Title	Archaeological craftwork 2021 : ethnography of archaeology at Suwahara site, Hokuto city, Yamanashi 2021
Sub Title	山梨県北杜市諏訪原遺跡における考古学の民族誌2021
Author	Ertl, John 吉田, 泰幸(Yoshida, Yasuyuki) 碇, 陽子(Ikari, Yoko)
Publisher	慶應義塾大学日吉紀要刊行委員会
Publication year	2022
Jtitle	慶應義塾大学日吉紀要. 人文科学 (The Hiyoshi review of the humanities). No.37 (2022.) ,p.1- 35
JaLC DOI	
Abstract	
Notes	
Genre	Departmental Bulletin Paper
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AN10065043-20220630-0001

Archaeological Craftwork 2021: Ethnography of Archaeology at Suwahara Site, Hokuto City, Yamanashi 2021

John Ertl, Yasuyuki Yoshida, Yoko Ikari

Introduction

This article is a report on our ongoing ethnography examining the production of archaeological knowledge in Japan. Covering year three of the project, this is a companion to our two previous reports (Ertl and Yoshida 2020, 2021a). Over the course of our five-year project we will investigate and document the activities involved in reconstructing a Middle Jomon period pit house, from excavation through post-construction utilization. Typically in Japan, any thought to rebuild an ancient structure takes place only after excavations. Our project is unique in that we know beforehand that we will reconstruct a Jomon pit dwelling and can incorporate this expectation into the initial stages of project planning and execution. This allows us to excavate at Suwahara while we ponder and reflect upon the inevitable gaps in information and questions that arise when designing and building a Jomon pit house. In this article, we seek to understand the connection between excavation methodology and the kinds of information on Jomon pit dwellings that standard excavation practices produce. This is a precursor for us to consider how changes in research design might help promote innovation in prehistoric architectural reconstruction.

The ethnography side of our project investigates the people involved in archaeology, what they do, how they view and make sense of material remains, and

how they shape and transform the world around us (Edgeworth ed., 2006). For this series of research reports, we have adopted the idea of "archaeology as craft" (Shanks and McGuire 1996), which is employed to illustrate the correspondence between the conceptual reasoning and practical execution that take place in archaeological practices. One aspect we looked at is "professional vision" (Goodwin 1994), an expert system used to make order from the world, which is acquired through repetitive practice and collaboration with people and technologies. In the context of excavations, this is the ability to see and comprehend relevant features at a site and in remains. Our discussion in 2019 emphasized our struggles to make sense of what we were seeing as we dug at Suwahara site. The difficulty was due not only to the quality of the soil in Yamanashi, which tends to obscure features, but also due to our inexperience in using the tools (garden scoop and hoe) that are used to reveal them (Ertl and Yoshida 2020).

Excavation at Suwahara resumed in the summer of 2021. To our surprise, it was far easier to see the differences in soil color that reveal site features. Had the ground changed? Was the weather more conductive to see features? Had we dug to a sweet spot where things came into focus? Or had something about us changed? Whatever it was, we found it was time to move on from the "peeling and shaving" method (Ertl and Yoshida 2020: 156) that characterized the 2019 field season. Having to decide how to proceed anew, the ideas that we had been contemplating about excavation methodology needed to be turned into purposeful action.

The following section outlines the excavation activities at Suwahara in 2021 (Table 1). The body of this report, however, is on research design, which was an ever-present issue during fieldwork and remains open-ended and flexible even now. On the surface, there is nothing noteworthy about how we have been excavating – no new scientific tools or modes of analysis are being used. The uniqueness, we believe, is that we are directing excavation and analysis toward the collection of data that might assist in the reconstruction of a Middle Jomon pit dwelling. As we

Table 1: Timeline of research activities.

Phase	Date	Activities
Pre-excavation (between excavation seasons)	October 2019 to July 2021	Laboratory work: Clean and sort artifacts (Keio University)
Excavation	August 28 – September 6	Preparation: rent excavator, set up toilet, set up datum (benchmark for measuring), set up grid benchmark, greet landowner, remove soil with excavator, remove remaining soil by hand
	September 7 – 9	Peel and shave, measure excavation area, take drone photographs, 3D rendering
	September 10 – 13	Measure sub trench 1 and 2, set up Pit 1–5, survey Pit 1–5
	September 15 – 17	Survey sub trench 3, take drone photographs, 3D rendering
	September 18 – 26	Closure: clean site, return equipment, fill sand into pit to preserve archaeological features
Post-excavation (preparation for 2022 excavation season)	October 2021 to March 2022	Laboratory work: Clean and sort artifacts (Keio University)
	January 21 and February 25 2022	Meeting with Kobayashi Ken'ichi (Chuo University)

