Earthquake Nation

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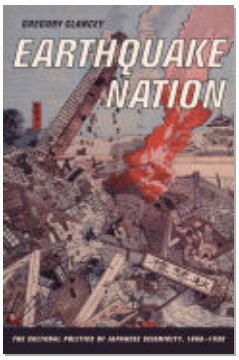

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Introduction

The story of the Great Nōbi Earthquake has a long history of narration in Japanese, particularly by architects and their historians.[1] It has not, as far as I know, ever been told in English.[2] Allowing for variations, the rudiments of the story go something like this: beginning in the 1870s, shortly after the Meiji Restoration, foreign teachers were brought to Japan to train the first generation of architects and engineers. The foreign (mostly British) architects taught Japanese to build in brick and stone, and the engineers demonstrated how to string telegraph wires, lay railroads, and span rivers with iron truss bridges. It was a classic example of "technology transfer," except that the object transferred was not so much machinery or material, but embodied knowledge. Masonry also laid up "culture" in the form of buildings indistinguishable from those lining the streets of London or Manchester. Bricks and pieces of stone became the smallest and most basic material units in the general technocultural adornment of a young, nervous, and radical regime.

Wooden-country Japan, it was decided, would be rebuilt in masonry and iron. The existing Japanese landscape—the temples, houses, and arched timber bridges—became the object of elaborate denigration (sometimes coded, sometimes bald) by foreign teachers and their Japanese pupils alike. The reigning metaphor was strength. Everything in and about Japan seemed, in comparison to Europe and the United States, fragile. This fragility made Japan seem feminine to foreign eyes, but sometimes made it beautiful.

Then, on October 28, 1891, one of the most powerful earthquakes in modern Japanese history, centered on the Nōbi Plain just north of Nagoya, rocked the main island of Honshu from Tokyo to Osaka. Large iron bridges and the walls of brick factories and post offices came crashing down, while Japanese temples, pagodas, and architectural monuments such as Nagoya Castle seemingly escaped unharmed. In the aftermath of the great earthquake, Japanese architects and engineers were forced to question foreign knowledge, and the foreign teachers began even to question themselves. Tokyo University lecturer Josiah Conder, an English architect, advised his students to reexamine the methods and practices of Japanese carpenters *(daiku)*. The 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. This task would preoccupy many of the best professional minds well into the twentieth century.

When I first heard this story of the Nōbi earthquake (or, rather, began piecing it together from many mouths and texts), it seemed the mirror-image twin to classical histories of Japanese technology and industrialization. Many stories of Japanese technical change begin much like the one I've told above (with the arrival of foreign teachers) but continue the way they begin, with Japan henceforth a pupil nation and the West a teacher culture. The most sensitive historians complicate this text by cultivating continuity between the Edo and Meiji periods (showing Japan to have been unusually "well prepared" to learn), emphasizing the speed with which foreign teachers were replaced by their Japanese pupils, or highlighting indigenous adaptation and innovation. Others point out the brutal human and natural costs of all that rapid learning. But rarely in the existing historiography of modern Japanese change does foreign knowledge itself so badly stumble (let alone come crashing down) as in the Japanese narrative of the Great Nōbi Earthquake.[3]

Why has the story of Nōbi failed to attract foreign narrators? It is—is it not?—a good story, and portions of it have been well documented in Japan for some time. One practical answer (we will encounter others less practical) is that it has mainly been told in a theater that few Western scholars of Japanese technopolitical change regularly enter: Japanese architectural history. In Europe and the United States, the Modern movement in architecture notwithstanding, the history of science and technology is considered far from architectural history and an ocean away from the history of art.[4] In Japan, however, where the word for technology *(gijutsu)* sounds more like the word for art *(bijutsu)* than the word for science *(kagaku)*, where nearly all architects are first trained as engineers, and where chief carpenters are li-

censed architects, it is not so odd to find earthquake-resistant engineering in books that are also about Buddhist temples and Le Corbusier. It is Japanese architectural history, rather than the history of Japanese science and technology, which includes in its domain the most elaborate and complex *gijutsu* of the period before foreigners arrived.[5]

Even when Japanese architectural historians talk about art and architecture in their pure forms, however, that is with nature or technology as context rather than content, European and American scholars have only infrequently listened. It is not just a language barrier. Since the nineteenth century, architects and artists in Europe and the United States have cultivated direct experience of the history of Japanese art and architecture (and that of many other non-Western peoples) through photographs and site visits. They have had less interest in retaining local guides, convinced that art and architecture are embodied in objects they can see, touch, and enter, rather than stories about those objects.[6] In any case, earthquakes are just as far from art in Europe and the United States as art is from technoscience.

