago. Earthquakes influenced the church architecture in the Philippines, wherein belfries were built separately from the main structure of the church complex, while the latter used massive buttresses to resist earthquakes.[1870]

The earthquake was also interpreted as a form a form of self-covenant amongst survivors that if they survive the tragedy, they would religiously be better persons, be more religious and always believe in God, and somehow, highlight gender issues when it comes to religiosity. One survivor reflected: "That may be well stretching things a bit too fat. Life goes on. Beyond the vision of firestorm – a relic of our deep religiosity – the process of rebuilding mus now get underway in earnest."[1871] A popularized story of a "macho" guy who, during the earthquake said: "…*Nagkabuhol-buhol 'yung dasal ko. Pati mga prayer before meals, nasabi ko na!*" (I mixed up the prayers, even the prayer before meals, I have recited!)[1872] One said that there are no more "macho" when the wrath of God strikes.[1873] A priest in his column at the Manila Bulletin said that "there are no atheists in earthquakes either", that everyone prays during calamities.[1874] But he adds, "However, it may be disappointing to God – if that is virtually the only time to pray. Prayer is not just last-ditch effort in times if crisis. Prayer should be seeking for God in all the circumstances of our lives, in good times as well as in bad."[1875] Moreover, people much go beyond prayers, and do the things to help the people in need: "But while we have a sign of relief saying 'Thank You, Lord, my family and I have survived it', or doubly grateful that we did not suffer as much as Baguio, Cabanatuan, or Pangasinan, thinking God is not enough. We must extend assistance and support to the thousands of less fortunate victims."[1876] One entrepreneur connected the idea of religiosity with the resurrection of businesses in the affected cities in northern Luzon. For him, spirituality and entrepreneurship can go hand in hand, especially in times of disaster: "We will survive this national crisis primarily because of our strong spiritual values. The same religious values can also be the wellspring of the more mundane and monotonous task of rebuilding the damaged physical infrastructures and pursuing the business opportunities that will result from the reconstruction activities. The spirit of enterprise is part of God's plan to assist the man in obtaining good even from misfortunes."[1877] For

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[1868] Jamil Maidan Flores, "The best and the worst times". *Philippine Panorama* (29 July 1990): 10, 12, 32.
[1869] "Editorial: Earthquakes are part of Philippine history." *Manila Bulletin* 211.19 (19 July 1990): 6.
[1870] Ibid.
[1871] Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1872] Bel R. San Luis, SVD, "Quake: Lesson vs 'crab mentality'". *Manila Bulletin* 211.23 (23 July 1990): 60.
[1873] Ibid.
[1874] Bel R. San Luis, SVD. "Word Alive: Quakes make us turn to God." 7,12.
[1875] Ibid.
[1876] Ibid.
[1877] Bernardo M. Villegas, "Economic reconstruction of damaged regions". *Manila Bulletin* 211.25 (25 July 1990): 31.

indeed, a critical, and willing mass of private entrepreneurs was needed for the economic recovery of Baguio, Cabanatuan, and Dagupan.[1878]

Another concrete manifestation of the religious reading of the earthquake was the prayer vigils held by some sectors of the religious community to encourage believers to pray for the souls of the victims, and to ask God to guide the country to survive another disaster in the future.

One of these was the prayer vigil, and donation drive was held on 21 July 1990, from Saturday, 6pm until 22 July 1990, Sunday, at the EDSA Shrine, spearheaded by Life Catholic Charismatic Community and the Human Life Foundation, and other charismatic groups.[1879] The prayer marathon was aimed at encouraging the faithful to pray to the fate of the country, with regards to the recent earthquake, as well as other calamities that struck the country, such as drought, Red Tide, typhoon, floods, and power failures.[1880] Families were asked to light candles outside their homes to signify solidarity with the vigil at the EDSA Shrine.[1881] Moreover, they noted the fact that despite the Philippines being the "only Christian country in Asia", it has one of the highest crime rates in the world, violence has become a way of life, and graft and corruption have permeated all levels in both the government and private sector.[1882] A statement of the organizers of the event reflects the apparent association of the recent earthquake tragedy with God being angry with the people: "Catholics, as well as other Christians, look at the earthquake as only the most recent manifestation of the displeasure of God over the rising criminality, sins, immortality, graft and corruption, violence, rebellion, total disregard for human life, and indifference of the Filipino people."[1883]

One of the heads of the Catholic Church in the Philippines also viewed the July 1990 earthquake tragedy an opportunity for Filipinos to have "a new lease on life". In his pastoral letter titled "New Life-As the Earth Trembled", Manila Archbishop Jaime Cardinal Sin pointed out that, "…It ought not to need crumbling buildings and hotels to remind us that in this world, no matter how sophisticated we think we can have become, we have no lasting city, and therefore, ought to live in this city in justice, hope, and genuine love."[1884] He asked all the believers to submit themselves before the mercy of God humbly, and realized the meaning of the recent tragedy concerning their faith as Catholics. He said, "In love, we are called to conquer death, even as Christ conquered death, and rose to give us new life as the earth trembled…On bended knees, we must ask God what he is telling us through this massive sign in our times. We ask this, not in order to be mired in paralyzing self-pity, but that we might have hope."[1885]

[1878] Ibid.
[1879] "Prayer vigil set." *Manila Bulletin* 211.19 (19 July 1990): 1, 21.
[1880] Ibid.
[1881] Ibid.
[1882] Ibid.
[1883] Ibid.
[1884] "Sin sees new life for Filipinos." *Manila Bulletin* 211.22 (22 July 1990): 1, 13.
[1885] Ibid.

e.7.3 The July 1990 earthquake and the discourses of nation-building

One aftermath of the July 1990 earthquake was the "resurgence" of calls, problematization, redefinition, and debates on nationalism. Nationalism as manifested in the manner of the idea of a country acting as a compassionate community – a nation of resilient people, and helpful and sacrificing nation. The unexpected and unrealized vulnerability tends to lead to the outpouring of support and "emblematization" of an imagined resiliency, concretely portrayed on stories of heroism, enduring Filipino spirit in times of disasters, and the failed responses as learning opportunities to strengthen the faith and hope to the country. Humanity, compassion, and volunteerism triumphed during the much-needed time for massive social action. As one journalist assesses it:

> We will always have earthquakes. That we cannot avoid. What is important is how we prepared ourselves for the quakes for the quakes come and how we respond. And we have always responded nobly to disasters. The nation's response to do everything possible for the earthquake victims in Baguio, Cabanatuan City and elsewhere is ennobling. It is a victory of the human spirit.[1886]

The meaning of the earthquake in the national life of Filipinos is a double-edged sword discourse of nationalism: it ignites the fire of compassion and resiliency and points out possible cracks in the thought bubble. As one columnist pointed out, "…calamities, like this earthquake, bring out the best and the worst in us"; the earthquake put aside the "talangkahan" (crab mentality) in Philippine politics, and was able to unite the people to help each other.[1887] The sense of belongingness to a nation through helping other people afflicted by disaster sums up what Anderson (1983/1991/2006) call in his framework of nationalism infamously known as “imagined community”.[1888] Select members of the intellectual elite tend to be the chosen voice of this nationalist narrative, In his speech before the Philippine Army Officers and Civilian Employees on 19 July 1990, Senate President Jovito Salonga highlighted the importance of resiliency as an enduring trait of Filipinos in times of calamities:

> The capacity of the Filipino to laugh in the face of adversity and suffering is one of the redeeming aspects of Filipino culture. It enables us to cope with pain and misfortune and attests to the indomitability of the Filipino spirit. Humor in the face of widespread misery is commendable, but I may say that there is something more than smile and laughter that makes us proud of being Filipinos in the wake of a natural calamity such as a devastating earthquake. It is our capacity as Filipinos in the face of natural disasters to forget divisions and differences, cast aside bitter conflicts and personal resentments, and in a noble expression of the

[1886] “Editorial: Earthquakes are part of Philippine history.” *Manila Bulletin* 211.19 (19 July 1990): 6.

[1887] Bel R. San Luis, “Quake: Lesson vs ‘crab mentality’”. *Manila Bulletin* 211.23 (23 July 1990): 60.

[1888] Benedict Anderson, *Imagined Community: Reflection on the Origin and Spread of Nationalism* (Verso, 1991).

> human spirit – pour treasure and resources, talents and energies to save human life and come to succor of the afflicted and the suffering.[1889]

Former President Diosdado Macapagal considered the tragedy as a turning point for a national rebirth – for the country to move forward by the partisan politics brought about by the previous dictatorial regime that continued to haunt the country years after the dictator was deposed. The problematic political situations in the post-martial Law years and the vehemently polarized politics of the era needed to be resolved as a matter of the past with learning from it: "From our perception of a wide impression, the quake could be an admonition that we, the Filipino people, leaders, and citizens alike, both under the dictatorship and in the newly restored democracy have been by and large recreant to the national welfare and must rethink our course… Some look upon the earthquake as the needed catharsis of a gravely troubled nation to rise to progress and greatness."[1890]

But despite these poignant words portraying the need for a unified national feeling in relation to the disaster, the call for pragmatic solutions to the enormous problems revealed by the calamity should be acted. Rantucci (1994) concludes that: "Political leaders, decision-makers, administrators and the people who most suffered the effects of the 1990-1991 calamities have learned the lesson and gained a better understanding of the relationship between extreme geological events and human development."[1891] One points out the man-made disasters emanated from the earthquake – failed construction policies, latent immoral acts of people in times of need, etc., to be harmful as well, despite "calamities caused by nature tend to unite people who, in the midst of catastrophe, forget about race and religion.[1892] The heavy politicking and insensitive political acts during disasters were seen as "disastrous drawback to the country's efforts at achieving a measure of progress at this stage."[1893] Furthermore, the call for a more professional response to calamities, and not merely or solely reliant on the capacity of non-state sectors to be mobilized for additional support was raised. One opinion strongly points this out: "It warms the heart that the citizens responded admirably to the call to help. But with the professionals not in charge, a lot of their contributions, particularly those kinds are likely to go to waste. Already there's a word that too much food had been sent to Cabanatuan where there was no food shortage, too little for starved barrio people trapped by the landslides in Kennon Road."[1894]

The July 1990 earthquake saw how the citizenry was mobilized to help the government in dealing with the aftermath of the disaster. The stringent government bureaucracy indeed was a major bottleneck in quick response; aside from the fact, the politics tend to be less proactive when disasters strike, whether it was because of administrative incapacities, or mere inaction. As one journalist points out, "By tradition, and its very system, the government cannot move quickly. Regulations have been the bane to public

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[1889] Jovito R. Salonga, "For the best in our culture and characters". *Manila Bulletin* 211.24 (24 July 1990): 7, 14.
[1890] Diosdado Macapagal, "The earthquake". *Manila Bulletin* 211.29 (29 July 1990): 7, 16.
[1891] Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo. Descriptions, effects, and lessons learned*, p. 129.
[1892] Mary Bessie Lee, "What About Man-made Disasters?" *The Sunday Times Magazine* (22 July 1990): 16-18.
[1893] Vicente B. Foz, "Not in the News: Quake's serious effects; politicians at it again." *Manila Bulletin* 211.20 (20 July 1990): 7.
[1894] N. G. Rama, "Editorial: Tale of two disasters – Killer earthquake & the aftershock of inept rescue operations". *Philippine Panorama* (29 July 1990): 3.

service, and worse, to business and industry. The principal lesson learned from the last calamity is that the citizens themselves can do a lot of things for the country if they put their mind to it. In the end, it's not the government, but the private sector that's the national engine of national progress and salvation."[1895]

Moreover, despite the apparent prevalence of stories about people who used the disaster to take advantage of others, which indeed added into the emotional burden of people on a national scale, stories of sacrifice and heroism stood out to be the guiding light of the nation in dealing with the moral aftermath of the tragedy. As one columnist argues, "…But the heroism of some men and women will be long remembered. The quake aftermath was a time for mourning but also a time for celebration. There were vultures, opportunists who robbed the dead and victimized the dying, and politicians who allegedly hoarded and soled relief goods. The unselfish acts of courage and mercy by many others, though, have renewed the spirit and taught us that there are more things to admire than to despise in the human being."[1896] Emphatic vignettes of these humanistic acts were seen in disaster-afflicted areas. Public and private doctors raced to Baguio and Cabanatuan to offer services for free.[1897] "*Gusto ko lang makatulong sa mga kaedad kong biktima.*" (I just wanted to help the victims), said Marvin Ordoñez, while assisting in handing dextrose to doctors and nurses in Cabanatuan.[1898] An old lady, Rosario Tingson, 77 years old, distributed prepared meals to victims at the rescue center: "I just wanted to help"[1899] While Marvin Madulid, a volunteer rescuer, continued to work, despite him failing to find her 17-year old sister inside the collapsed CCP building.[1900]

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Sum Up

This chapter provides a lengthy discussion about four significant earthquake experiences in the 20th century. These earthquakes happened in different political periods of the century, from the Commonwealth era to the post-EDSA years. One common thread that binds these earthquakes is that the governments during the said calamities were under Filipinos. Responses were generally different, but a closer look will show there are a typical reaction and response from the government and the people.

The period also saw developments in how institutions and people are engaged with disaster response. Modern scientific knowledge was produced both by Filipino and foreign scientific experts. Extensive documentation of the earthquakes was also seen, especially during the latter years of the century. Moreover, the earthquakes discussed highlighted the intertwined relationship of disasters, politics, and national life of Filipinos, particularly on matters pertaining to disaster response, effective administration, mobilizing support, and manifesting Filipino values in times of calamities. The concept of

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[1895] "Editorial: NGOs and private individuals respond to emergency". *Manila Bulletin* 211.28 (28 July 1990): 6.
[1896] "Tales from the Rubbles: Heroism and opportunism in the wake of the July 16 killer quake." *Philippine Graphic* 1.9 (13 August 1990): 7-8.
[1897] Ibid.
[1898] Ibid.
[1899] Ibid.
[1900] Ibid.

Filipino resiliency as a framework in responding with disasters has been a foregoing discourse in national disaster management schemes in the country for a long time. Though the period cannot be exactly identified, the July 1990 earthquake is an excellent example on how the nation was defined through the prevalence of national support, manifested through support beyond the disaster area, and even way beyond the geographical boundaries of the Philippine nation. In the years that followed, in other large/scale disasters that the country experienced, as I argue, until in recent years, nationalism, through calls for social action, volunteerism, and compassion, and manifested in various forms of proactive initiatives, showcase this indeed helpful, but delicate concept of nation and nationalism, that in many times, doesn't resonate into actual paradigm shift and reform on the policy level. The nationalist feeling in times of disasters is ephemeral and epiphenomenal; it is difficult for it to be translated to actual, long-term improvements in disaster response.