discuss in this report, the act of reconstructing pit dwellings in Japan is something that occurs only after excavation and analysis have shown there to be remains worth remaking. Indeed, our previous research looking at hundreds of examples of Jomon pit house reconstructions did not find one project where a decision to reconstruct preceded the results of excavations (Ertl 2021; Ertl and Yoshida 2022). With this objective in mind, how have we chosen to excavate at Suwahara?

Suwahara Excavation 2021

The 2021 field season at Suwahara site took place in September with a team of six people. After removing the fill protecting the site, the surface was prepared by way of the "peel and shave" method. Five pits were identified in the southwest quadrant (pit 1 to pit 5). Each were excavated in half sections, and photographs were taken

Figure 1: View of the excavation of subtrench 3 at Suwahara site. (16 September 2021)

before completing the other halves. A possible pit dwelling feature was identified in the northeast quadrant. A trench (subtrench 3) was excavated crossing this feature 40cm by 800cm and to a depth of 50cm (Figure 1). At each 10cm interval depth, photographs were taken, and small pottery sherds were collected and bagged together. From this trench, 205 distinct remains were collected including pottery, obsidian flakes, and stones.(1) A total station was used to take GPS measurements of the excavation site and outlines of excavated features. Location information was also collected for all remains except for small pottery sherds and artifacts that had been inadvertently moved while digging. Multiple photographs were taken of each

(1) In principle, we decided to take measurements of pottery that were 2cm in length or larger. The problem we encountered was that any smaller pottery sherds were both abundant and they also tended to be easily displaced as we dug. Additionally, the smaller the pieces the more difficult it is to pinpoint the pottery typology needed for further analysis. Equally important are stones, which Sano Takashi said may be relevant as they could have been used to hold roofing materials in place. For that reason, we have been collecting rocks that are approximately fist-size and larger.

Figure 2: Screen capture of three-dimensional image of Suwahara site on first day of excavation, 9 September 2021.

Figure 3: Screen capture of three-dimensional image of Suwahara site on final day of excavation, 17 September 2021.

feature before and after excavation, and drone images of the site were taken at the beginning and end of the field season. These images were processed with photogrammetry software to produce 3D images including the entire site on the first (Figure 2) and final days of excavation (Figure 3). At the conclusion of field

Figure 4: Suwahara site after excavation. The site was protected with sandbags placed in trenches and pits, covered in two blue tarps, and filled with sand. (26 September 2021)

season, the site was covered with blue sheets and partially filled with sand for protection (Figure 4).

This short summary of the 2021 Suwahara field season hits on all our significant activities. Behind this veneer of "what we did," lies the unaddressed reasons for "why we did it in this way?" Herein lies the issue of research design. The remainder of this report details the background problems and issues, but here we will jump right into our methodology and what we hope to find by excavating this way.

The All-Dots Survey

While explained in more detail below, we employed what has been called an "all-dots survey" (*zen-ten dotto chōsa*), which requires the collection of location information for every pottery sherd and other significant remains at a site. This can be quite laborious, as the people digging must repeatedly pause and take measurements. The

primary benefit is the ability to pinpoint the location and relationship between pottery sherds and other remains long after excavation has ended.

Sano Takashi (former head of the Hokuto Archaeology Center and co-collaborator) proposed method to detect the use of sod roofs on Jomon pit houses. Typically, identification of sod roofs is limited to burnt dwelling remains, where a layer of charred earth might be found above the level of the pit floor (see Takada 1998). As such charred remains are relatively rare, this might lead one to wonder if sod covered pit dwellings were the norm or if materials such as thatch or bark were more abundant (Asakawa 1998: 520).

Sano's hypothesis is as follows. At a long-term settlement site like Suwahara, if the roofs of pit houses were covered with dirt, it is possible that the dirt on the roof would include potsherds. As a pit dwelling is used, the inhabitants will make, use, and perhaps intentionally leave pottery on the floors. In such a case, the pottery on the roof will likely be older than the pottery deposited on the pit floors. When excavating remains, one is looking to find this older pottery located just above the floor pit, where a roof would be expected to have collapsed. Furthermore, one might also find newer pottery above this hypothesized sod roof layer (the layer with older pottery), as one can imagine the subsequent disposal of pottery long after the pit dwelling was abandoned.