On the other hand, architectural historians in every country have certain things in common. One is an uneasy relationship with narratives of progress, which began well before the term *postmodernity* was coined among them to describe a shift in design theory. In Japan, where all architectural historians are first trained as engineers, and then as architects, and finally as historians, the unease has arguably been less strong than in the West. Yet it still exists. On faculties of engineering at Japanese universities, Japanese architectural historians find themselves the only humanists, and perhaps the only group that does not wholeheartedly embrace the vision of unilinear progress notoriously common among engineers of all nationalities. "Progress" has often been viewed with suspicion in the cosmopolitan world of art (it is arguably one of the ideas that that world first constructed itself against) and this is also the inheritance of Japan's architects and, even more, their historians, many of whom study and admire ancient buildings. The story of Nōbi has progressive elements—the move away from received foreign authority is also one toward self-sustaining Japanese discovery—but its central trope, the need to discover a local style synthesizing past and present, is more typical of art historical narratives than technoscientific ones.[7]

Nonetheless, a Japanese architectural historian I know refers to the Nōbi earthquake using a term from cosmology: the Big Bang.[8] This perfectly captures the sense of the Nōbi earthquake as a moment of violent creation, infinitely expansive. Before the Big Bang, Japanese merely absorb foreign knowledge. Nature itself then intervenes—a peculiarly Japanese sort of destructive nature—and sets the na-

tion on a knowledge-producing quest at once "Western" yet all its own (or as a later generation would have it, "modern"). The political and gender relations between foreign knowledge and Japanese nature reverse overnight. Japan is no longer fragile. Its beauty, once considered refined, is now sublime, powerful. The Western factories and bridges now embody vulnerability rather than strength. They require an act of rescue.

It cannot be coincidence, however, that this story of the Nōbi earthquake evokes a moment—circa 1890—that historians have identified as a watershed in Japanese nationalism. Foreign knowledge is humbled on the Nōbi Plain at the very time it was being questioned at a whole range of other sites, and in a range of ways.[9] Any sense of mystery in this convergence between nature and nation disappears once we accept the science-studies lesson that nature is inevitably spoken for—even manifestations of nature as loud and unmistakable as earthquakes.[10] Indeed, while certain strands in the story were crafted in the disaster's immediate aftermath, others predated it—receiving sudden amplification in the theater provided by the ruins of Nagoya—and still others have been influenced by subsequent events. The idea that Japanese cultural nationalism is bound up with stories about nature is hardly new or surprising.[11] But that nationalism can also be bound up with natural catastrophe may be a more novel contention.

Although earthquakes are normally treated as a footnote to modern Japanese history, late Meiji and Taishō were periods of unusually strong and frequent seismic activity, climaxing with the destruction of Tokyo itself in 1923. Seismicity was in this sense a constant, catastrophic undercurrent to the Japanese nation-building project, one that not only dogged it, but in some sense produced it. We are used to the idea that accidents and disasters expose previously unimagined vulnerabilities, and this has certainly been true in modern Japan. Less self-evident is the way political actors (including scientists, architects, and other state-credentialed professionals) craft advantage from these same phenomena. How the unexpected natural disaster and the normative machinery of governance intertwine, creating not only states of emergency but emergency-oriented states, is a topic we have only begun to explore despite a plethora of intriguing evidence.[12] Japan—where catastrophe not only has been regular and consequential over so long a period of time but also has left such a rich documentary record—is an excellent place to pursue such inquiries.[13]