CHAPTER 5

A History of Earthquakes in the Philippines and A History of Philippine Earthquakes: A Transversal Summary and Interpretation

"What I learned, in short, is that the world became shakier in the nineteenth century. By that I do not mean simply that political revolutions and industrialization were perceived in terms of precipitous, dizzying change. I mean that the earth was caught trembling more often than before. Reports of jerks, bump, rumbles, and thuds proliferated. They passed from hand to hand in newspapers, letters, scientific transactions, and medical case studies. Certain countries and even towns acquired reputations for impressive instability. Travelers looked forward to the thrill of a first earthquake. People learned to suspect that the sound of a distant wagon rolling over cobblestones was the trembling of the earth itself—and they could check the morning papers to confirm it."

- Deborah Coen, *The Earthquake Observers* (2013)[1901]

The narratives presented in the previous chapters show a history of earthquake occurrences in the archipelago, as well as a qualitative approach to historical seismology as a field of study of earthquakes. The mix of these two provides a qualitative methodology to the understanding of earthquake experiences of Filipinos, perhaps a "social view" of earthquakes by telling the story of individuals and social institutions in times of calamities. By narrating a history of earthquakes through the following theoretical guides: (1) earthquakes as historical events and turning points, (2) historical seismology, and (3) long duration perspective to understand the evolution of earthquake experience and responses, one can draw extensive analysis on the the following ideas: (1) how can we frame our historical understanding of disasters, (2) how can we determine chronologies and periodization, and further identify turning points and changes in how Filipinos view disaster experiences, and (3) how sectors of the society respond, adapt, and mitigate the effects of such environment-induced tragedies. Going back to the research questions posed at the introductory part of this work, I attest that they are addressed extensively by this dissertation work. Chapters 3 and 4 answered most of the issues raised by the work: why are the earthquakes choses historically notable, how did Filipino communities responded to the disasters caused by the earthquakes, and if there were a continuity and evolution of responses from the state and its institutions concerning post-disaster rehabilitation.

The six Luzon earthquakes discussed in this work, the 03 June 1863, 18-20 July 1880, 20 August 1937, 02 August 1968, 17 August 1983, and 16 July 1990 earthquake, were

[1901] Deborah Coen, *The Earthquake Observers: Disaster Science from Lisbon to Richter* (University of Chicago Press, 2013), p. 2.

all national in scale: the direct involvement of the national government in acting on the needs of devastated communities, as well as the mobilization not only of state resources, but of the private, non-government sectors, as well as the international community. In different scales and manifestation, the segments of the Filipino society were both victims and proactive actors in rescue and rehabilitation. The recurrence of earthquake hazards in the archipelago made it a part of the community and in a general sense, national life of Filipinos; it made Filipinos both adaptive and vulnerable, both resilient and susceptible – a boon and a bane. Whether we use "frequent life experience" (Bankoff 2009)[1902] or "adaptive failure" (Hoffman and Oliver-Smith 1999)[1903] as a lens of profoundly understanding the duality of Filipino's status during disasters, we can extract further specific vignettes to enrich our knowledge of how Filipinos respond and adapt to disasters. The bureaucratic and cultural responses are some of these particular examples of how we can further fathom and grasp the traditional and continuously evolving disaster mentality of Filipino communities. How people interpreted the earthquake incident, and the apparent religiosity of Filipinos that has been consistent from the 19th to the 20th century. At this point, how can we connect the dots? This cppater offers a transversal summary and interpretation of the previous chapters and presents a critical summary of the main ideas and arguments presented. With this summary, it attempts to englighten the reader on how we can approach the historical topic and issues raised along the discussion of each earthquake studied. This chapter is divided into

a. Development of institutional responses, 1863-1990: Technological and Bureaucratic

In my view, disasters are political, and responses are personal, and bureaucratic and ministerial. In various earthquakes disasters that hounded the country, the state's response always underwent a reactive-proactive phase, part of the regular period of reaction and rehabilitation during a post-disaster response. The cycle of rescue operations, immediate and ill-equipped in terms of capacity coincide and move to bureaucratic responses such as fiscal and budgetary decisions, institutional scientific intervention, and public infrastructure policy and regulation review. There is an apparent repetition of shortcomings, responses, and post-disaster programs implemented since the 19th century. Although the nature of the state and its people evolved through time, it is visible that reactive rescue operations, hounded by the lack of proper equipment and training of the state's rescue teams, were the first scenes one can observe on the six earthquakes discussed. And when things subside, the government makes its way to make bold decisions related to financial and administrative matters of rehabilitating the devastated areas. One consistent description from the 19th to the 20th century, magnifying the cases of the responses of the government after the earthquakes, is bureaucracy trumps quick and efficient government response; the multi-layered government structure proved to be a tube with various bottlenecks, preventing the easier release of funds and implementation of orders.

Trivial and encyclopedic is the presence of scientific agencies monitoring the situation and providing the scientific dimension on how the state should lay down its plan for long-

[1902] Bankoff, "Cultures of Disaster, Cultures of Coping: Hazard as Frequent Life Experience in the Philippines", p. 265.
[1903] Hoffman and Oliver-Smith, *The Angry Earth*, p. 29.

term rehabilitation of communities – its seems that the government needs these institutions to help them understand why the earth moved, not to include and expand the scientific capacities of the state to use science to lessen the damage of earthquakes as an environmental phenomenon, whose field of scientific study, seismology, has long been entrenched in the country as a field of study. Seismologists, civil engineers, and architects that worked in this period during the post-disaster rehabilitation phase were the pioneers of their era; but their ideas did not translate to be the foremost in the objective of making the towns and cities earthquake prepared and resilient. The building code in the country has evolved since the 19th century – depending on the needs of town, the developments in the field of public infrastructure building, and the dynamics of urban planning and city creation. But the building codes passed in the country tend to be more of the punitive body of rules and regulations, and not of standardization, enhancement, and vibrancy in public construction.

Moreover, the strong presence of private and international support is a default auxiliary to the incapacities of the Filipino society in dealing with the effects of a hazard or in the aftermath of a disaster. There was a strong and consistent presence of local and international organizations that stepped into the fray and offered alternative support to the people and communities. On the one side, one can read this as a triumph of humanity and the operationalization of a highly functional and interconnected network of social groups and organizations. But on the other side, this can also mean that the state has always been handicapped in estimating and taking full control of the situation as a consolidated body in disaster responses. Rephrasing the "strong families, weak state", argument (McCoy 1994; Kaelin 2012)[1904], in times of disasters in the Philippines, there are strong non-governmental organizations and a relatively weak state. And as proven in certain manifestations, the ideological development of anti-state and communist leading organizations presented an alternative to the way the state handle situations in times of disaster. Bankoff and Hilrost (2009) argue that the prevailing social and economic order influenced how the state and the NGOs perceived vulnerability and responded to the needs of the people in times of calamities.[1905] As Rutten (2008) shows, in the height of disaster indeed coincided with the strengthening or the leftist above-the-ground militant and underground-armed struggle in the country.[1906]

The field of post-disaster governance is one of the toughest in the disaster risk reduction and management cycle. The idea of recovery and bringing back into the normal state of affairs the communities affected by hazards tests the capability of agencies and the people to get their feet and stand up from the ground. With the strong support of different private social servicing agencies and NGOs, practices from all over the country, particularly those that are highly vulnerable to hazards, can be collected and can serve as a pattern for national, regional, and local disaster risk reduction and management plans. Like putting local knowledge in mainstream mitigation advocacies, we can do the

[1904] Alfred McCoy, (ed.) *An Anarchy of Families: State and Family in the Philippines* (Quezon City: Ateneo de Manila University Press, 1994); Lukas Kaelin, *Strong Families, Weak State: Hegel's Political Philosophy and the Filipino Family* (Quezon City: Ateneo de Manila University Press, 2012).

[1905] Greg Bankoff and Dorothea Hilhorst, "The Politics of Risk in the Philippines: Comparing State and NGO Perceptions of Disaster Management" (Overseas Development Institute, 2009). DOI: 10.1111/j.0361-3666.2009.01104x.

[1906] Rosanne Rutten (ed.), *Brokering a Revolution: Cadres in a Philippine Insurgency* (Quezon City: Ateneo de Manila University Press, 2008).

same with improvisation practices. These measures will be viable in equipping local officials as well as making the state agencies aware of their responsibility of to strengthen and enhance capacities of people on the ground, doing the necessary steps to mitigate disaster threats and effects. Making concrete steps to institutionalize best practices in disaster response is one clear example of the learning capacities from each and every disaster. How did Filipinos learn from specific disasters? This is not measured on merely lessesning the number of casualties in times of calamities, but more on, despite the fact of intense presence of exnvironmental hazards, the people and the government act steadfastly and proactively to prevent negative effects of disasters in its high time. Moreeover, the proactiveness in also manifested through prior development in disaster education, and scientific instituonal development in disaster response. Of course, the most feasible way of making use of historical information is to relate it to a much more recent experiences of calamities. The narrative of earthquake disaster presented in this work is for use to have a grasp of the Philippine experience in the the long the past centuries. It shows us the repetitive cycle of failures, and openings for proactive development; it looked like that in the past 150 years, Philippine state response to earthquake disasters revolve around an uneding cycle of misfortunes and faults, as in a Möbius strip of disaster and recovery. But learnings always come at hand in many ways that state institutions and the public realize along the process of recovery, and preparation for future disaster scenarios.

To visualize the evolution of institutional responses, a timeline of policies, institutions, and scientific studies made is presented for us to locate and situate the development of programs and projects concerning post-disaster rehabilitation and recovery.

Photo No. 36

A timeline of policies, institutions, and scientific studies that are results/related to the 1863, 1880, 1937, 1968, and 1990 earthquake
(Se Table No. 32 for thespecific legend)

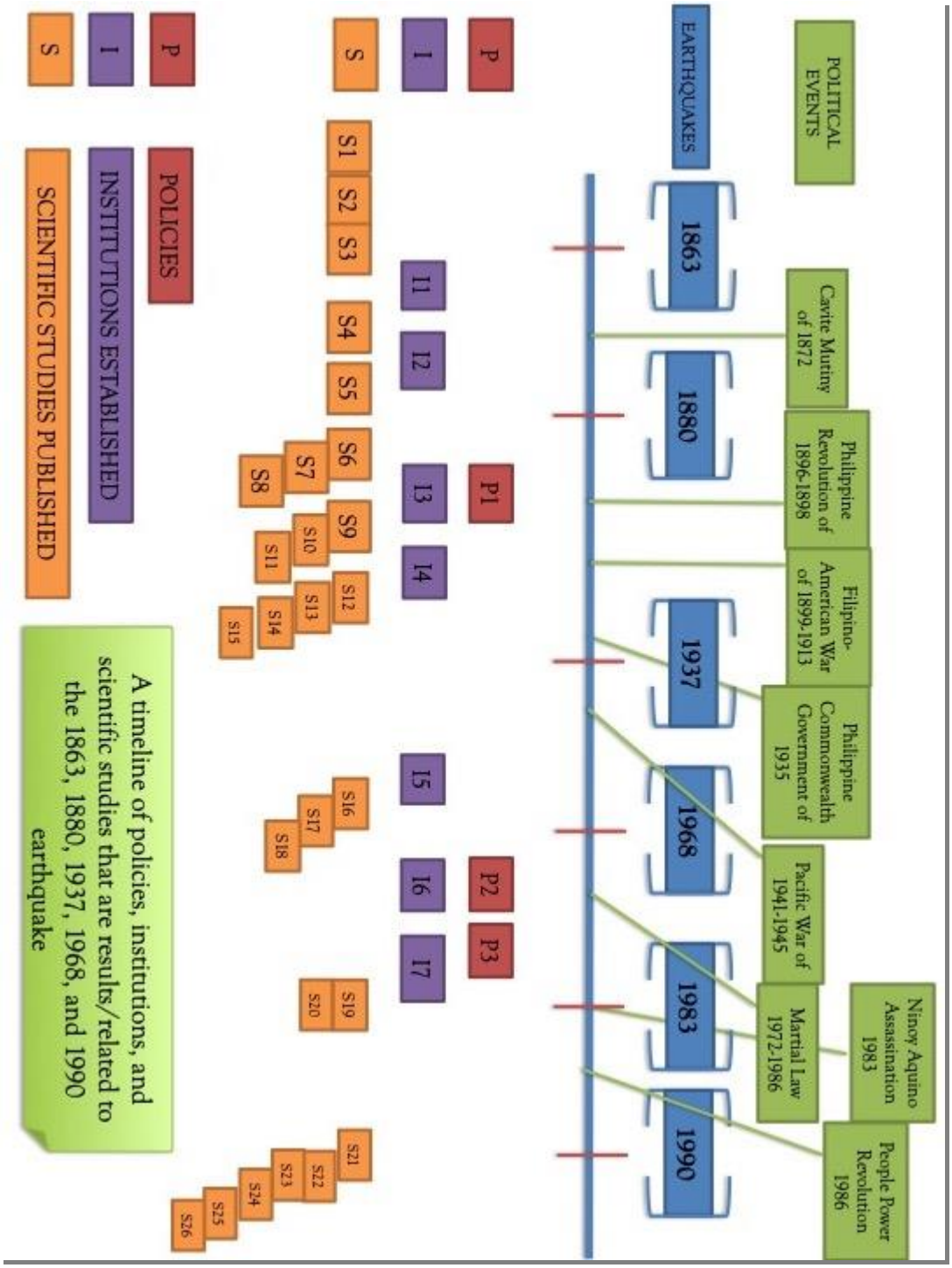

Table No. 30
Summary of policies, institutions, and scientific studies that are results/related to the 1863, 1880, 1937, 1968, and 1990 earthquake

Policy		Institutions		Scientific Studies (Author)	
P1 (1888)	Spanish Building Code	I1 (1865)	Observatorio Meteorológico de Manila	S1 (1858)	Valdés
P2 (1972)	Philippine Building Code	I2 (1866)	Inspección General de Obras Públicas	S2 (1862)	Cerero
P3 (1977)	Revised Philippine Building Code	I3 (1884)	Servicio Meteorológico - Observatorio Meteorológico de Manila	S3 (1863)	Garcia del Canto
		I4 (1901)	Philippine Weather Bureau	S4 (1870)	Valdés
		I5 (1952)	Commission on Vulcanology	S5 (1879)	Faura
		I6 (1972)	Philippine Atmospheric, Geophysical and Astronomical Services Administration	S6 (1881)	Centeno
		I7 (1982)	Philippine Institute of Vulcanology and Seismology	S7 (1884)	Abella
				S8 (1885)	Centeno
				S9 (1893)	Abella
				S10 (1895)	Saderra Masó
				S11 (1895)	Abella
				S12 (1897)	Coronas
				S13 (1910)	Saderra Masó
				S14 (1911)	Saderra Masó
				S15 (1912)	Coronas
				S16 (1966)	Gervasio
				S17 (1968)	Oca

				S18 (1969)	UNESCO
				S19 (1983)	Valenzuela-Garcia
				S20 (1983)	Santiago-Rillon
				S21 (1990)	EQE Study
				S22 (1991)	EEFIT Study
				S23 (1991)	Japan Government-sponsored Study
				S24 (1992)	PHIVOLCS Inter-Agency Study
				S25 (1994)	Rantucci
				S26 (1996)	Hiroshima RCRG Study

b. Development of Public Responses, 1860s-1990s: Religiosity and other cultural responses

The complex interplay and interrelation of local culture, scientific knowledge, and people's vulnerability is manifested in how rumors and fears dictate people's mentality and response to natural hazards. On the side of the Filipinos, people commonly viewed risks culturally.