The Egg Slicer Survey

The half-section is one of the key methods used to obtain information on the size and shape of a feature and identify differences in the contents of the fill. In Japan, standard procedure for pit dwellings is to excavate in quadrants, leaving a x-shaped belt through the middle creating cross-sections (Figure 5) (Hattori 1985: 52). These cross sections provide a generous amount of information, and it has even been suggested it provides enough context to identify elements of the above-ground structure of pit dwellings (Fukushima 2004). But in general, the information they have provided

Figure 5: View of cross section belt excavated at a Heian period pit house feature at Nishikubo site (Hokuto, Yamanashi). (21 August 2019).

about the shape and materials of a Jomon pit dwelling has been limited.

When starting excavations at Suwahara in 2019, our search for traces of pit houses proved fruitless. One reason is due to the quality of the soil. We recalled Sano's comment, "The soil in this area is different from the Kanto region, so it will be difficult to find pit houses." Sano added that the section belt to split the pit house into four quarters was based on the soil condition in the southern Kanto region, where traces of pit buildings are easy to identify. In other words, the "unique" condition of southern Kanto region was generalized into the "norm" and instituted in excavation manuals for beginning archaeologists.(2)

(2) In fact, Yoshida experienced a situation where such "standardization" did not apply in excavation research. Yoshida participated in the excavation of a Yayoi period site in Aichi Prefecture. Archaeologists there repeatedly remarked that the conditions described in excavation manuals were not found at sites in this region, especially the soil. In Kanto, a circular dark-colored soil (a pit dwelling feature) can be seen in contrast to the light-colored Kanto loam layer soil. That is what is meant by "Kanto" mentioned by

Figure 6: Section of pit dwelling preserved in resin on display at Kabayama site (Kitakami, Iwate) visitor center. (4 July 2021)

Building off the idea of the cross section, Miyao Toru (one of our collaborators from The Niigata Prefectural Museum of History) suggested an alternative to the cross-section belt. He suggested making several narrow trenches to create numerous sections that allow one to observe the depositional process inside the pit house. When hearing Miyao describe this method, Yoshida Yasuyuki said, "like an egg slicer." Additionally, Miyao suggested preparing a resin replica of each section (Figure 6) that could be transported back to the laboratory for future analysis. In the

Sano. Yoshida also heard someone say that "black soil was buried in the features dug into the dark-colored soil, making it difficult to identify." Another story claimed: "Only one researcher says that he can identify features in this difficult condition." In the excavation of the Yayoi period site in Aichi Prefecture, archaeologists made test trenches in areas that might be features to observe the section and then extended the test trench to excavation grid. This is the same feature of the settlement excavation in the early days of the modern Japanese archaeology mentioned by Doi and Kuroo (see below). However, it is by no means an outdated method, but a basic method that is necessary depending on the soil conditions.

Suwahara excavation, it is important for us to see which layers of the deposited layers in the pit are the traces of the collapse of the superstructure of the pit house and which layers indicate the disposal activities that took place in the depression. Understanding this need, Miyao's suggestion could make it possible to create many opportunities to observe the depositional process. However, it is impractical for us to prepare resin replicas of all the sections we wish to observe. Instead, we decided to take multiple images of the sections and prepare them as three-dimensional images using photogrammetry software.

Research Design

The remainder of this report delves into the anthropological background, the organizational structure, and methodological issues that surround our project. The first section is a review of design anthropology, an emerging field of study that repositions the relationship between researcher and subject to one of partnership in the unfolding of future-oriented activities. The second section discusses the different roles and organizations (expert systems) involved in reconstruction, examining the gaps between each phase and the need to incorporate the interests of the people in latter phases into the initial excavations. The final section is a historical review of excavation methodology in Japan that shows the tension between needs for efficiency and standardization with the idiosyncrasies of the local conditions and aims of archaeological investigation.(3)

According to our five-year research plan, the final year ends with us

(3) Ikari Yoko is a cultural anthropologist (Meiji University) who is also co-investigator on the JSPS research grant, although she has not actively participated in the excavation. Ikari wrote the first section on design anthropology, which the three authors spent the past year reading and discussing together. Ertl wrote the second section and Yoshida the third. Yoshida and Ertl cowrote the above summary of our research methodology (the all-dots survey and egg slicer survey). Ertl was the primary author of the remainder of the report.