What I am after in the pages that follow, however, is not the political or social history of earthquakes per se, but their emergence as objects of Meiji-period knowledge-making. The mastery of new and foreign knowledge was, after all, a major component in the charisma of the Imperial state. The phenomena of seis-

micity would prove unexpectedly problematic, however, both to the Japanese project of "Western learning" *(yōgaku)* and Western efforts—often initiated by expatriates—at characterizing Japan as landscape and culture. Tracing the construction of knowledge is normally a matter of choosing a discipline, describing its discourse and practices, and locating it within discrete institutions. I will be more interested in the way an emerging problem—in this case seismicity—restructured disciplines, institutions, and individual careers around itself, and sometimes set them in conflict. I am not suggesting that earthquakes have agency in the sense of making choices about how groups and individuals choose to confront them. In fact, experts, institutions, and specialized equipment proved necessary, as we will see, in order that seismicity even be isolated and named. Earthquakes did have a certain agency, however, in refusing to become stable "knowledge objects." This force of Japanese nature was important and intractable enough to reorder academic discourses and practices imported from locations such as Britain and Germany, where the earth does not move with such destructive consequences. Thus did the science and architecture of earthquakes become internationally recognized Japanese specialties by the beginning of the twentieth century, although efforts to sustain that achievement would prove more than mercurial.

My account opens with the arrival of foreign (mostly British) professors at Tokyo's College of Technology (Kōbudaigakkō) in the middle 1870s. It first follows a particular college course, architecture, which in Japan was also a new word, practice, substance, and type of calling. Anglo-Japanese architecture is historicized in a matrix that includes *daiku* (traditional Japanese architect-carpenters), engineering (the unifying principle of the College of Technology), and art (something that was not engineering, but maybe architecture, and maybe even *daiku*-work). My own uncertainty about some of these words and their meanings is not an attempt to be coy, but to preserve and report uncertainty or contingent usage among my initial subjects—British men for whom Japan, by a certain metaphorical logic, was sometimes "the Britain of the East." I construct solid materials—stone, brick, wood, and eventually concrete—into my narrative at the same time, inscribed in all sorts of ways by their foreign and Japanese handlers. What I am aiming for in these early sections is the design of "Japan" and "the Japanese" by Anglo-Japanese architecture, and the simultaneous erection by that same nascent discipline of "the West" in Japan itself. As I demonstrate in the second chapter, earthquakes were a central concern and opportunity in the construction of this Far-Easterly Britain.

The account of the Nōbi earthquake with which I began was crafted in its original form not by architects, but members of a second discipline even closer to the

phenomena of earthquakes: seismology. Despite having European roots, seismology's development as a modern science—one with its own institutions, diplomas, instruments, publications, and so on—occurred largely on Japanese soil in this same period. Bringing seismologists onto the stage, which I do in the third chapter, reworks the standard narrative in fundamental ways. It demonstrates, for example, that foreign knowledge of Japanese nature prior to the Big Bang was not monolithic or uncontested, even among foreign professors. In fact a bitter disagreement broke out at Kōbudaigakkō itself about how the events of Japanese nature and the materials of Japanese culture intertwined, even about where (and if) lines should be drawn between them. At the center of this contest were two Englishmen, Josiah Conder, "the father of modern Japanese architecture," and John Milne, the founder of "Anglo-Japanese seismology." Disputes over earthquakes and *daiku* merged with disputes over the relandscaping of Japan, the relandscaping of Britain, the knowledge-practices of different sciences and arts, portrayals of race and gender, and how to properly map Eurasia and the world. When disaster was finally visited on central Japan in 1891, all parties flocked to the ruins in order that longstanding scientific and cultural disputes might be settled. One result of that settlement was the emergence of Japanese seismology as a global science, and one full of insights for a receptive West.