A dilemma usually shared by environmental historians is the fact that the scarcity of sources limits disaster history. Though this is a reality, it does not convey a message that the past should be left unwritten. Research should continue to work to make the past knowledgeable. Vulnerability, as a concept, has time dimensions; it has historical context on its own. Perceptions of vulnerability in the past might be different from how it is conceived today. Coping with disasters develop as time progresses. Through the introduction of scientific knowledge, people are given avenues to understand situations fundamentally and to prevent extreme damage of a natural hazard. But as we have stated, developments in science and bureaucratic institutions did not mean invulnerability. In the calamities presented, there were a variety of responses the Filipinos did to cope with the disasters. These differed from one another, depending on how other social factors entered into the scene and affected the flow of events. With these, people see an image of abstract vulnerability.

Societal preoccupation adds up to the emotional and psychological burden of dealing with the effects of earthquakes. Political and economic conditions tend to put weight on the supposed to be a clear and attentive mind of people during the disaster response and rehabilitation phase. These issues make the disaster a complex and complicated cultural norm – and people tend to make various and varying dispositions on how to interpret and understand the disaster. These complications all lead to a prevailing

attitude – leave everything to fate and God. It is complicated to deconstruct the multi-layered stories of people in times of disasters, for example, earthquakes. People have perceived earthquakes as a hostile force of nature that have to be dealt with, yet damages can be alleviated. Divine means and rehabilitation were some of the common responses to earthquakes. Scientific inquiries later served as an alternative to people to understand earthquakes as a common natural event.

Understanding how people have become vulnerable or eventually invulnerable to disasters can be viewed on how science contributed to the crafting of new knowledge about disasters. Towards the second half of the 19th century, the world recognizes science as the primary epistemological framework in human development.[1907]. These brought a new light in enriching the status of science as substantial for reforms, not just a prerequisite to divinity and salvation. Also, Spain at these times has accepted the new means in administering colonies, social punishments, and even their views on the cause of disasters.[1908] In the 1860s up to the 1880s, the fluctuating economic and political affairs between Manila and Madrid influenced the flow of communication and decision-making. During the end of the 1930s, the combined political stress of a looming international war, and the Filipinos grappling to deal with the management of their own affairs under a preparatory government mixed up with the urgent need to address the destruction of Manila after the August 1937 earthquake. The different societal mood in the late 1960s and the early 1980s under the dictatorial regime influenced the outcome of response, appreciation, and coverage of the event as a national concern; in the August 1968 earthquake, the authorities and the public identified lapses in their reaction, but in the August 1983 earthquake, the regime's media controlled the flow of information; thus, limited details about the government's shortcomings were reported, and the newspapers were flooded with state efficiency and concern to the victims. Lastly, the July 1990 earthquake as a Pandora's Box of everything – government in a fiscal dilemma, polarized and partisan politics amongst politicians and the people, and extremely hampered communities. No wonder it is considered one of the most historical disasters in recent Philippine history, together with the June 1991 Mount Pinatubo eruption, and the 2013 Super Typhoon Yolanda devastation. But in general, it must be said that since the 1860s, given the highly bureaucratic response of states' in times of disasters, the mere period of rescue and rehabilitation is a period of anomalies.

Hazards and the societal contexts where they live often show the high risks people have to deal with; the incapacities and the shorthanded responses of authorities in the aftermath of disasters add up to the risky lives of people. The seemingly repetitive cycle of reactive and shortsightedness in post-disaster rehabilitation and reconstruction efforts, in the revisions in the urban and resettlement planning of towns and cities, further displace people from the supposed to be envisioned organized settlements after disasters. Thus, people tend to look for refuge from their emotional-cultural pillar – spirituality. This refuge is not only in the form of helplessness leading to compassion as responses; the guarantee of opportunistic fellows and vultures is as possible as the presence of helping hands for victims,

[1907] Alvin Jason A. Camba, 'Diskurso ng Siyensiya: Kolonyal na Diskurso sa mga Sakuna mula sa Panahon ng Instrumentasyon tungo sa Panahon ng mga Amerikano' published in *Daluyan* (July 2011), p. 120.
[1908] Ibid., p. 120.

Traditionally, as mentioned previously, hazards are seen as acts of God; threats are considered as wages of sin and reflect notions of human morality. In some cases, it is seen as God's wrath, through nature getting back to the humans. With a form of fanaticism to Catholicism was present in people's minds leading to the Church's control over people's mentality, the wrath of God was inevitable. Thus, the only thing that can save them, based on available sources, was to pray and continue being "good" servants of the faith. During calamities, people run into churches to conduct *novenas* and pray until a storm passes their town. A few days after, parishioners usually conduct processions of saints to ask protection and guidance, so that hazards will never happen again. The historical experiences of Filipinos on certain environmental disasters have a surmountable influence on the way they view and respond to the challenges of the natural environment. Local knowledge provides mechanisms for people to predict natural hazards. These include careful observation of animal behavior, the position of heavenly bodies, sun and cloud formation, wind direction, as well as calendars of cycles on agriculture and aquaculture. Through these methods of prediction, people respond in varying contexts of levels of personal and collective capacities. One common attitude of Filipinos, in determining their capacity to cope with the challenges of society, whether environmental disasters, economic crisis, or family and personal problems, is the "bahala na" value. Jocano (1999)[1909] argues that it is beyond risk-taking, but of courage and calculated assessment of odds; Bankoff (2003)[1910] furthers that it is both an effective assessment of odds, and a passive acceptance of one's fate. But as seen in the cases of the earthquakes narrated, people tend to submit to this mentality in times of helplessness, then this attitude of emotional vulnerability automatically goes into transition to an outlook of hope and perseverance, that sooner or later, everything will get back to normal, and people will be back on their feet. But in contrast, it can also be observed a pattern that in reported accounts, there is a tendency to describe the socio-economic as severely devastated, whereas the socio-economic elite as a substantial segment of the society – the vulnerable poor, and the resilient rich.

One sharp generalization that we can take from the growing literature of environmental and disaster studies is that the more vulnerable society is, the more religious it manifests, or vice versa. Bankoff (2004) argues that "Technology fails to provide a sense of security: the predictions of the state's meteorological and seismic agencies are generally portrayed as unreliable, while most engineering accomplishments are viewed as futile and inconsequential."[1911] From this view, we can infer that the presence of scientific institutions does not guarantee the people with a secured life in times of disasters. Earthquakes as pragmatically accepted as an inevitable force of nature, corresponding damages are such as an irrefutable outcome. What the scientific institutions gave to the Filipinos is a modern and scientific mentality that disaster damage can be lessened, not prevented. Vulnerability has time dimensions; it has historical context of its own. Vulnerability in the past might be different from vulnerability of today. Coping with disasters develop as time progresses. Through the introduction of scientific knowledge, people are given avenues to basically understand situations, and to prevent extreme damage of a natural hazard. But as we have stated, developments in science did not actually mean invulnerability. In the cases presented, there were a

[1909] Felipe Landa Jocano, *Working with Filipinos: A Cross-Cultural Encounter* (Metro Manila: PUNLAD Research House, 1999).
[1910] Bankoff, *Cultures of Disasters*, p. 167-168.
[1911] Bankoff, "In the Eye of Storm: The Social Construction of the Forces of Nature and the Climatic and Seismic Construction of God in the Philippines", p. 92.

variety of responses the Filipinos did to cope with the disasters. These differed from one another, depending on how other social factors entered into the scene and affected the flow of events. With these, an image of abstract vulnerability can be seen. Unfounded nihilism may consider local knowledge is an instigator of fear. Local knowledge is a product of human's interaction to the environment; thus, a cultural matter. Cultures adapt to changes in certain given times and situations. One thing, related to this, that we should need to eradicate, is the culture of making apocalyptic pronouncements and announcements that puts less-privileged people into further vulnerable state. It is the responsibility of the state, together with the much stronger civil society sectors in the country, to work together to ensure proactive capacity-building measures to equip people with necessary knowledge regarding hazards and disasters.

One common historical realization that is present in almost all the earthquakes discussed is the presence of Chinese as victims of earthquakes. Aside from the July 1990 earthquake, the historical materials used in this work placed them in the situation where they were part of the sector that was vulnerable and heavily affected. In Philippine history and historiography, the Chinese have always been presented as an indispensable economic sector and complex cultural sector (Wickberg, 1965[1912]; Chu, 2010[1913]; Hau, 2014[1914]; Uytanlet, 2016[1915]) Since the 19th century, the Chinese were the working population of the Philippine economy – labor force, a source of investment, etc. Since then, they became part of the Philippine society not only as an essential pillar of the economy but also of the socio-cultural dynamics of the country. Despite this, they remained to be a sector that exclusively lives and develops on its own, particularly on their sacred cultural and religious norms. Disasters flatten out the socio-cultural barriers and reveal the much-hidden strains and traits of a society. The Chinese, as what this narrative presented, have always been victims of earthquake disasters in Luzon.

On the one hand, we can attribute this to their economic presence; the damages and destruction of towns due to the tremors lead to the loss of properties often owned by Chinese, especially in major cities. On the other hand, how different sectors of the society view them as part of the population that were victims of the earthquake is up to various levels of interpretation. The ones who died during the 1863 earthquake were working class Chinese; they became part of the state's post-disaster public construction workforce in the 1880s; they were the center of attention after the Ruby Tower, a Chinese residential territory at the heart of downtown Manila, collapsed; and in the August 1983 Laoag earthquake, many Chinese residents died and lost their commercial properties. In these cases of earthquake disasters, the Chinese were the silent, unnoticed sectors that were portrayed not as vulnerable, but as a group of people who had bad luck and worse fate amongst the displaced and contestable marginalized segments of Philippine society.

[1912] Edgar Wickberg, *The Chinese in Philippine Life 1850-1898* (New Haven and London: Yale University Press, 1965)

[1913] Richard T. Chu, *Chinese and Chinese Mestizos of Manila: Family, Identity, and Culture, 1869s-1930s* (Leiden and Boston: Brill, 2010).

[1914] Caroline Hau, *The Chinese Question: Ethnicity, Nation, and Region in and Beyond the Philippine*s (Singapore: National University of Singapore Press, 2014).

[1915] Juliet Lee Uytanlet, *The Hybrid Tsinoys: Challenges and Homogeneity as Sociocultural Constructs among the Chinese in the Philippines* (Eugene: Pickwick Publications, 2016).

c. Prospects in Disaster Communication and the Public: Earthquake Disasters and the Media

The information flow within and beyond the government and public sphere is an important aspect that should be looked into to understand how the disaster happened, and how the media of communication played their part as transmitters and mediators of data and knowledge about the disaster. Since the 19th century, the print media played a role in information dissemination regarding the status of victims, budgetary releases of the government, and the propositions for the rehabilitation of communities. The power of telegraphy as the fastest communication courier during the late 19th century, until the early decades of the 20th, was proved to be effective in times of disasters. The collection of reports about the status of communities in provinces were related to the government in Manila, and this made the authorities aware of the immediate actions to be taken. The experiences of the Spanish civil government in the 1880 earthquake and the Commonwealth government in 1937 were proof of telegraphy's use in disaster communication. The rise of telephone and modes of broadcast media such as radio and television made the line of communication faster, and a little bit more complex.

As history tells us, governments used the available state-controlled and leaning newspapers to exercise their control over the management of the disaster, by projecting an image of bureaucracy in full awareness and control of the disaster rehabilitation. The Spanish newspapers, the Commonwealth era periodicals, and the Marcos regime newspaper all manifested this kind of disaster reporting. Private newspaper companies tell a variety of stories, not just how the government "perfectly" responded to the situation. Non-government newspapers frequently tell the story of the people, the lapses in the government response, and the undocumented needs of communities affected by such disasters. Newspapers were also vital in one major aspect of disaster responses in the country – the mobilization of donations from different local and international sectors. Whether government controlled or private print media companies, all made their initiative to encourage people to make donations for the victims of the earthquake.

Moreover, the newspaper did also play a part in tracing the flow of donations from one entity, usually the government, to the beneficiaries, which were the victims of the earthquake; or in the case of private newspapers who mobilized the money, a reverse situation, wherein they were the one who handed over the donations to the government. Furthermore, the media is also vital in disseminating the scientific information about the disaster. They made the laboratory scientific knowledge a concern of the public – a public domain. The "laymanization" of hardcore experimental data was and is always a practice to enable the people to further understand the nature and effects of the environmental hazards, beyond what they perceive to be solely cultural and religious events.

The role of media in disasters has been studied by communication scholars and is categorically labeled as risk communication. Risk communication deals with the experts intentionally conveying about health and environmental risks, obtained from scientists and technical experts, to a target audience of non-experts through designated channels; it also dwells into any public or private communication of individuals or social risks, with or without intentional goals conveyed from any source to any recipient through any

channel.[1916] One particular outcome risk communications purposefully set into is being to make individuals aware of a specific hazard; thus awareness is considered the first step in educating and changing the behavior towards hazards.[1917] From this, communication ideas and knowledge are indispensable. The field of crisis communication aims at preventing or lessening the adverse outcomes resulting from a crisis.[1918] The informative function of this field encourages the receiver to take some action to avoid the possible threat or harmful effect and create a rational understanding of the risk.[1919] An individuals ability to take actions during a crisis brings about a sense of empowerment, allowing individuals to feel a though they have some control in the situation.[1920]

Scientific communication involves science as the content of communication media; it is about the content, the product and the processes involved in it. Scientists, communicators, and audience constitute the stakeholders in this social discipline. A scholar argues that in disaster risk reporting, the scientist and the public are involved at opposite ends, and the media resides in the middle, serving as the bridge between the two. [1921] There is an apparent dichotomy in this relationship; the scientists serve as a source of knowledge, and the public was the ones needed to be educated. Professional scientists are the producers, and the non-scientist public is consumers of ideas. The media, or communicators, bridge the gap or serve as the connectors between the two. In this manner, technical, scientific concepts and discourses are being transformed into popularized or "laymanized" state, for the public to grasp and "consume".