reconstructing a Middle Jomon period pit dwelling at Umenoki site. Making this pit house is not the goal of our project, however. There are already four pit houses at Umenoki, and we are under no illusion that we might build one that is in any way better than what is already there. Instead, we wish to understand and document the multitude of activities – data-collection, decision-making, guesswork, collaboration, and craftwork – involved in turning Jomon period remains into a "Jomon" pit house. In this, we hope to identify where gaps in data-collection or interpretive leaps take place as the project moves from initial excavations in year one to the making of a pit house in year five. We understand that these gaps and leaps are inevitable in any reconstruction project, as no Jomon pit house has remained intact enough to remove any doubt as to its original form. What is important is to understand why these gaps occur and what kinds of issues arise from them. Doing so allows us to better evaluate and appreciate the diverse attempts to recreate Jomon pit houses in Japan (Ertl 2021; Ertl and Yoshida 2021a, 2021b; Sato 2018) and provide a foundation for us to build our own.

Design Anthropology: Foresight in a Field

The sub-discipline of design anthropology has received a lot of attention in recent years. Keith Murphy (2016: 451) explains the reason for this emerging trend is that there is a renewed sensitivity to understand how societies are created and exist in relation to their circumstances, rather than just understanding them as given and existing outside of us. Appadurai notes that no matter how much society seems to exist independently of our hopes and desires, in fact, "daily order is produced by social actors who elect to comply with certain rules. fulfill certain obligations, meet certain expectations, and make various deliberate social efforts" (Appadurai 2013: 253). This view, that designing is made by the constant efforts and activities of various people, leads us to turn to the view that designing is not a professional activity limited to experts (or even to some omnipotent being).

The concept of design utilized in our project is also used in this sense. Design is not restricted to the meaning of prediction or projection by an authoritative designer. Rather, we use design in the sense of an improvisational orientation that is created by the people who are present when the "design" is realized. Tim Ingold, a leading anthropologist, uses the example of the sociologist Turnbull to draw attention to the fact that medieval cathedrals were not the work of a single architect, but the practice of many craftsmen employing ad hoc practices and on-the-spot foresight. In other words, the cathedral was not built based solely on the predictions and projections of a single authority (although most famous buildings bear the name of a famous architect), but it equally is given shape through the behavior of the many people involved at the site. Here, design involves imagining the future, but that imagining is "far from seeking finality and closure, it is an imagining that is open-ended" (Ingold 2012: 29). It is not a rush to imagine things that have not yet happened, but the "perception of a world in becoming" (Gatt and Ingold 2013: 145). To understand the curious term "perception of a world in becoming," future-oriented temporality is a key concept.

Here one can look to Hirokazu Miyazaki's ethnography *Method of Hope*. Miyazaki challenges the past-oriented (retrospective) nature of conventional anthropological knowledge. According to Miyazaki, the people of Fiji continue to hold on to the hope that their land will be returned to them, even after 100 years. If Miyazaki were to make the hopes of the Fijian people the object of his analysis, he would be writing retrospectively. However, instead of portraying hope as an object, he transforms it into a method and writes with the same temporality as the still unfulfilled hopes of the Fijian people (Miyazaki 2004).

What can we expect from embracing this kind of future-oriented temporality, inherent in the idea of design anthropology, to this project? The reconstruction of ancient architecture involves many actors involved in a series of "messy practices" (Ingold 2012: 28) such as excavating, classifying, measuring, making blueprints,

selecting materials, cutting timbers, tying them into place, and so on. However, because each task is carried out by its own specialist, the practices are fragmented. To bridge these divides, the ideas and methods of design anthropology can be incorporated. In other words, through anthropological involvement with a field which always entail participatory observation, anthropologists think with, move with, and learn from people in the field. By investigating with the local people rather than about them (Ingold 2011), we have no choice but to accept the undefined nature of the future and accompany the people in the fields they interact within. Through participant-observation, anthropologists think, move, and learn together with people. When anthropology is no longer about researching the people on the ground but becomes a practice of researching with the people on the ground (Ingold 2011), it embraces the undefined nature of the future. That is, instead of observing the field as dictated by the prediction and projection of individual personnel, anthropologists will be engaged in the field activities together and involved in shaping the direction of what is happening there. The gaps in the data may then be filled in when activities proceed in the context of improvisation and foresight.