In later chapters, I shift attention from the teachers to their pupils, the first generation of Japanese architects and seismologists, who were deeply affected by lessons learned on the Nōbi Plain. Following the careers of scientists such as Ōmori Fusakichi and Sekiya Seikei and architects such as Tatsuno Kingo, Itō Tamekichi, and Sano Toshikata, I trace how foreign knowledge about Japan changed (and other times remained stubbornly fixed) as Japanese themselves gained access to its productive machinery. Well initiated into European and American professional practices and personas, Ōmori, Itō, and their colleagues still constructed different relations with the West-centered disciplines than had their teachers. Japanese seismologists—practitioners of a "Western" science born and principally nurtured in Japan itself—negotiated knowledge production with the European powers as citizens of an "earthquake nation."[14]

Analyzing earthquakes discursively need not lesson their reality as physical events and human catastrophes. A large swath of Japan moved in October 1891 like waves move on the ocean (for those who have never experienced a major earthquake, I am not taking license). Tens of thousands died or were injured, and hundreds of thousands lost their homes. Great British-built bridges and factories indeed came crashing down. Foreigners and Japanese alike were shaken in every

sense, and searched for cogent things to say. It was a traumatic event, for all its subsequent malleability. My own text, in staying relatively close to academic discussions, cannot do full justice to the social histories of this and other disasters nor trace the plight of victims. I do, however, have something to say about their manipulation. Others have argued before me that the traumatic events we call natural catastrophes are excellent sites at which to see social, cultural, and political processes revealed. As I hope this fine-grained study demonstrates, however, the anxieties and opportunities that disasters evoke have themselves been destabilizing to processual notions in the physical and social sciences both. In objectifying seismicity and seeking to inscribe it onto paper with machines, nineteenth-century science did its best to make the sudden and sublime into the gradual, regular, and, above all, understandable. At the end of the day, however, it could not save modern Tokyo. Nor could it fully save itself—as theory, method, or even community—from the consequences of the unanticipated event.

Although I leave the words *foreign* and *knowledge* to be defined by historical actors, the text will, I hope, make the phrase "technology transfer" even less tenable than it currently is as a description of how objects and practices come to be constructed across different geographies. An artifact of modernization theory—a colonizing project whose effect on histories of Japan has been particularly obscuring—the metaphor of packing and shipping does not describe very well the action in the pages that follow, even if it animates some of the historical discourses I trace.[15] I have used linguistic metaphors such as "translation" and "pidgin" in places where they seem to fit, but have relied more heavily on the notion of "inscription," which evokes the physical and material part of the act of writing, is well grounded in the instrumental sciences (such as seismology), and is slightly less laden with communicativeness. The characters in my account are not always mimicking language as they inscribe objects and practices with properties and meanings. The Earth is also a character that inscribes—rearranges technical and cultural objects into patterns—but one that never "speaks for itself."

Neither do all of the human actors in this book have equal voice, particularly *daiku* (Japanese architect-carpenters), who, as much as earthquakes, are central to most of the stories I tell. *Daiku* are sometimes quoted directly, but, like the Earth, more often are spoken about and for. Although I am sympathetic to the social-history ideal of giving voice to the voiceless, this text is especially concerned with the practice of disciplinary ventriloquism. Subaltern figures such as *daiku* (and, more generally, "artisans") have been regularly animated in the writings of architects and other elite professional groups, including their historians. With a few no-

table exceptions, however, their own testimony is largely lost to us. We can still accord the voiceless a measure of justice, however, by being precise about who is speaking for and about them and why, by segregating them from their spokesmen and specters to the degree that they regain the respect we reserve for the unknowable.

This book is a work of history, but one that attempts to be faithful to transdisciplinarity, as one step toward an academy less disciplined against (and more nurturing toward) studies that cross multiple borders. My research has required extended stays and the forging of friendships across a number of disciplinary realms. It has also involved shuttling between disciplinary libraries, which, both in Tokyo and Cambridge, Massachusetts, organize their books so that architectural students will never encounter biologists, seismologists will be shielded from what artists said, and Japanese carpenters and English botanists seem as different as the Sun and an octopus. In order to follow the actors across the field, however, we have sometimes to follow them into the woods. The book is partly a plea to "retie the Gordian knot," as Bruno Latour puts it, "by criss-crossing as often as we have to, the divide which separates exact knowledge and the exercise of power."[16] In this case it is not only science and power that have had to be criss-crossed to follow the action, but physics, carpentry, and art; Japan, Italy, and California; race, generation, and gender; and so forth. Such crossings not only leave each category less discrete and bounded, but trace out a landscape in which catastrophic events (and their threat) require a feverish repair and reconstruction often missing in classical accounts of knowledge-making.