A society that has an efficient communication system can overcome challenges brought about the natural environment and disasters induced by the vulnerable human population. I think it's a necessity for the experts, the communications, and the public, to revisit our ‘relationship' as actions in communicating ideas to lessen the disastrous effects of natural hazards to our society.

It is highly observable that Filipinos have a lot of shortcomings and incapacities when it comes to coping with the effects of worsening environments hazards and conditions. Ideally, the state maximized all of its resources in building a formidable disaster risk reduction management that fits the contexts and necessities of the country. Aside from strengthening local participation in planning, execution, pre- and post-disaster governance, the government, together with the much more active civil society groups and non-government organizations which are undoubtedly more capable than many state institutions, are gradually changing the mentality and attitude landscape of people from a reactive to a proactive disaster response mechanism. I think, aside from making the people equipped with the locally-crafted and nationally executed disaster risk reduction and management program, investing in efficient and effective communication

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[1916] A. Plough and S. Krimsky, “Emergency Risk Communication Studies: Social and Political Context” *Sci. Tech. Hum. Values* 2 (1987), 4-10.
[1917] Frank Baker, “Risk Communication about Environmental Hazards” *Journal of Public Health Policy* 11 (3), 1990, p. 347.
[1918] Patrick R, Spence, Kenneth A. Lachlan, and Donyale R. Griffin, “Crisis Communication, Race, and Natural Disasters”, J*ournal of Black Studies* 37 (4), 2007, p. 541.
[1919] Ibid.
[1920] Ibid., 543.
[1921] Gary Jay Montemayor, "Communicating Risks, Risking Miscommunications: Mass Media and the Science of Natural Disasters" *Risking Resources, Reckoning Risks:* The 2014 UP Third World Studies Center Public Lecture Series on Natural Disasters Lecture No. 1, 03 September 2014, Claro M. Recto Conference Hall, Faculty Center, UP Diliman.

mechanism should also be prioritized. Communicating scientific ideas about hazards are very complex; it requires another nationally driven state program to create a culture-based communication mechanism for Filipinos, given our experiences when it comes to coping with nature's threats. A society that has an efficient communication system can overcome challenges brought about the natural environment and disasters induced by the vulnerable human population. It's a necessity for the experts, the communications, and the public, to revisit our 'relationship' as actions in communicating ideas to lessen the disastrous effects of natural hazards in our society.

d. An Analysis of Filipino Resilience: Scientific and Nationalistic

At this point, let us visit, or revisit, one concept that has floated in the public discussion in the recent years, in light if the surging interest on mullti-disciplinary approaches in environmental and disaster studies. The concept of resilience has been a topic of critical engagements by scholars and ordinary people, from academic conferences to social media platforms. It is a viable move to put this concept into our discussion of the history of earthquakes, as this, I believe, transgresses various issues in bureaucratic and local responses of people in times of disasters. Although it can be said that the discussion of resilience sprung from the recent typhoon and flooding experiences of the country, particularly, as I argue, from the 2011 moonsoon rain flooding in Metro Manila, this concept can be used to further extend the discussion on how can we make sense of our previous historical disaster experiences, such as that of earthquakes, to further understand the compounded and complicated nature of ou dealings with hazards and calamities.

d. 1 Meaning(s) of "resilience"

In the recent years, especially in the time of major documentation of Filipino experiences of disasters because of social media, more opinions and sentiments have surfaced, and these indeed challenged the existing discourse on hazards, disaster, and mitigation. The "reporting" of the many recent calamitous experiences, not exclusively earthquakes, for example, floods, have paved the way for a reassessment of important notion when it comes to hazards and disasters. One of those is our appreciation of the concept of resilience. Resilience has been one of the most used and abused terms in disaster studies. It has been used to describe a group of people's capacities to overcome tough and difficult life challenges, threats, and obstacles, whether personal or collective. In Filipino language, resilience is translated as "katatagan", and has the root word "tatag" in Tagalog. Noceda and Sanlucar (1869) defines and refers to "tatag" as stiff and straight things, standing without wobbling, and firmness (firmieza); and synonymous to other Tagalog words such as "tibay: (strength) and "tiis" (patience).[1922]

Before becoming a widely used concept in disaster and climate studies, resilience originated as a physical science idea about the capacity of an object to absorb and deflect external forces. Its roots in the biological and physical sciences refer to it both as

[1922] Noceda and Sanlucar, *Vocabulario de la lengua tagala,* pp. 476, 519, 622, and 623.

an ecological concept and a physics concept focused on elasticity and shocks.[1923] To highlight its nature in climate and disaster studies, some scholars suggest the use of "human resilience" or "social resilience". Crafting the concept of resilience more as a human agency in a socio-ecological system, rather than a property of a given system, it is, therefore, an issue not exclusive on the "question of systemic (social and cultural) adaptation to external factors, but as a constitutive element of any working society."[1924] The physical and mental properties of resilience as a concept make it more complicated as a framework for understanding and preparing human communities in disaster risk mitigation programs.[1925] Moreover, resilience is "a useful concept that helps us overcome dichotomous thinking when we attempt to theorize the intractable linkages between the natural world and the social world."[1926] Hastrup (2008) argues that resilience "is an emergent quality of all responsible social action; it is the rule and not the exception of social life, given that all societies must demonstrate a degree of flexibility to operate and ultimately survive."[1927]

This concept has been institutionalized or is being used by government and non-government institutions to promote their programs of disaster preparedness and management, and poverty alleviation efforts. The Philippines' national university, the University of the Philippines, established the UP Resilience Institute (UPRI) in 2016 as a "proactive hub of benchmark, innovative information vital to the nation's efforts in climate change mitigation and adaptation", and has the mission to empower local communities through multidisciplinary actions toward resilience", functions as an intitution "concerning multi-hazard, multidisciplinary, multisectoral, comprehensive disaster risk reduction and management (DRRM)", focused on research and creative work, knowledge sharing, education, and institutional capacity building.[1928] Development and humanitarian sectors have used resilience their programs and initiatives. The "shift of focus on mitigation promulgated by green organization to adaptation,"[1929] The Center for Disaster Preparedness (CPD), a two-decade-old non-government organization that pioneered community-based disaster risk reduction and management (CBDRRM) and climate change adaptation (CCA), advocates people and community resilience through capacity-development programs and projects related to community-based disaster risk reduction and management.[1930] Founded in 1998, Habitat for Humanity Philippines, a satellite organization of the US-based Habitat for Humanity, a religious, non-profit organization

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[1923] Laura Rival, "The Resilience of Indigenous Knowledge", in Kirsten Hastrup (ed.), *The Question of Social Resilience*: Social Responses to Climate Change (The Royal Danish Academy of Science and Letters, 2009), pp. 295-297.

[1924] Kirsten Hastrup, "Waterworlds: Framing the Question of Social Resilience", in Kirsten Hastrup (ed.), *The Question of Social Resilience*: Social Responses to Climate Change (The Royal Danish Academy of Science and Letters, 2009), pp. 11 and 26.

[1925] Rival, "The Resilience of Indigenous Knowledge", p. 298.

[1926] Ibid., p. 294.

[1927] Cited in Met Fog Olwig, "Climate Change = Discourse Change? Development and Relief Organizations' Use of the Concept of Resilience", in Kirsten Hastrup (ed.), *The Question of Social Resilience*: Social Responses to Climate Change (The Royal Danish Academy of Science and Letters, 2009), p. 330.

[1928] University of the Philippines Resilience Institute <https://resilience.up.edu.ph/>

[1929] Met Fog Olwig, "Climate Change = Discourse Change? Development and Relief Organizations' Use of the Concept of Resilience", in Kirsten Hastrup (ed.), *The Question of Social Resilience*: Social Responses to Climate Change (The Royal Danish Academy of Science and Letters, 2009), p. 320.

[1930] Center for Disaster Preparedness <https://www.cdp.org.ph/>

aimed at building homes for the poor, have used the concept of resilience both as a description to the people they serve, and as a framework to gather donations and sponsorships for their poverty alleviation initiatives.[1931] Resilience has also been used not only as a framework and perspective in planning and implementing out disaster management programs, but also as a post-disaster psychosocial support project. In a recent study, Hechanova, et. al (2016) used a psychological impact intervention tool, called "Katatagan" (Resilience) for the victims of Typhoon Yolanda (Haiyan) from three communities in Samar province in the Philippines.[1932]

Pragmatically and arguably, resilience has been an unnoticed component and skeleton of present-day Filipino nationalistic spirit. The perennial natural hazards and disaster the Philippines experienced in the past decades have surfaced a complicated entanglement of patriotic-defeatist attitude, manifested through collective sentiment, disaster management frameworks, and national institutions. And this is where the apparent gap between proactive long-term effective disaster management plans and actions, and sense of safer and disaster-free communities can be seen; on the one hand, there are scientific institutions that have ideally considerable influence over programs that have used nationalistic frameworks in disaster management, and on the other hand, there's a Filipino society that prefers to console themselves with patriotic notions of survival to coopt with the shortcomings of the national government, in which they do inconsistently point out, and do not eagerly demand, frankly speaking.

d.2 Development of national scientific institutions as a response to strengthen resilience

To reiterate an earlier point, in general, national scientific institutions are vital in nation-building. These agencies are mandated to deliver plans and programs, which are aimed at advancing economic development and social progress through the benefits of modern science and technology. The primary objective of scientific institutions is to become centers of ideas and applied knowledge to advance socio-economic development and people's welfare through innovative programs and projects. In a speech by Juan Salcedo, chairman of the National Science Development Board during the centennial anniversary celebration of the Manila Observatory on September 1965, he called on the scientists to engage themselves in the development of the Philippines:

> Now our present period is known as the Age of Science. Never before have so many men been actively engaged in the pursuit of science and technology. Never before have their results contributed so tremendously to the ordinary ways of life. Lives of civilized men now are in a thousand ways directly dependent on changes produced by science…Now, government and private enterprises are embarking on a vigorous program of scientific researches, either undertaking them solely or extending financial assistance to proponents in the hope that these researches

[1931] Habitat for Humanity Philippines <https://habitat.org.ph/>

[1932] Ma. Regina M. Hechanova, Lynn C. Waelde, and Pia Anna P. Ramos, “Evaluation of Group-Based Resilience Intervention for Typhoon Haiyan Survivors”, *Journal of Pacific Rim Psychology* 10 (12): 1-10, 2016.

> would produce results that would prove significant and beneficial to the world of science.[1933]

Scientific institutions were developed under the assumption of creating national agencies that will promote national consciousness on a particular natural phenomenon and will serve the public harnessing a society full-geared against natural hazards. They were part of this era when the institutions of science were put into the arena of national consciousness. Sciences were brought out from the walls of their laboratories and of the academe and were placed in the field of public cognizance. Let us look at the short history of the development of some scientific institutions and how bureaucracy framed the need for a disaster-safe society influence the institutionalization of science for disaster mitigation.

Throughout the decades from 1900 to 1940, the agency tasked to research seismology and volcanology was the Philippine Weather Bureau (PWB). Established on 1901 through the *Philippine Commission Act No.131*[1934], one of its central departments was the Seismological Section. The bureau also became active in observing volcanic activities. Volcanoes such as the Bulusan in Sorsogon, the Taal in Batangas, and the Mayon in Albay were some of the focus of the scientists of the bureau. They built ambulant seismic facilities in the vicinity of the volcanoes, observing, warning people, and assessing the damaging of lava and pyroclastic flows.[1935] Nevertheless, the work of the PWB construed to be consistent: providing weather service to institutions, businesses, and local people. The training of Filipino expert-scientists in key fields of meteorology and seismology were strengthened, as it was one of the general goals of the Commonwealth government. PWB's relation with foreign scientific bodies and overseas meteorological agencies continued to flourish. All might have been considered well until the end of the fateful year 1941. At the advent of the Pacific War, the PWB became a target of military occupation by the Imperial Japanese Forces. Though funds came in the succeeding months, rebuilding structures and purchasing new instruments became very slow. The seismic station in the Ambulong area in Taal, Batangas was repaired for three years, until it became operational in 1948.[1936] A new geophysical facility was established in Diliman, Quezon City, having new electromagnetic photo-recording seismographs as new installations; for the old seismic station such as at Baguio, Iloilo, and Davao, strong motion seismographs were installed in 1951.[1937] In light of the Philippine industrialization programs launched in the 1950s, the weather bureau was expected to enhance its capabilities and services to the economy and to the public

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[1933] Juan Salcedo, Jr., "The Manila Observatory and Philippine Science, World Science, and Nationalism", *Science Bulletin of the Science Foundation of the Philippines*, Volume 16(1) (Science Foundation of the Philippines, 1965), pp. 10-11.

[1934] Philippine Commission (PC) Act No. 131: An Act providing for the establishment of a weather bureau for the Philippine Islands and appropriating eight thousand and sixty-six dollars and fifty cents ($8,066.50), in money of the United States, for the purchase of instruments and apparatus and the installation of the same", *Annual Reports of the War Department for the Fiscal Year ended June 30, 1901*: Published Laws and Resolutions of the Philippine Commission (Washington: Government Printing Office, 1901), p. 276-279.

[1935] See *Report of the Governor General of the Philippine Islands to the Secretary of War 1919* (Washington: Government Printing Office, 1920), p. 182, and *Report of the Governor General of the Philippine Islands 1921* (Washington: Government Printing Office, 1922), p. 232.

[1936] *Weather Bureau Centennial, 1865-1965: Philippine Republic Weather Bureau Centennial Souvenir* Program (Manila, 1945), p. 10.

