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**Aitor Anduaga's**

*Cyclones & Earthquakes: The Jesuits, Prediction, Trade, & Spanish Dominion in Cuba & the Philippines, 1850–1898*

Review Author: Kerby C. Alvarez

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# Book Reviews

AITOR ANDUAGA

## Cyclones & Earthquakes: The Jesuits, Prediction, Trade, & Spanish Dominion in Cuba & the Philippines, 1850–1898

Quezon City: Ateneo de Manila University Press, 2017. 375 pages.

Possessing a command of both social and physical science research, Aitor Anduaga writes about the history of meteorology and seismology, institutional scientific networks, and scientific ideologies and discourses in the second half of the nineteenth century, an important period in Spanish contemporary history. Evident in his works, namely, *Geofísica, Economía y Sociedad en la España Contemporánea* (CSIC Press, 2009), *Meteorología, Ideología y Sociedad en la España Contemporánea* (CSIC and AEMET, 2012), and *Geophysics, Realism and Industry: How Commercial Interests Shaped Geophysical Conceptions, 1900–1960* (Oxford University Press, 2016), are the correlations between scientific development and the greater social and economic milieus. Anduaga demonstrates that science and society do not exist in a vacuum.

His latest opus, *Cyclones & Earthquakes: The Jesuits, Prediction, Trade, & Spanish Dominion in Cuba & the Philippines, 1850–1898*, is a historical assessment of the institutional and bureaucratic transformations in two of the remaining Spanish colonies in the second half of the nineteenth century and of how these scientific makeovers helped institutionalize meteorology and seismology as indispensable bodies of knowledge in advancing colonial

economy and education. In this historical context, Anduaga ventures into a multifaceted, albeit geographically specific, field of the history of science and technology—the development of institutional meteorology and seismology in the Philippines and Cuba. The author guides readers through the complicated nineteenth-century Spanish bureaucracy and details how scientific institutions flourished in the intricate ministerial structure that connected the Madrid government to its colonies.

The book's arguments revolve around four aspects: (1) the institutionalization of science, mainly, meteorology and seismology, and the role of Jesuit scientists and Spanish state engineers in scientific advancement in the colonies; (2) knowledge production through experiments, observations, and scientific publications; (3) the engagement of the economic elite in scientific development; and (4) an evaluation of Spanish peninsular and overseas bureaucracy through the lenses of scientific governance and network building by state and nonstate actors.

In the late–nineteenth-century Philippines and Cuba most of the scientific accounts and studies about typhoons and earthquakes were made by Jesuits and Spanish colonial state engineers, including military (*inginieros del ejército*), civil (*inginieros civiles*), and mining (*inginieros de minas*) engineers. They played active roles in developing the colonial economy, even though Madrid was often hesitant to invest in new and risky scientific projects. The Jesuits and state engineers established their presence as "scientific architects" in the colonies.

At the vanguard of the emergence and maturation of modern scientific ideas in the colonies were Philippine and Cuban observatories that generated innovative ideas and instrumentation. These observatories—the Observatorio Meteorológico de Manila (OM), the Observatorio Fisico-Meteorológico de Havana (OFMH), and the Observatorio del Colegio de Belén (OCB) in Cuba—equipped the colonies with the basics of environmental science, particularly meteorology and seismology. These observatories' scientists and engineers mastered the craft of measuring patterns of weather influences and terrestrial movements. Behind the institutions during the formative years were the Jesuits Federico Faura (OM), José Algué (OM), and Benito Viñes (OCB), and the creole Andrés Poey (OFMH).

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

Philippines, state engineers like Rafael Cerero Sáenz, José Centeno y García, and Manuel Cortés led the production of scientific knowledge. In Cuba, colonial military engineers and officials such as José Gutiérrez de la Concha, Francisco Serrano, Domingo Dulce, and Francisco Lersundi played active roles in the promotion of institutional meteorology and seismology.

Anduaga narrates the development of these sciences in the Spanish colonies from the point of view of the state and how state agencies and actors were the protagonists in this nineteenth-century imperial project. On the one hand, the book "highlights the ambiguous role of the state, dictating regulations, but committ[ing] little to the provision of technical and financial means" (58). On the other hand, Anduaga's work, anchored on institutional history, is a quasi-biographical account of the work of professional scientists and engineers. This book veers away from the usual template of "work-achievement-legacy" and does not detach these scientists from the institutional development and the evolutions and fluctuations in scientific and technological advancements of their time. It presents a historical narrative of an era when the coexistence of religion, science, and secular scientific thinking was put into reality by progressive liberal thought.