A Linear Model of Prehistoric Reconstruction

Reconstructing prehistoric architecture is generally divided into three separate phases: excavation and analysis, design, and construction. Between each of these phases there are gaps, where the evidence and ideas from the previous phase are insufficient to complete the next. In practice, this means that decisions about an ancient building draw from sources outside the immediate excavation or even from outside the discipline of archaeology. It is in these decision-making processes, where people draw together information from a vast array of sources, that the subjective aspect of architectural reconstruction becomes most apparent (Stanley-Price 2009). It is also among the most problematical aspects of reconstruction because these decisions are rarely documented (Ertl 2017, 2021).

Rebuilding an ancient dwelling is like to trying to bake a cake from a partial list of ingredients. It requires much more than compiling an "ingredient list" from archaeological remains and features. One must make a clear image for what the pit house should look like (the design) as well as work the raw materials into a solid structure (its construction). Thus, the gaps between the phases of reconstruction are not only from a lack of information but also stem from the very different sets of activities and expertise that it takes to complete them. In practical terms, reconstructing a Jomon pit house only begins with the work of archaeologists in the field. It connects with the knowledge and craftsmanship of architects, earth scientists, historians, building engineers, and carpenters: each who might apply their trades in different ways.

The linear model depicted below is but a partial representation of the complex interactions during any specific reconstruction project. As Michel Callon (2004) has explained about design and innovation, the actors involved are connected in networks of mutual influence, exerting influence upon each other through each step of a project. To improve the design process, he argues that a project should strive to be collaborative and open to the different interests at hand (Callon 2004: 3). The aim of this section is to identify the organizational systems that divide and separate the different actors involved in archaeological reconstruction. Doing so may help us consider how the varied interests of the various actors involved might be incorporated into the earliest stages of research design. For example, how could the concerns of the end-users of a pit dwelling, the carpenters who build them, or the architectural historians who design them be incorporated into a discussion about how one should excavate a site?

The Three Phases: Excavation and Analysis

Any reconstruction project begins with excavation and analysis. These activities are what provide the fundamental information such as the size of pits and postholes,

section drawings, interpretations of deposition, and analysis of organic materials. Many people are involved in this phase, as different people may dig the ground, collect GPS coordinates, take photographs, process remains, and write up results. This first phase may be seen as ending with the publication of results in a site reports and journal articles.

Important for our analysis, any decision to reconstruct an ancient building at an archaeological site is dependent upon the decision to preserve it. In Japan, preservation is only guaranteed once a site is designated a "historic site" (*shiseki*), and this designation is usually granted one excavations have produced substantial results. For example, the large-scale settlement sites of Sannai-Maruyama (Aomori) and Yoshinogari (Saga) had already undergone several seasons of excavation before designation. At Goshono site (Iwate), ninety percent of the site was saved from excavation, but only after the analysis of unique burnt-dwelling features (*shōshitsu jyūkyo-ato*) provided proof that pit dwellings had sod-covered roofs (Takada 1998).

The lesson here is that reconstruction follows excavation, not the other way around. The design and construction of an ancient dwelling is only contemplated after excavation, meaning that any issues that come up during these latter phases do not work their way into excavation methodology. In theory, authorities should be able to conduct additional excavations after designation, but they must receive permission from the Agency for Cultural Affairs to do so.(4) In practice, additional excavations at historic sites are usually limited to surveys that might identify the range and distribution of site remains. In making our database of reconstructed

(4) Indeed, our excavation at Suwahara was a compromise stemming from this limitation. Initially we asked if it would be possible to excavate one of the pit dwellings at Umenoki site. Sano Takashi quickly dismissed the idea, explaining that it would be impossible to receive permission from the Agency for Cultural Affairs, especially as Umenoki had just been designated a historic site in 2014 and site preservation and development plans had already been set in motion.

prehistoric buildings (Ertl 2021; Ertl and Yoshida 2022), we never came across a site were authorities excavated a pit dwelling feature with the express intent to uncover new information that might be used for making reconstructions.(5)

Design

The second phase of reconstruction is design. To come up with a cohesive design, the data from excavation and analysis need to be supplanted with information from other sources. Excavation will commonly reveal the size of posts and the depth and circumference of the pit. One might identify the tree species used, find remains of wooden slats or beams, or discover that the roof had been covered with dirt. These data alone do not provide a blueprint for reconstruction. At most, they provide a checklist of features that should be included. The resulting design process has been called "imaginative reconstruction" (*sōzō fukugen*) (Aoyagi 2010) and requires filling in the gaps with logically driven decisions based on historical or ethnographic examples or universal principles from architecture and engineering (Ertl 2017).