[1937] Ibid.

in general. One main goal of the bureau modernization was to expand its geophysical service by acquiring more modern seismological instruments.[1938] The Geophysical Division of the PWB remained a vital part of the agencies work. In line with the governments thrust to create institutions for the promotion of national welfare, this division of the PWB assumed significant tasks: (1) preparation and dissemination of technical advice to the public on geophysical matters and phenomena, such as tsunamis and seismic sea waves, (2) supervision of the operation and maintenance of geophysical observatory and seismic observation network, (3) formulation, coordination, and development of geophysical studies on Philippine seismicity and utilization of the same in earthquake engineering, and (4) utilization of geophysical data with related scientific and technical agencies.[1939] This work of the PWB on seismology continued until it was mandated by a new act, which created a revitalized weather institution in the Philippines come the 1970s. The series of eruptions of Mt. Hibok-Hibok in northern Mindanao (1951) and the formation of the Didicas Volcano on the northeastern coast of Luzon (1952) prompted the establishment of a national agency focused on the volcanology. Given these events, which was no doubt made headlines, reinforced the need to have a state-level agency that will be at the forefront of monitoring and addressing concerns and preparations for imminent volcanic eruptions. With the growing necessity for a national body for volcanology, the government created the Commission on Volcanology. Passed on 20 June 1952, Republic Act No. 766, known as *"An Act to safeguard life and property against volcanic eruptions and dangers by creating a Commission on Volcanology and providing relief for victims of such calamity, and for other purposes"*[1940] became the legal basis of the COMVOL. Though seismology was an essential branch of the COMVOL's work, come 1972, it was institutionalized to be part of the revitalized weather bureau, Philippine Astronomical, Geophysical, and Astronomical Services Administration (PAGASA). This agency, established through Presidential Decree No. 78, was placed under the Department of National Defense.[1941] All matters regarding earthquakes and other seismological concerns were under the mandate of PAGASA.[1942] As one of the agencies supervised by the National Research Council, which was under the NDSB, the COMVOL also underwent revitalization. Approximately two months after EO No. 784 was issued, on May 1982, COMVOL was changed into the Philippine Institute of Volcanology (PHIVOLC), with a redefined platform of functionality and services. The plans, programs, and activities of the institute were structured to meet the expanding needs of the scientific community and of the Philippines as a whole.[1943] The need for a more scientific approach to the government's efforts to mitigate disasters brought about by natural hazards compelled the transfer of PAGASA from the Defense Ministry to the NSTA. By virtue of the Executive Order No. 984 issued on 17 September

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[1938] *Weather Bureau Centennial, 1865-1965*, p. 11.

[1939] Ibid., p. 22.

[1940] *Laws and Regulations passed during the Third Session and Sixth and Seventh Special Sessions of the Second Congress of the Republic of the Philippines in 1952*, Volume 7, Republic Acts Nos. 674 to 833 (Manila: Bureau of Printing, 1953), pp. 262-264.

[1941] Presidential Decree No. 78: Establishing the Philippine Atmospheric, Geophysical, and Astronomical Services Administration, *Vital Documents in the New Society: All General Letters of Instructions and Presidential Decrees from November 26, 1972 to January 25, 1973*, Volume 3 (Manila: Central Book Supply, Inc, 2004), p. 57.

[1942] See Sections 3c, 4b, and 4c, *Presidential Decree No. 78*, pp. 58-59.

[1943] *Annual Report of the Philippine Institute of Volcanology (PHIVOLC) 1982*, (Quezon City: National Science and Technology Authority, 1982), p. 4.

1984, PAGASA was placed under NSTA supervision.[1944] The transfer has an impact to PHIVOLC's functions. Indicated in Section 3 of the said order the National Geophysical and Astronomical Office, a division of PAGASA, was merged with PHIVOLC, adding seismology as one of its scientific turfs.[1945] The order thus provided for the centralization of seismological studies and researches in the institute; the agency was then known as Philippine Institute of Volcanology and Seismology (PHIVOLCS).[1946]

What can we extract from this institutional narrative? One can generalize that some national scientific institutions in the Philippines are a product of a reactive response to the effects of environmental hazards and disasters. The calamities that were "national" in scale and coverage prompted the government to enhance the scientific bureaucracy and community to address the needs of devastated communities. Aside from the laws and decrees that created these scientific institutions, the establishment of specific disaster management-mandated institutions in the country, the Office of Civil Defense (OCD), and the National Disaster Coordinating Council, now known as the National Disaster Risk Reduction Management Council (NDRRMC), ushered in new forms of bureaucratic-nationalistic approaches in disaster mitigation and post-disaster response. Although their function performance and impact are arguably debatable, what we can particularly point out is how they implement the government views on disaster as a framework of policy implementation and management. Bankoff and Hilhorst (2009) argue that "different actors 'see' disasters as different types of events and, because they perceive them as such, they prepare for, manage and record them in very different ways…State and state agencies 'see' disasters in one way; the people directly affected 'see' them in another."[1947] Government considers disaster as a deviation from the "normal" way of life, thus, "this perception has, at its core, the desire to restore a community or society to its pre-disaster state or what is usually referred to in the literature as a state of 'normalcy'."[1948] This idea is a complete contrast to the way a non-governmental organization thinks of disasters; they more likely interpret environmental; catastrophe as a result of much massive socio-economic vulnerabilities, caused by grander schemes of poverty, social inequality, and class differences.[1949] There is a clear partisan and ideological bias in perceiving and responding to disasters amongst prime sectors in disaster management in the Philippines.

d.3 Deconstructing Filipino Resilience

The typhoons and monsoon rains the Philippines experienced in 2011 and 2012, during the time of the start of the height of Filipino obsession to social media, specifically Facebook, brought about a collective sentiment of Filipinos being the most resilient people in the world. This period was the time that social media was on the rise; it was still being utilized as a platform to promote entertainment and socialization, and its perils

[1944] See Executive Order No. 984: Transferring the Philippine Atmospheric and Geophysical and Astronomical Services Administration to the National Science and Technology Authority, Providing for its reorganization, and for other purpose. Accessed 21 January 2019. <https://bit.ly/2zsCLqT>.
[1945] Ibid.
[1946] *Annual Report of the Philippine Institute of Volcanology and Seismology (PHIVOLCS) 1984*, (Quezon City: National Science and Technology Authority, 1985), p. 1.
[1947] Bankoff and Hilhorst, "The Politics of Risk", p. 2.
[1948] Ibid., pp. 8 and 10.
[1949] Ibid., p. 13.

were limited to a certain extent. The water hazards of those years brought an unprecedented social media nationalism, advocating a collective mentality that the dangers are there, but the Filipino will always prevail, as we are the resilient, bar none. Let us cite some examples.

On 25 August 2011, the Philippine Daily Inquirer (PDI) reported that the National Historical Commission of the Philippines (NHCP) awarded Janela Arcos Lelis, a young schoolgirl from Albay Province, cash incentive and recognition for her “selfless act of courage, reflective of her love of country, and a constant reverence to the national symbol”, by saving the Philippine flag of their school from the floods.[1950] She became famous because a fellow Bicolano took a photograph of her saving and carrying the Philippine flag during the onslaught of typhoon "Juaning" in July of her hometown, and it went viral in various social media, like Facebook and Twitter. This award, as well as the massive commendation of "netizens" sparked a wave of a nationalistic undertone of resilience in times of disaster.

The heavy rains caused by the monsoon season in August 2018 caused another outpour of "social media nationalism" as people started to praise the unwavering Filipino spirit in another period of annual rains and floods in the country's capital region. A tweet from the Philippine Star Twitter account sums up a wave of clinging up with the idea of Filipino resiliency and ignited the month-long use of the phrase "The Filipino Spirit is Waterproof."

Photo No. 37

The photo of Janela Arcos Celies, carrying the Philippine Flag during a flood in Albay Province in July 2011[1951]

[1950] Jocelyn R. Uy, "Schoolgirl, 12, honored for saving the flag", *Philippine Daily Inquirer*, 25 August 2011. Accessed 20 January 2019. <https://bit.ly/2W7jncB>.

[1951] Jocelyn R. Uy, “Schoolgirl, 12, honored fo saving the flag”, *Philippine Daily Inquirer*, 25 August 2011. Accessed 20 January 2019. <https://bit.ly/2W7jncB>.

Photo No. 38
Photo of a Philippine Star Twitter Account tweet depicting a/the "The Filipino Spirit" during calamities[1952]

[1952] Michael Josh Villanueva, "The Filipino Spirit is Waterproof", *Rappler,* 09 August 2012. Accessed 20 January 2019. < https://bit.ly/2CAGT9f>.

Photo No. 39

A compiled picture of "The Filipino Spirit is Waterproof" photos[1953]

But the apparent buzz made by the flooding, literally, of social media posts and publicity materials, from random ordinary individuals to media networks and state agencies, was met, this time, by critical opinions and counter-perspective regarding this branding of Filipino resiliency. As early as 2014, a year after the infamous Typhoon Yolanda (Haiyan) caused a national catastrophe in the country; someone has pointed as the dangers of too much subscription to this Filipino kind of resiliency. The socio-cultural response of looking at the silver lining in times of disasters is both a boon and a bane. The admirable trait of keeping a positive outlook and being culturally dependent and self-reliant of Filipinos is good for a country perennially hampered by calamities, but it is also a defeatist and hapless condition as people don't demand accountability from the government on why, on the decades that the country experiences these calamities, there are no viable solutions offered and implemented to solve such problems.[1954]The concept of resilience has been romanticized, in a way that it has been a tool of the government to excuse itself from its failures and shortcoming.[1955] The dismissal for further scientific and critical evaluation of the situation through "*Anong magagawa natin?*" and the reduction of inquiry to been acceptance of normality by "*Ganyan talaga eh*" has been a default practive and knee-jerk reaction when clamities struck communities.[1956] Comic relief has been the norm; yes it has been a source of strength, but has been an apparent escapist, defeatist means of moving on, and not demanding accountability of the government.

[1953] Michael Josh Villanueva, "The Filipino Spirit is Waterproof", *Rappler,* 09 August 2012. Accessed 20 January 2019. < https://bit.ly/2CAGT9f>.

[1954] Shakira Sison, "The Problem with Filipino Resilience", *Rappler*, 30 October 2014. Accessed 21 January 2019. < https://bit.ly/2FNmYqB>

[1955] Bons Magsambol, "Has resilience been used as an excuse for government shortcomings?" *Rappler*, 13 August 2018, Accessed 20 January 2019. <https://bit.ly/2AXpU0z>; Tyne Villan, "Why resilience is actually bad for us as a nation", *Philippine Daily Inquirer*, 13 August 2018, Accessed 20 January 2019. <https://bit.ly/2DpeRig>; Gideon Lasco, "Romanticizing resilience", *Philippine Daily Inquirer*, 16 August 2018. Accessed 20 January 2019. <https://bit.ly/2FOE4of>.

[1956] Shakira Sison, "The Problem with Filipino Resilience".

One argues, “Our resilience has allowed us to settle for less of what we actually deserve”.[1957] Moreover, Lasco (2018) points out that the “narrative of individual resilience can often omit the question of who needs it. When we speak of the “Filipino spirit,” we often refer to the poor and marginalized; no one will ever call the rich “resilient,” because they never need to be such…to misrecognize victimhood as “resilience” is to ignore how disasters reflect and reinforce social inequalities.”[1958] Indeed, adding class analysis into the equation brings us deeper into the problem of this resiliency usage.

Given these ideas, how can we put into the equation, resilience as a concept for other natural hazards and calamities? We can argue that resilience is an innate feature of the Filipinos, though people may not call it resilience per se, as the way it has been portrayed scientifically, and in popular media. But pragmatically speaking, in discussing resilient people, or resilient communities, we must take into consideration socio-economic class and gender dimensions for us to full visualize the dynamics of disaster and disaster response as historical realities in the Philippines.

As discussed in the previous chapters, there were historical examples, or proofs, that indeed, the most devastated sectors are those who are in the base of the socio-economic pyramid. Moreover, some recent studies indicate that even in the discourse of memorializing disasters, marginalized sectors have little voice in the commemorative process.[1959] The experience of socio-economically deprived, and ethnically segregated groups such as the Chinese, prove the existence of a society that is bound to act and respond to calamities along capitalist priorities racial lines. In analyzing history of disasters, social justice is a vision that seeks an inclusive reconstruction of the past. The first step, I think for this to come into fruition, is to document their existence and experiences as part of the grand narrative of disasters. From this, we can expand our discussion of the particular socio-economic dimensions of disasters.

Moreover, the shortcomings of state institutions in making communities economically resilient in the long-term, and disaster resilient in times of calamities, puts forth the long-standing reliance of communities to innate cultural values to overcome the vulenrabilities posed by their socio-economic status, and the harsh conditions posed by natural hazards. Cultural values offer additional psychological capacities to people. It strengthens their mental and emotional foundation in times of hazards. Values such as ‘bayanihan’, the ‘oragon’ mindset of Bicolanos, and even the ‘bahala na’ of Filipinos in general, serve as coping strategies in times of uncertainty. Lastly, folklore, legends and myths also guide people to understand environmental phenomena based on oral traditions crafted and enriched through generations. Every indigenous or ethnic group, and local communities in the country have their own set of oral and mythical stories pertaining to disasters; these stories give warning and guidance to people. Armando and Paula Carolina Malay compiled in their work *Our Folkways* legends and myths from different parts of the archipelago.[1960] Futhernore, resilience is also manifested througggh

[1957] Villan, “Why resilience is actually bad for us as a nation”.
[1958] Lasco, “Romanticizing resilience”.
[1959] Sean McKinnon, Andrew Gorman-Murray, and Dale Sominey-Howes, “’The greatest loss was a loss of our history: Natural disasters, marginalized identities and sites of memory*”, Social and Cultural Geography* 2016, p. 8
[1960] Armando J. Malay and Paula Carolina Malay, *Our Folkways* (Manila: Bookman, Inc., 1955).

the assertion of a memory-making process wherein discrimination and exclusion against marginalized communities is manifested.[1961]

e. Situating the FIlipino Experience in relation to other "Earthquake Countries": The Philippines, Japan, and Indonesia

The Philippines is not the only country in the Southeast Asian and Pacific region that experience perennial destructive earthquake occurrences. The geographic and geological background of the Philippine archipelago mirrors that of archipelagic Japan in the above-north Pacific Ocean and the long stretch of the Indonesian archipelago in the south Pacific.

For this part, situating the Philippine experience of major earthquake disasters with that of fellow "earthquake countries" in Asia, such as Japan and Indonesia, and making a plain comparative identification of the social and political responses between the three countries is an instrument to view and understand how the Philippine experiences vary concerning other societies. Earthquake experiences are used as objects of comparison don't precisely match and coincide with each other regarding period, but a diachronic comparison shows us how each society acted on the threat of this geological hazard, and how they interpreted this in their own terms and contexts. While I understand that doing comparative study is a dissertation project itself, for this part, the study attempts to provide a simple view of how we can compare and contrast the experiences of the countries mentioned. This is not an extensive comparison but rather, a plain identification of the similarities and differences of experiences and responses based on available historical literature about the subject matter.