Anduaga argues that "peripheral production," i.e., knowledge produced and enhanced in the peripheral colonies (293), occurred in Cuba and the Philippines. In doing so he offers a substitute narrative to the conventional argument of the colonies' supposed inability to detach themselves from certain imperial limitations and of the empire's doubt on their ability to stand on their own in terms of science. This claim contrasts with the prevailing dependency theory and metropole–colony discourse that subscribe to a linear and one-directional knowledge flow and that argue, for example, that developments in meteorology and seismology in the colonies were simply by-products of metropolitan innovation. Anduaga's work is thus an appraisal of the unrecognized contributions of the Philippines and Cuba to meteorology and seismology.

The connections that linked the Jesuits, the colonial government, and traders and merchants resulted in meteorology, and to a certain extent seismology, becoming a focus of interest and investment by select members of the colonial Philippines and Cuba. For example, Anduaga argues that the three arms of the Spanish state (civil, military, and ecclesiastical) worked directly and indirectly with each other to promote meteorology and its applications—forecasting and other meteorological services—consequently

helping the military and the private sector prevent certain environmental disasters (293). Moreover, he emphasizes the Jesuits' role in the production of scientific knowledge, specifically in creating cyclone-warning systems, which ran parallel to the reestablishment of the Society of Jesus in Spanish overseas dominions. These parallel events represented a double-aimed project, with the Jesuits' scientific endeavors covering the missionary and educational objectives of their redeployment in the colonies (291).

The Philippine and Cuban experiences in the rise of meteorology had profound similarities; both countries had the commercial elite as donors and supporters, in a context where weather forecasts catered to their needs. Anduaga argues that, "given the institutional weakness of science in the Philippines, forecasting would not have developed as a public service had it not been for the commitment of the elite" (79). Donations from the business sector flooded the observatories in Manila and Belén, and the Jesuits used the money to purchase instruments from Europe. The regular release of meteorological warnings and reports to the economic elite, foreign merchant houses, and shipping companies in both the Philippines and Cuba revealed the select audience of this "public service." Anduaga notes that, more than the economic benefits from this scientific development, a "feeling of solidarity" prevailed among the merchants and an "agora of chamber of commerce" existed where different professions within the business sector shared and talked about meteorology and its remunerations to their industry (92–93).

Another aspect the book emphasizes is the expansion of networks and the Madrid bureaucracy's role in it. Anduaga argues that the Madrid government developed an "obsession with bureaucratic control and ministerial conception of science" (191), despite the fact that the blossoming of meteorology in the colonies operated on a laboratory-to-public scheme and not as an archetypal state-initiated project. Scientific networks in the colonies were established and grew under the planning and efforts of local scientists and funding from the colonial government and private business sector. These networks that started in the Philippines and Cuba had their own sophisticated components, players, and enablers and were later recognized and enhanced by their respective colonial governments as valuable in trade and other economic pursuits. The hand of bureaucracy finally entered when the state recognized and took over these institutions.

For whom were these developments? Anduaga underscores one critical conjecture in his book, which for some may seem limiting and less inclusive

but is historically valid and logical. Scientific development in the past had a select audience, which was apparent in its major players and beneficiaries. Advancements circulated within a circle of experts, public officials, and elites in the private sector. As José Rizal depicted in *El filibusterismo* using the metaphor of a mysterious and inaccessible physics laboratory, scientific works only benefited the state and the colonial sciences. One could be critical and ask: where are the Filipinos and Cubans in this narrative? Further research will surface them and accord them space in the historical narrative. In my opinion, science was liberated and became more liberating in the nineteenth-century Philippines and Cuba. The science that was usually confined to the laboratories evolved into a "public science," and this process manifested in the fields of education and commerce, with the support and bureaucratic backing of influential segments of Philippine and Cuban society in the nineteenth century.

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PATRICK F. CAMPOS

## The End of National Cinema: Filipino Film at the Turn of the Century

Quezon City: University of the Philippines Press, 2016. 665 pages.

If there is one thing to be gleaned from this voluminous book, it is that Patrick Campos is passionate about Philippine cinema. This passion is perhaps what drove him to deconstruct it so that we can appreciate it with newer lenses.

There are a number of reasons why *The End of National Cinema: Filipino Film at the Turn of the Century* differs from other works in the field of Philippine film criticism. First, unlike other film scholars, Campos does not frame his analysis strictly within a socio-realist tradition, the art versus commercialism debates, or nativist and indigenization perspectives. His work is influenced by various theoretical approaches ranging from political economy to spatial analysis, from geopolitics to postmodern and postcolonial concepts. Weaving these various approaches is no mean feat, but Campos manages to do it effortlessly and, best of all, turn it on its head, thereby