Recognition of fragmented identity among my characters and myself has led me to adopt, for the majority of this text, the narrative form. One can only arrange a text analytically if speaking to an audience that accepts the terms of an analysis and owns common analytical tools. The way scientists and architects, science-studies scholars and Japan specialists, historians of technology and art, or Americans and Japanese, write, are inevitably far apart. One of the Japanese characters in this story, self-styled "American Architect" Itō Tamekichi, dealt with a similar problem by writing separate chapters, in one of his later books, for each intended audience. He would begin each chapter, "I am an old X, like yourself."[17] The danger, of course, is that each X will read only chapter X, concluding "as I thought!" It was indeed Itō's hope to become X (to the 10th power). I have no such interests or illusions.

The narrative form, as every novelist knows, lets everyone and everything ascend the stage as they do in real time. Chisel-wielding Japanese carpenters can burst into a meeting of seismologists examining seismograms, architects may find

themselves dancing with politicians at a costume ball, zoologists can declare themselves to be architectural historians, and seismologists turn out to be ethnographers. All of these things occur in the following text, at least metaphorically. Actors were not only uncertain about where they are going, but whom they are going there with, and sometimes who they themselves were. It strikes me as important to emphasize uncertainty and liquidity in a time and place—Meiji Japan—where they extended even to the ground beneath one's feet.

Because I approach architecture and science through their relationship with destructive earthquakes—and hence with each other—there is necessarily much in the life of Meiji-period architects and scientists I have not discussed, and which specialists in one or the other field might wish that I had. Architects, for example, were more concerned on a regular basis with floor plans, elevations, ornament, and style than with earthquakes. Seismologists spent more time pouring over seismograms and mapping fault lines than considering how buildings performed in the face of seismic waves. From the perspective of some disciplinary scholarship, the issues at the center of my account might thus be interpreted as exceptional rather than the normative. As we shall see, however, architects and scientists in Japan could scarcely remain for long on one side of that equation. While necessarily selective, my accounts of Japanese architecture and geophysics are certainly no more so than histories of design organized by style, or of seismology organized around instruments or theories. I recognize my debt, however, to scholars working across a range of methodologies, and beg their indulgence as I organize often-familiar material in unfamiliar ways.

Aside from issues of methodology and textual crafting, this study will, I hope, invite new questions about how "Western learning" was defined, interpreted, transformed, and made use of not only in Meiji Japan but at other sites around a colonized world. When we abandon the metaphor of "transfer" for more fine-grained accounts of how technoscientific objects were formulated, knowledge-making emerges as less unidirectional, and ultimately more believable in its chaos and partiality. Storytelling about how smoothly things and behaviors were reestablished across cultural boundaries made a certain strategic sense to the first generations of non-Western scientists, engineers, architects, anthropologists, and so forth whose careers depended on their apparent synchronization with distant knowledge-producing centers. This makes less sense, however, in the retelling, especially when it obscures a more subtle but revealing dissonance. As we will see in the case of the first Japanese scientists and architects, narratives of resistance or correction were often woven into texts that still sought sympathetic readership in Europe and the

United States. We cannot continue to see non-Western scientists, architects, and other professionals, then or now, as universally content to gather data for foreign interpretation or infinitely to replicate foreign forms, even when they tell us, in many instances, that that is mainly what they are doing.

Most of the figures encountered in the following pages, despite frequent reverses and failures, arguably had greater faith than our own contemporary experts (and citizens) in their ability to confront and contain destructive nature. Their naming of Japan as a nation of earthquakes was no simple exercise in natural description, and was certainly no surrender to pessimism. An age-old source of catastrophe became in the Meiji period a new sort of problem, but also something of an opportunity. Only in the Taishō period would seismicity become a subject virtually anathema to processual narratives, a status it arguably retains today. In traveling this peculiar arc, earthquakes shaped Japan materially and symbolically as deeply as Japan shaped the arts and sciences of natural disaster. Contemporary accounts of modern Japanese change cannot forever avoid their rumbling presence.