One aspect common on these earthquakes, and the studies that focused on them, is that they did not happen solely in a random, conventional era, and the effects, meaning and interpretations, and responses of different societal sectors did not exist in a vacuum, that they were always in relation to particular political and economic milieu and context. Browsing through studies about the responses of Japan and Indonesia after earthquakes and earthquakes as an epiphenomenal result of another natural hazard (such as volcanic eruption) provides as an avenue to compare and contrast their experience with that of the Philippines during a particular period.

Table No. 31

Notable destructive Earthquakes in the Philippines (19th-20th centuries), Japan (19th-20th centuries), and Indonesia (19th century)[1962]

[1961] McKinnon, Gorman-Murray, and Sominey-Howes, "'The greatest loss was a loss of out history'", p. 16.

[1962] The earthquakes in Japan and Indonesia are derived from the following studies: Gregory Clancey, *The Earthquake Nation: The Cultural Politics of Japanese Seismicity*; Clancey, "The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe"; Jan Wisseman Christie, "Under the Volcano: Stabilizing the Early Japanese State in an Unstable Environment", in David Henley and Henk Schulte Nordholt (eds), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015), pp. 46-61; Anthony Reid, "History and Seismology in the Ring of Fire: Punctuating the Indonesia Past", David Henley and Henk Schulte Nordholt (eds.), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015), pp. 62-77.

Philippines	Japan	Indonesia
1863 Manila Earthquake	1855 Ansai Earthquake	9th and 10th century series of volcanic eruptions in Mataram
1880 Central and Southern Luzon Earthquake	1887 Earthquake	1815 Tambora Earthquake
1937 Western Luzon Earthquake	1880 Yokohama Earthquake	1822 Merapi Volcano Eruption Earthquake
1968 Luzon Earthquake	1891 Nōbi Earthquake	1833 Padang and Bengkulu Tsunami
1983 Northern Luzon Earthquake	1923 Kantō Earthquake	1883 Krakatoa Volcano Eruption Earthquake
1990 Central and Northern Luzon Earthquake	1995 Kōbe Earthquake	2004 Sumatra Tsunami (early 2[1st] century)

e.1 On Japan

The 19th century Japan is a period of transition to "modernization". As the re-installed monarchy, the Meiji Government, was laying down the foundation of industrial and bureaucratic reforms in the country, they were hounded by the challenge of continuous natural hazards, which tested their country's transition not only in the political and economic aspects but also in the architectural and scientific program they initiated to establish an advanced society. This project was a complete contrast of its predecessor, the isolationist Tokugawa regime; and was bannered by the idea of *bunmei kaika* (civilization and enlightenment), manifested through architecture, transportation, and political ideas.[1963]

Japan experienced six (6) notable earthquakes since the second half of the 19th century, until the last years of the 20th century (1855, 1887, 1880, 1891, 1923, 1995), covering the reign of four emperors: Mutsuhito (Meiji), Yoshihito (Taishō), Hirohito (Shōwa), and Akihito (present Emperor). The devastation caused by these earthquakes challenged the modern Japanese government, proven by its massive investment in Western seismological knowledge and instruments, as well as the proliferation of European-inspired urban architecture that promised to be earthquake-resistant. But this process of dealing with the destructive effects of earthquakes didn't run smoothly in the country vehemently serious to be more advanced than other earthquake-stricken countries, and literally, be a few steps ahead of the earthquake itself. The turn of the century saw the rise of the *Kobudaigakko* (College of Technology), Western engineers and architects, Japanese *daiku* (carpenters) in making Japan a landscape of stones, grounded on the framework that new architecture and masonry tradition means modernity.

Clancey (2006/2015) argues that amongst the many earthquakes that struck Japan, the 1891 Nōbi earthquake made Japan at the crossroads of modernity: it challenged the European architecture sponsored by the state itself, it validated the fears of local Japanese carpentry sector that the new architectural program does not fit in to the environmental context of the archipelago, and it paved the way for the institutionalization

[1963] Clancey, “The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe”, p. 918.

of seismology and earthquake engineering as a state project.[1964] He describes the said earthquake as “as a moment of violent creation, infinitely expansive”, and a dramatic episode in the Japanese 19th-century history, wherein one "chief ingredient in the ‘’drama” of the natural disaster is the sudden and often cacophonous mixing of lay and expert voices.”[1965]The mix of the of Japanese carpentry tradition and the reliance on "modern techniques" from Western countries, such as Great Britain and Germany, which are clearly not "earthquake countries", was a point of major contention amongst state and local actors. The Europeans even described the Japanese "woodenness" as "as insubstantial, combustible, and paper thin, and could even interfere with the contemplation of the beautiful.”[1966]Tensions and mistrust were seen in the years of implementing the modernization program. Western standards of a modern and earthquake-resistant city were proved to be a too hyperbolic to the traditional Japanese community – unrealistic as many of them thought of.[1967] The entrance of Western knowledge was not blocked or considered toxic, as proven by Japan's state-sponsored program of cultural and political borrowing from the West. Seismology, as a discipline, had a relatively "peaceful rise", from the works of John Milne in the 1880s, to the establishment of the *Shinsai Yobō Chōsakai* (Imperial Earthquake Investigation Committee) that foresaw the implementation of the seismic architecture and engineering reforms in the Meiji and Taishō era, to the period of first-generation Japanese architects and seismologists trained in Western-style seismology, such as Tatsuno Kingo, Itō Chūtata, and Ōmori Sano in the first three decades of the 20th century.[1968] Clancey (2015) furthers that seismology, as a state-sponsored science was double-edged based on the intellectual tradition of Isaac Newton and Alexander von Humboldt: a science of aftershocks, and as a successor of Confucian scholarship where signs and portents preceded earthquakes.[1969]

The media coverage of the 1891 Nōbi earthquake was exceptional, as the voices of criticism and resistance to the highly publicized Western architectural and engineering programs of the Meiji Government were heard and manifested. Reid (2015) argues that this earthquake “revealed the fragility of Western engineering when too-confidently applied to the Japanese Earth, reversing the colonizing trope which portrayed Japan as a vulnerable landscape in need of rescue by European science.”[1970] The earthquake coincided with one period in Japan's print media history – the opening of Japanese newspapers to modern print and audience.[1971] Accounts, narratives, literary descriptions, and scientific reports flooded the reading public’s domain; overlapping information and description about the extent and effects of the earthquake were made available to the larger audience.[1972] Newspapers like the Mianichi Shinbin and the Choya Shinbun flat out criticized the government, and foreign architects and engineers, due to their negligence and mismanagement of the construction of heavily devastated and collapsed

[1964] Clancey, *The Earthquake Nation: The Cultural Politics of Japanese Seismicity*; Clancey, “The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe”.
[1965] Clancey, *The Earthquake Nation: The Cultural Politics of Japanese Seismicity,* pp. 3; Clancey, “The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe”, p. 914.
[1966] Clancey, *The Earthquake Nation: The Cultural Politics of Japanese Seismicity,* p. 17.
[1967] Ibid., pp. 50, and 55-62.
[1968] Ibid., pp. 66, 79, 81, 151., 213, and 226.
[1969] Clancey, “The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe”, p. 939.
[1970] Ibid., p. 945.
[1971] Ibid., p. 917.
[1972] Ibid., pp. 919-920.

monumental buildings in major cities such as Tokyo at Nagoya.[1973] The complaints against the reliance on foreigners were also manifested through one traditional Japanese material art – woodblock painting. These multicolored woodblock prints, which appeared a few days after the earthquake, presented the landscape of devastation and the people coping with the catastrophe.[1974] These prints were considered not only a form of realistic art but also a portrayal of the long-standing antagonism of some sectors of the Japanese society against the coming and presence of foreigners in their land. Those contained interpretations that the earthquake was a result of the bad omen – the Westerners, triggered by the memory of an earlier earthquake, the 1955 Ansai earthquake, which, based on their belief of omens, signaled the fall of the Tokugawa shogunate.[1975]

In general, the people affected by the earthquake became subject of an often-coordinated presentation as "citizens-victims"; they were "are appropriated as martyrs or exemplars, objects of state or state-directed charity."[1976] A socio-economic dimension was also seen, as to which social class became victims, and who survived the catastrophe. Clancey (2015) pointed out that the Japanese socio-economic upper strata, the aristocratic elite and the remnants of the samurai class, benefitted from the advanced technologies and revitalized Japanese craftsmanship, as they were able to "to buy talent, making it more likely that their own buildings would write out waves which struck down flimsier and less expensive structures."[1977]

Another aspect where the 1891 Nōbi earthquake was related to is with the issue of Japanese nationalism. The last decade of the 19th century in Japan was a period of high nationalistic sentiments, ushered in by the promise of modernity at the start of the Meiji era in the 1860s. Clancey (2006/2015) argues that earthquakes were constant and catastrophic undercurrent of the Japanese experience of nation-building, or, the 1891 earthquake indeed generated the Meiji nation-building project itself.[1978] But how did the catastrophe laid the foundation of collective national sentiments? The 1891 Nōbi experience was a boon and a bane: it provided an avenue for an intensified promotion of seismology as a national and international science, and it consolidated the feelings of embarrassment due to catastrophe, and the anti-Western sentiment of different sectors of the Japanese society. It intensified the faith for the need for modern knowledge, yet it became a source of Japanese embarrassment.[1979] On the one hand, Clancey (2015) furthers that "this was truly a national natural catastrophe. It was national in it was deemed by many of its narrators to have affected nation-state directly, and a nationalizing discourse of recrimination, sympathy, and even patriotism was generated it by a newly-consolidating modern print media."[1980] Japan became a leading country in seismology and earthquake science, making the label as an "earthquake nation" not merely as an experiential context, but rather a monicker for scientific and technological leadership. In the decades that followed since 1891, Japanese seismologists led

[1973] Ibid., 921.
[1974] Ibid., p. 923.
[1975] Ibid., p. 934.
[1976] Ibid., p. 916.
[1977] Ibid., p. 925.
[1978] Clancey, *The Earthquake Nation: The Cultural Politics of Japanese Seismicity*, p. 4; Clancey, "The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe", p. 910.
[1979] Clancey, *The Earthquake Nation: The Cultural Politics of Japanese Seismicity*, p. 226.
[1980] Clancey, "The Meiji Earthquake: Nature, Nation, and the Ambiguities of Catastrophe", p. 909.

research expeditions in different global seismic zones, such as in Assam, India (1897), San Francisco (1906), Valpariso (1906) and Miessina, Italy (1908).[1981] On the other hand, the antagonism to Western architecture, seen through the woodblock prints and in different forms of print media spectrum, was a substantial proof of the "failure" of foreign knowledge to "save" Japan from the catastrophe, despite the perennial assurance of architectural and engineering advancements.[1982]

e.2 On Indonesia

The chronicled histories of the kingdoms of Java "suggest that for centuries the Javanese had suffered periodic bouts of geological instability and that throughout that time, the supernatural agency was ascribed to them."[1983]These natural hazards, together with other human actions "helped to shape the political and religious ideology of this early Javanese state, and which provided, to a degree, a template for its successors…"[1984] since the 10th, until the last decades of the 10th century, not only in the old political entity of Java, but in other older geopolitical kingdoms of the Indonesian archipelago. One primary proof of this was the 10th-century eruption of Merapi wherein the explosion caused the abandonment of the monumental structures the kingdom has built, due to the threat of the volcanic eruption, subsequent earthquakes, or even tsunami.[1985] Christie (2015) argues that the Merapi's "major eruption, or series of eruptions, of Merapi, at the heart of the central Javanese portion of the state, is the most probable cause of this turmoil, and physical evidence seems to confirm this suggestion."[1986] The experience of the Mataram state during the said period is a combination of (1) acknowledging the political and cultural implications of natural hazards such as volcanic eruptions and earthquakes, and (2) acting on the preservation of the state by making proactive political and governance decisions, as well as creating a more "syncretic" societal religious foundation for the people to have a strong cultural base in dealing with the threats of their environment. Christie (2015) concludes that available inscriptions detailing the Merapi eruptions in Java "cast an oblique, but useful, light on the effect of environmental stress upon one of the island's early states – that of Mataram – and of the uses made of religion in generating and sustaining political stability."[1987]

Reid (2015), in his study of the earthquakes in Sumatra in the 19th century, and it's probable relation to the recent 2004 Sumatra earthquake, argues that there's an apparent shortcoming amongst historians about the writing of some environmental hazards to create a culture of memory for disaster preparedness: "But the historians and others who wrote about Sumatra in the late nineteenth and twentieth centuries did little to prepare their readers for violent earthquakes, tsunamis, volcanic eruptions, and

[1981] Ibid., p. 931.
[1982] Ibid., pp. 927-928.
[1983] Jan Wisseman Christie, "Under the Volcano: Stabilizing the Early Japanese State in an Unstable Environment", in David Henley and Henk Schulte Nordholt (eds), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015), p. 46.
[1984] Ibid., p. 48-50.
[1985] Ibid., p. 49.
[1986] Ibid.
[1987] Ibid., p. 61.

climatic aberrations."[1988]The 2004 Sumatra tsunami caught scholars of history off guard, as the literature provides, there's an apparent silence of major earthquake or earthquake-related epiphenomenal hazard the country in the past since the year 1883. Reid (2015) period in between 1883 and 2004, is a period of geological calmness, and a period of modern instruments, which "…coincided with a period of misleading geological moderation, so that modern Indonesia could be built without serious consideration of the dangers it would eventually have to face."[1989] It can be understood in this assertions is that the lack of consistent historical studies on earthquakes during a certain period, whether due to the lacking of geological activities in the Sumatran region, or the lack of interest due to it's apparent non-impact to the society, triggered the lack of preparedness comes one major earthquake and/or tsunami that hit the island. The lack of readiness, which was reflected in the absence of historical awareness, is connected to the failure of one pillar of historical seismology – documentation of hazards and disasters. Reid (2015) concludes in a pragmatic manner, arguing that "…in a zone as seismically active as Indonesia we must expect history to be discontinuous, through the effects both of volcanic eruptions alternately enabling and destroying intense agricultural production, and of tsunamis periodically destroying coastal settlements."[1990]

e.3 Comparing Experiences: The Philippines, Japan, and Indonesia

What do these historical notes have to do with the Philippine experience in the 19th and 20th centuries? Comparing the earthquake experiences of the three countries is sui generis, a study itself and of its own, and needs a broader, separate scientific and historical research endeavor. But for this work, the experience of the Philippines, as discussed in the bulk of this dissertation work, can be compared with that of Japan and Indonesia, based on the available historical discussing their own separate experiences, during the same period of time, the 19th and 20th centuries. To summarize, presented below are three aspects where the three countries were compared with each other: (1) state responses, (2) media coverage, and (3) local interpretations and reactions.

Table No. 32
Comparison of Earthquake experiences in the Philippines (19th-20th centuries), Japan (19th-20th centuries), and Indonesia (19th centuries), in several aspects

	Philippines	**Japan**	**Indonesia**
State Responses	✓ During the 19th century, the monarchy mobilized the professional experts in Spain to rebuild Manila	✓ Implementation of Wester/European architectural and engineering practices in devastated	✓ Available local literature suggests the states worked in two ways: (1)

[1988] Anthony Reid, "History and Seismology in the Ring of Fire: Punctuating the Indonesia Past", David Henley and Henk Schulte Nordholt (eds.), *Environment, Trade and Society in Southeast Asia: A Longue Durée Perspective* (Leiden: Brill, 2015), p. 62.
[1989] Ibid., pp. 68-89.
[1990] Ibid., p. 77.

	✓ Commissioning scientific activities and studies related to the era (1860s-1990s) ✓ The governments were invariably slow and reactive in dealing with the post-disaster response and rehabilitation mechanisms ✓ Institutionalization and massive bureaucratization (and repetitive reorganization and restructuring) of seismology and disaster response mechanisms (1937, 1968, 1983, 1990)	areas, as part of the larger Meiji modernization program ✓ Institutionalization of seismology and earthquake engineering as early as the late 19th century ✓ The monarchy acted as benevolent rules for the devastated communities (Meiji and Taishō era monarchs)	creation of a politico-religious bureaucracy that balanced the political and religious needs of the state (ruler-subject relations) ✓ Abandonment town locations and the establishment of new urban centers that are "safe" from the frequent seismological and volcanological threats
Media Coverage	✓ The 19th century Manila newspapers presented the earthquakes as an opportunity for the government's image, particularly the monarchy, to be the benevolent institution in the colonial state ✓ The 1937 earthquake was presented as a calamity with the same intensity as with the human conflicts it coincided with	✓ Criticism from Japanese newspapers critical of the Western/European dominance in modern architectural programs and projects ✓ The monarchy was presented as caring and responsive rulers ✓ The use of wood brick painting to create an impression of resistance against the domination of	✓ Literature and local sources suggest that earthquakes were treated as accepted realities, but due to the lack of better historical studies that perennially reminded people of their geological and geographical context

	(i.e., the volatile political situation in the Pacific) ✓ The 1990 earthquake produced a sea of literature, particularly from the "free" media, about the earthquake, making it more of socio-political issues, more than an environmental and scientific phenomenon	Western/European ideas in architecture and engineering	
Local Interpretations and Responses	✓ Political: Manila must be rebuilt, and Spain has a role in it (1863 and 1880 earthquake) ✓ Political: The earthquakes of 1968 and 1983 saw how the ✓ Religious interpretation: The 1863 earthquake is God's punishment due to the emerging Secularization Movement ✓ Earthquakes destroyed families and plummeted the orphan population ✓ The people were relegated into a hapless and helpless situation, in a repetitive cycle, despite developments in	✓ Subtle resistance from carpenters through artworks and insistence of their masonry practices ✓ The knowledge and practice of seismology as "learned" by Western/European scholars was reframed as a continuation and evolution of pre-Meiji earthquake prediction tradition (influenced by Confucian thoughts and belief) ✓ The extremity of earthquakes in the Japanese archipelago always pose and result to massive destruction, despite the proactive and highly	✓ The people interpreted the frequent eruption of volcanoes (i.e., Merapi, Krakatoa) as signs of an angry higher being; thus ruler abide by the call for a better life for their subjects ✓ The concrete correlation of environmental threats and political order that earthquakes are relational to political stability

	responses and institutionalized seismological sciences	systematic disaster response mechanism the Japanese government has established	

In the three countries involved in this comparison, documentation proved to be a vital difference. Reid (2015) argues: "Before 1900 our understanding is dependent firstly on the written records of observers, and increasingly on the scientific investigation of the traces left by volcanic eruptions, earthquakes, and tsunamis on the ground. The ring of fire around the Pacific where the periodic pattern should be clearest is for the most part deficient in historical records before 1600, perhaps in part because of the pattern of periodic disasters. Only Japan has records back into the first millennium CE."[1991]In the Philippine, there is available documentation but needs organization and reorganization. In the case of Japan, the Meiji era reforms in the bureaucracy made it be more like a laboratory in terms of administrative documentation. In the case of Indonesia, documentation remained to be in the political and cultural texts and historical materials and needed separate and appropriate re-documentation.

In the case of Japan, it was clear that the post-disaster response was handled domestically, with the international community acting upon through the decades-long presence of European architects, engineers, and seismologists. The resources of the Meiji government were allotted in the immediate rebuilding of massively destructured large buildings and infrastructures, damaged partially built modern structures, and scientific and academic ventures to produce new knowledge on earthquake destruction-free urban landscape. In the case of Indonesia, I think, the response remained cultural for a long time, though in the early decades of the 20th century, institutionalized meteorology and seismology commenced through the establishment of the Batavia and in Lembang. Documentary-wise, the threats of environmental threats in Indonesia partially "slept", and the bulk of present-day data on the effects of major catastrophes in their archipelago that happened come the 21st century. Reid (2015) registers this opinion frankly: “The relatively low number of casualties from Indonesia’s natural disasters in the twentieth century, and the very high numbers of casualties of political conflict, mostly state-sponsored, make it unsurprising that historians should have focused on the political.”[1992]In his study about the role of local urban and rural community organization in disaster response in the Philippines, Bankoff (2007a) argues that in Indonesia, traditional forms of civic engagement exist in many towns and communities; in the Philippines, it is overlooked and it needs to be continuously documentated and studied.[1993]Bowen (1986), in his analysis of the "gotong-royong" (mutual assistance) tradition in Indonesia has been used both as a form of an individual's or a community's reciprocation to each other and as means of the state to mobilized rural village labor.[1994] He furthers that this Indonesian community value is categorically similar to the “gotong royong” in Malaysia,

[1991] Reid, “History and Seismology in the Ring of Fire”, p. 64.
[1992] Ibid., p. 69.
[1993] Bankoff, “Dangers of going it alone”, p. 330.
[1994] John R. Bowen, “On the Political Construction of Tradition: Gotong Royong in Indonesia”, *The Journal of Asian Studies* 45(3), 1986, pp. 545-561.

and the “bayanihan” tradition in the Philippines.[1995]Communal and personal manifestations of reciprocity in many Philippine towns are present, not only in times of calamities but also on usual, ordinary life transactions.[1996]

Knowledge dissemination wise, the Philippines and Japan had established better communication and collaboration, rather than with Indonesia. Since the 19th century, when Japan and the Philippine were developing their seismological researches, the pioneer scientists in the said countries have borrowed each other's instruments, data sets, and theories and postulates to come up with their geography-specific explanations of the geological stresses their respective territories had experienced. The scientific relationship between the Manila Observatory and the Imperial College of Tokyo, and the Seismological Society of Japan that started in the 1880s and expanded until the 1930s. The question that remains to be further looked into are the specific application of ideas shared especially in post-earthquake research and infrastructure policy development to lessen the effects of frequent geological stresses.

CONCLUSION

As a conclusion, this dissertation has presented and discussed a history of earthquakes in the Philippines, particularly those situated in the island of Luzon, in the 19th and 20th centuries. This work has attempted to document historical disasters, and the developmeny of institutional and local responses, concerning post-disaster rehabilitation, scientific program initiated to understand the nature of major earth tremors, and propose proactive disaster response program to combat and avert the serious effects of earthquakes to communities.

The discussion below provides several propositions of this work’s relevance and post-research contribution to Philippine historiography, specifically on environmental and disaster histories. The propositions include: (1) an approach to the historical study of Philippine earthquakes, and (2) this works’ contribution to research, and (3) the recommendations for future researchers on how to improve this work and start other related research from questions emanating from this work.

a. Approaches to History of Philippine Earthquakes

In every field that history topic that emerges as a potential complex field of knowledge production about the past, there must be certain propositions on approaches, perspectives, and methodologies for it to be formally accepted as a focus of research.

[1995] Ibid., p. 558.
[1996] Mary R. Hollnsteiner, “Reciprocity in Lowland Philippines”, *Philippine Studies* 9(3), 1961, pp. 387-413.

For this dissertation, one contribution is to propose a periodization of Philippine history from the point of view of hazards, i.e., earthquakes, and dialectically, a suggested timeframe of Philippine earthquakes in history. From this conjunction, how can we have a bird's eye view of the trajectory of Philippine disaster history writing?

The history of natural hazards and threats falls into the discipline of environmental history. The study of the natural environments includes the method of analyzing how communities and societies changed physical landscapes, as well as how the natural structure of the earth dictated the form, nature, and flow of human settlements. The natural sciences can extensively explain environmental in a detailed and mathematical manner. Reconstructing the history of the environment by centering on natural hazards produces a broader and wide-ranging intellectual landscape of events. On the one hand, the immanent nature of certain ecological sciences produces the laws governing the physical events and/or catastrophes; on the other hand, as this study will use, the configuration aspect refers to the 'series of states that have uniquely occurred through the interaction of immanent processes with historical circumstance: the context of the process.

The histories of disasters and disaster response in the Philippines have been an emerging focus of research in the social sciences. Philippine environmental history is being regarded as a pressing agenda in the reconstruction of local and national histories. Research and narratives concentrating on topics on the history of the Philippine environment, natural resources, environmental institutions, ecological science and management, and natural and man-made threats have been in the mainstream academic discussions and conferences. Generally, Filipino environmental historians are trying to establish notions and ideas regarding the effects of natural calamities to Filipinos' lives in different time periods. Surveying the studies made on the history of natural hazards, tragedies and disasters, except for those in the last four decades, most of the published works are chronological and descriptive. Thus, the aspect is still a "terra incognita"– an unchartered territory in history.

The study of the natural environments includes the method of analyzing how communities and societies changed physical landscapes, as well as how the natural structure of the earth dictated the form, nature, and flow of human settlements. From this standpoint, we can see the value of human aspect in reconstructing histories of natural hazards in the Philippines. Using human-environment interaction as a theoretical guide, environmental history narrative attempts to present conniving and competing facts and mentalities on the reconstructed narrative of historical events. It has been a default to an environmental historian to cross and bridge two disciplines: history and geography. As a body of knowledge, geography "includes above all the study of physical environment…", and the prime goal in interrelating it the historical reconstruction is "to discover in what ways and to what extent this environment affected history."[1997] These two disciplines merge as ideological pillars in environmental history, as well as a manifestation of what Bankoff argues as *"*transenvironmental*"* (2016).[1998] Geographic knowledge can be used as a vital construct in examining the influence of the physical environment to human history. He anchored this idea from Braudel's conception of historical movements as

[1997] W. Gordon East*, The Geography behind History* (London: W.W. Norton & Company, 1995), p. 2.
[1998] Greg Bankoff, "Hazardousness of a Place: A Comparative Approach to Filipino Past", *Philippine Studies: Historical and Ethnographic Viewpoints* 64(3-4): 335-357.

longue durée – rapid, slow and do not move at all. He related this to the hazards and its effect on environmental landscapes and human population in long periods of time. Bankoff also observed that the mainstream historical writing tradition is bounded by the political and rested on the idea of nation and state/nation-state. He argues that the archipelago is situated in different natural hazards and disaster risks in the Indo-Pacific Region, and this can be the leading or the prime context of analyzing the development of Philippine environmental past. These hazards include the Northwestern North Pacific track of typhoons, the Pacific *Ring of Fire*, as well as the *Alpine-Himalayan Orogenic Tectonic Plate*. He argues that Philippine environmental history should always be parallel with the usual nation-state narrative production. He emphasized that environmental hazards and phenomena do not stop at national borders; it is, by its nature*, transnational* and *transregional.*

Factors such as climate, human-environment interaction, migration, agriculture, and land use, and as well as housing and architectural styles are some that can lead to insights on how local populations adapt to frequent environmental threats. Using these parameters, formal and informal connections can be traced, and the complex system where these operate can be understood. The role of people's organizations should also be made into the surface narrative. He argues that these locally organized groups are a concrete manifestation of collective adaptation to the frequency of natural threats. The importance of digging up the veracity of events through its local context first, before bringing the situation into the arena of national narrative reconstruction should be stressed out. One common mistake in “nationalizing: the environment is making the diverse contexts as a linear flow of hazard to disaster phenomena and homogenizing the narrative of all affected communities.

Going back to the theoretical framework set in the introductory chapter of this work, this narrative of selected earthquakes presents a treatment of hazards as historical events and turning points. Indeed, these earthquakes were important transitional and triggering events in the political structure of each period when they happened, and opportunities and reinvigoration of specific scientific, bureaucratic, and cultural schemes, manifested in the way sectors responded and acted on after such earthquakes.

This study heavily relied on archival and doumentary materials. It is a boon and a bane in disaster research. On the one hand, it fulfills the role of the historian as a researcher and compiler of historical information, and the vision to expand the known past by digging up the terrain of historical information. It also guided the trajectory of the study as a form of historical documentation of calamities. On the other hand, the research tends to submit to conventional positivist thought in historical studies, wherein the dictum, “no document, no history” serves as the official mantra of research. This present study does not claim to be an all-ecompassing documentation of earthquake disasters, as it is short, due to documentary evidence of some pertinent information vital to the study of earthquakes and their effects. One example of this is the effects of earthquakes in population statistics. It is a common knowledge that environmental disasters are one of the many causes of population decline, probably second to latent social processes and human-induced calamities. One difficulty encountered by this study is to prove the proportional claim of the earthquake disasters studies as “national” in scope, but looking at the mortality data, or the lack of thereof, there are loopholes to be addressed. As a form of qualitative historical seismology study, this work used demographic information as essential item in looking at the pattern of effects and response in a grand scheme and lacks the critical statistical analysis of population information. The demographic data

presented in this information are somehow raw and preliminary in terms of how those were extracted from the archival document and processed for analysis.

b. Contribution to Historical Research

The study attempts to be included in the growing historical literature about environmental history, history of seismology, history of disasters, and a history of disaster response in the Philippines. The study will relate and connect each other through varying levels of analysis through critical reading and inter-/trans-/multi-disciplinary approach in historical studies. This dissertation project aims to contribute to the growing field of environmental history, specifically in the subfield of the history of disasters. It attempts to offer a narrative of Philippine history from the environment. It will try to negotiate for the enhancement of understanding about the conjectures of knowledge use in times of hazards and calamities; where do local knowledge and scientific information meet and prevail over another, and how do people manage to use them to mitigate the effects of environmental hazards. It will present a history of resilience and adaptation; risk reduction mechanisms have historical and cultural value and serve as a basis of communities' social memory of disasters.

These fields of history have been emerging topics of research in the Philippines. The historical reconstruction of the archipelago's environmental past has been regarded as both research and policy agenda. Research and narratives concentrating on topics on the history of the Philippine environment, natural resources, ecological institutions, ecological science and management, and physical and man-made threats have been in the mainstream academic discussions and conferences. Natural and social scientists, and engineers and professional experts working in the field of disaster management have considered, for example, the topics of environmental history and history of disasters, as valuable in determining suitable research/based policy reforms and implementation, on the level of disaster risk reduction for the country. The presence of academic core groups and programs involving historians and social scientists in initiatives of national agencies and universities, for example, the Department of Science and Technology (DOST) and University of the Philippines (UP) are seen as concrete realizations of these research developments. For example, the UP adopted DOST's previous program, the Project Nationwide Operational Assessment of Hazards (Project NOAH), and turned it into a research institute under the university, now known as UP Resilience Institute (UPRI). Social scientists, historians, in particular, are being engaged in the programs of the UPRI.

One loophole in disaster studies this research has observed is that the apparent disregard of a variety of responses people made in times of calamities, and many themes, frameworks and approaches are classified into limiting capsule narratives of vulnerability and resilience. It was mentioned that Hewitt (1983) problematized the *"*dominant view*"*, and the emergence of the "alternative view" in disaster studies. Recent works of literature lead to the linear-dichotomized binary nomenclature of disaster experiences and responses to vulnerability and resilience.[1999]

On the one hand, an emerging sub-framework in disaster studies is the "vulnerability discourse", which became a popular theme in the writing of the environment.

[1999] Hewitt, *Interpretations of Calamity*, p. 6.

Vulnerability transcends into the geographic, socio-political and psychological facets of people facing constant chaos due to natural hazards. Though it is challenging to conduct scientific measurements of people's defenselessness to disasters, we can initially assess it by characterizing how they responded to such. The effects of hazards, such as typhoons, earthquakes, volcanic eruptions, even biological threats[2000], in the life of Filipinos can be as destructive depending on different parameters. Nonetheless, we can look into the past to see how devastations gave birth to such defenselessness. On an anthropological perspective, vulnerability is coined as *"*adaptive failure*"*, which is an essential element of a disaster, particularly in location, infrastructure, sociopolitical structure, production patterns and ideology that characterizes a society.[2001] Furthermore, vulnerability can also be understood not only by the actual event of a disaster but also through realizing that it is "generated by economic and political processes."[2002] With this, we can consider that vulnerability is not just a mere notion of being susceptible to accidents from such uncontrolled or unexpected havoc of the environment. Vulnerability also means the socio-economic incapacities of people to respond in time of disasters. Moreover, anthropologists argue that the "pattern of vulnerability that society has conditioned the behavior of individuals and organizations throughout the life history of a disaster far more profoundly than will the physical force of the destructive agent."[2003] Therefore, we can assess that vulnerability has psychosocial nature, as it also pertains to the human's lack of capability to obtain counter-emotional apparatus in different disasters experiences.

On the other hand, resilience is a cultural mentality – it comes with tradition, historical experience, and emotional foundation. It might be an escapist act for a failed or ineffective systematic disaster risk reduction program, but for some societies, it works. Resilience stands on local and localized knowledge and knowledge systems. A few years ago, there's an online social media buzz on Filipino resiliency meme "Filipinos are waterproof" and "Bagyo ka lang, Pilipino kami". This, though short term, is sometimes in the roots of how we think of ourselves. A much more in-depth cultural analysis is needed to get concrete answers from this. Even me, I am guilty of accepting and sharing this kind of memes in social media, but later realize the broader problem of how we see things and how we find solutions.

Though it seems visible most of the time, it is a hasty assumption that local knowledge is instigators of fear. It is a cultural matter. I believe cultures adapt to changes in given times and situations. One thing related to this that we should need to eradicate is the culture of making apocalyptic pronouncements and announcements that puts less-privileged people into the further vulnerable state. It is the responsibility of the state, together with the much stronger civil society sectors in the country, to work together to ensure proactive capacity-building measures to equip people with necessary knowledge regarding hazards and disasters. From the perspective of a sub-discipline of anthropology called ethnoscience, a differentiation of local knowledge from indigenous, folk, and traditional can be made. To be more specific, and encompassing as well, the

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[2000] One can look at the study on the history of locust infestation in the Philippines: Ma. Florina Y. Orillos-Juan, *Kasaysayan at Vulnerabilidad: Ang Kabihasnan at Lipunang Pilipino sa Harap ng Pananalanata ng mga Balang, 1569-1949* (Manila: De La Salle University Press, 2018).
[2001] Hoffman and Oliver-Smith, *The Angry Earth*, p. 29.
[2002] Piers Blaikie, et al., *At Risk: Natural Hazards, people's vulnerability and disasters* (London: Routledge, 1994), p. 22.
[2003] Oliver-Smith and Hoffman, *The Angry Earth*, p. 29.

use of the term "local indigenous knowledge" systems, or "LInK" as used by some scholars are being suggested. Local knowledge can be a set or body of knowledge acquired by local people; localized and has been in existence for a certain period, accumulated through collective experiences and interactions, moral and cultural values, etc. It is a dynamic one, contrary to the widespread observation that it is static and rigid; it changes as time passes by, and continually influenced by innate creativity and innovation, as well as experimentation and impact by external systems. It reflects the worldview, behavior or attitude, as well as perceptions of people to their environment. It is a source of power and stature; it influences power relations and reinforces respect to designated holders and keepers. Moreover, local knowledge is a highly specialized form of knowledge; women, elders, or children manifest a way of it depending on contexts and situations. It is not evenly distributed in a community; there are highly specialized occupations such as in fishing, agriculture, midwifery, and construction of houses that remain under or within a particular group. Local knowledge is also a gendered body of thought.

Concrete applications of local knowledge can be seen by looking at how does this body of knowledge influence perceptions on natural hazards. The way people define disasters explains the way they look for solutions, and what they consider to be a solution. Local knowledge is collectively defined on how people react and respond to hazards. As a form of oral culture, local knowledge is being passed from one generation to the succeeding. People can predict hazards or disasters by observing natural signs such as animal behavior, changes in the water level in the seas or groundwater source, abnormal weather phenomena, etc. This is an aspect of what Bankoff (2003) calls as "cultures of disaster".[2004] This does not mean that cultures are disaster-prone; it refers to the study of the life of communities facing a constant threat of natural hazards, and how people cope with these environmental challenges. In general, from a western point-of-view, some local knowledge systems are not considered scientific; it is labeled as passive and is merely a part of local tradition.

If local knowledge has been a core culture amongst communities, can it be used as a tool to mitigate impacts and reduce risks brought about by natural hazards? The primary challenge is applying these ideas from the communities and makes it a component of proactive local and national disaster management policies. Traditionally, dangers are seen as acts of God; threats are considered as wages of sin and reflect notions of human morality. It some cases, it is seen as God's wrath, employing nature getting back to the humans. Local knowledge provides mechanisms for people to predict natural hazards. These include careful observation of animal behavior, the position of heavenly bodies, sun and cloud formation, wind direction, as well as calendars of cycles on agriculture and aquaculture. Through these methods of prediction, people respond in varying contexts of levels of personal and collective capacities. There are cultural responses to ease the risks or effects of natural hazards. Interventions such as material culture, construction of houses, and technological innovations are some of the means people cope with the threats of the natural environment. The current shift on the materials being used by residents in some areas in Batanes islands manifests the changing trend of typhoon occurrence in the islands. Religion also plays a role in mitigating disasters. Using local worship beliefs, people create a narrative about their experiences in times of disasters. The social organizations in a community also show the

[2004] Bankoff, *Cultures of Disasters: Society and natural hazard in the Philippines.*

use of local knowledge to reduce disaster risks. The relationship between peoples and groups creates avenues to lessen the impacts of a disaster.

It is also essential to problematize the role of local knowledge in the current disaster risk reduction program in the country. Based on Republic Act 10121 or the Disaster Risk Reduction and Management Act of 2010, disaster risk reduction and climate change policies should recognize indigenous knowledge systems. It has been observed a year before the sunset review of said law that there is an evident gap between policies and practices; there is an apparent disconnect between measures from the national levels to the mechanisms being implemented locally. Local knowledge in disaster risk reduction can be mainstreamed, as this will enable the state to increase awareness for the people to understanding cultural foundation and methods how the effects can be mitigated. First, since local knowledge is based on the values and norms of a community, it is vital that it is contextualized, not standardized. Different communities have different needs. An implementing policy cannot support all the communities, given the geographic, social and political dimensions of the country. By engaging people in identifying local practices, experts are relating to the ordinary people the rudiments of scientific knowledge; it is a form of bringing science to the grassroots, or maybe, a type of grassroots science. Engagement should be in a holistic manner; people tend to be reluctant to planners who attend them as outsiders, not as participant-observers. The diffusion of local knowledge requires fine-tuning to suit local condition when policies were crafted and are about to be implemented in communities. Other factors such as poverty, violence, and climate change must also be considered. Disaster risk reduction plan should also be an integrative one; the master plan to be made should have a strong local knowledge foundation to be able to relate to the local context and experiences of people. Disaster risk reduction interventions have to be designed as a development strategy; comprehensive programs must be made, and risk mitigation should be a viable component. Local knowledge should be accommodated by the national agencies involved in disaster risk reduction; hybrid forms of knowledge can be produced, where contextualized science can be applied to local situations. Local knowledge should be recognized as a valuable source of ideas and practices. Questions on the validity and constant applicability of local expertise to disaster risk reduction are always being addressed to advocates. Will it work all the time? To answer this, it is essential to take note that local knowledge is dynamic; it changes and adapts to contexts, needs, and priorities of communities. A vibrant local knowledge system is needed; integrating the concepts of sustainability and evolving an environmental scheme to the standard approach in planning and execution is a necessity.

Further studies regarding the application of local knowledge to different regional and cultural contexts must be continued, like how policies and programs are being treated. It is observed that probable disastrous effects come when there is an evident mutuality or disconnect between policies, the people, and the environment. Engaging local ethnic and indigenous peoples in studying, framing, and crafting policies are not just a trend, and it is a must. The fab on the mere claim that the Filipino spirit is resilient simply because we are used to disaster is a manifest disregard of everyone's right to experience the extent of what the state and its people can offer as social institutions.

c. Final Thoughts and Recommendations

By placing events in a thematic timeline, we can identify essential periods where historical realities that were a product or influenced by the earthquake disasters narrated in this dissertation. We can observe the following patterns and draw the following concluding points:

1. The major earthquakes in Luzon studied in this dissertation fall on the months of June, July, and August. If we are going to corroborate this with the totality of all recorded and studied earthquakes in the archipelago, this will look like coincidental geological events; but considering such cultural norms existing in the country, future earthquake events that might fall on these periods will soon become a pattern understood culturally.
2. There were almost 26 comprehensive geological and seismological studies about the earthquakes indicated in this dissertation. These works can be attributed directly because certain earthquakes happened: a manifestation of reactive knowledge production as it may seem, but these works are groundbreaking during their time, particularly the ones made in the second half of the 19th century, during the time that seismology and geology were fields that were gaining ground as expertise amongst state scientists and engineers. Disasters as examples and turning points in intellectual history. Six scientific institutions were established by different state governments to be the lead agency in producing knowledge about earthquakes, as well as crafting recommendations and policies for the government: the private Observatorio Meteorológico de Manila (1865), the Inspección General de Obras Publicas (1866), the Philippine Weather Bureau (PWB), the Commission on Volcanology (1952), the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), and the Philippine Institute of Volcanology and Seismology (1983). These institutions are connected to each other; state intervention and continuous bureaucratic reorganization expanded and decentralized activities of every institution, until a specific agency, the PHIVOLCS, was designated, and still, the functioning Philippine government agency tasked to study and monitor earthquake activities in the archipelago. Indeed, disasters are events that push people and sectors to conduct research and use the existing bodies of knowledge production to create a pool of useful scientific materials for about the technical nature of such calamities, or the local and cultural ideas emanating from those tragedies. The 1863 and 1880 earthquakes made the Spanish government realize the importance of state scientific institutions; the establishment of the IGOP and the state acquisition of the private Observatorio de Manila; the creation of Comvol, the reorganization of PWB to PAGASA and PHIVOLCS, and the rise of environmentalism in the Philippines, manifested through the proliferation of advocacy groups for the protection of environment and natural resources, were all related, directly and indirectly, to specific disaster event.
3. One concrete policy of governments dealing with the rehabilitation of earthquake-stricken communities was the enactment of building codes. It can be observed that from 1863 up to 1990, only three times that there were enacted and revised building codes in the country: in the Philippine Building Code of 1888, Republic Act 6541 (1972), and Presidential Decree 1096 (1977). These laws were a product of post-earthquake policy enhancements of governments: the 1888 code after the July 1880 earthquake, and the 1972 and 1977 code as products of the August 1968 earthquake, and several relatively small earthquakes that destructed Luzon.

As a way of partially concluding this study, it is hereby recommended the following thematic topics to be researched, emanating from the ideas presented in this work:

1. Disaster and social memory. Problems dealing with local and collective sentiments, emotions, and memory can be expanded. In particular, stories of families and orphans, the vulnerable segments of society, opportunism, and even sentiments of nationalism and national integration can be looked into. As pointed out by the jury, we can expand the discussion of the role of individual and collective memories as standpoint of analyzing disaster experiences.
2. Disasters and social class. As pointed out, the need for further class analysis of disasters is needed, as this is indeed a valid framework of understanding in disaster research. As soon as the discussion of hazards had its turn and focus on the people, and not solely on the nature of the calamity, further life experiences of people that became victims of calamities can be made, and they can be studied from the point of view of historical and existing socio-economic parameters.
3. Disasters as continuities, discontinuities, and evolution. As a counter or contrary framework to this work, it can be looked into the idea that disasters do not only destruct and devastate but rather, it is a process of continuity and evolution, as well as discontinuities with a sense of prolonging societal changes. For example, a social history of adaptation of towns and cities, wherein earthquakes are viewed as an integral environmental process that not only shapes the geographical landscape of society but also an event that enhances the capability of people to adapt to such environmental challenges.

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