The actors involved in design phase shift. Architectural historian Unno Satoshi writes: "Most people think of archaeology when they hear the words 'excavation' or 'ruins.' Yet with places like Heijo Palace, Yakushi temple, Sannai-Maruyama and Yoshinogari sites, the reconstructed buildings one sees at these sites are the achievements of 'architectural history'" (Unno 2017: 255). Continuing, Unno admits that reconstruction is a multidisciplinary activity involving individuals from fields of "archaeology, literature history, preservation studies, and art history" (256). This collaborative enterprise amounts to a field of study that Unno dubs "reconstructionology" (*fukugen-gaku*) (Unno 2019: 328).

(5) There are a few cases where previous reconstructions have been revised following subsequent excavation and analysis. For example, excavations at Toro site (Shizuoka) preceding renewal of the site park in the 1990s revealed errors in the designs from 1951 (Unno 2019: 24) and discovered a new raised floor building that was reconstructed as a shrine or temple (*shinden*).

Unno depicts the flow of reconstruction with a chart starting with "excavation survey" at the beginning and "reconstruction design draft" at the end (2017: 136). The first step in reconstruction work is named "preconditions" (*zentei jōken*), which he sees as a comprehensive analysis of the "raw data" (*nama no jōhō*) garnered from excavation (135). Along the way, design is envisioned as practice filled with trial and error, where design ideas are examined and reshaped based on available data. Outside of a mention that new excavations may be useful for garnering new information to support a design,[6] Unno depicts "reconstructionology" as an "academic" (*-gaku*) activity that starts after archaeological excavation and ends before construction.

The main limitation in his flowchart is that it seems to take archaeological results as a given at one end and construction as an uncomplicated resolution at the other. It is likely that Unno, an architectural historian, understands the complexities involved in these other phases dominated by archaeologists and engineers but chooses not to interject. Based on his model, our suggestion would be to expand the experimental (trial and error) aspect of his research flowchart back to the excavation phase. This would allow one to question whether prevailing excavation methods produce the best results possible for coming up with designs for ancient architecture.

Construction

The last phase is construction. As with the gap between excavation and design, there is an equally important gap between the design and construction phases. Here the problems shift. Blueprints and materials lists may be so complete that they

(6) Unno is likely referring to excavations at Heijo Palace, where excavations and reconstruction ideas led by scholars at Nabunken have been ongoing since the 1960s. From what we have seen, hypothesis testing involving new excavations is extremely rare in Japan. This is due, as explained above, to the protections placed upon nationally designated sites. It is also because many rescue excavations will have removed all remains.

clearly identify the wood species, dimensions, and other characteristics of the materials. They may denote the location for rafters, numbers of cross members, and methods for attaching the structure and roofing materials. With such detailed information, construction may seem uncomplicated. Yet in practice it is far from so. To facilitate the shift from a two-dimensional design to a newly built "Jomon" dwelling, a vastly different set of activities and expertise are employed.

From the early 1990s, the scale and scope of architectural reconstructions grew rapidly with the Japanese government beginning to fund site development projects (Kato 1998). The size, numbers, and scale of reconstructions took off with sites like Yoshinogari (98 buildings), Sannai-Maruyama (19 buildings), and many others. Typical of site development at this time, site administrators contracted out the design work to architectural historians from Nabunken, universities, or design firms specializing in historical buildings (Ertl 2021: 171). Also typical of this time was the reliance upon mid to large-scale construction companies to build them. For instance, Obayashi Corporation (one of the major five construction firms in Japan) consulted on the site developments and built the monumental longhouse and six-pillar tower at Sannai-Maruyama (Obayashi Co. 1998).

Employing construction firms makes sense. Reconstructed buildings are only one part of site development activities that include landscaping and building museums. The benefits of employing such firms are that they can outsource unusual materials and find specialized contractors to thatch roofs or tamp earthen floors (*tataki*). The "ancient" buildings they make may be faithful to the images produced by architectural historians, even though they are made with contemporary construction practices and modern materials such as concrete foundations or waterproof membranes to ensure the safety and longevity of the structure. The drawback of this construction philosophy is that reconstructions at such sites emphasize the outward appearance these buildings over other considerations.

Alternately, there are a host of examples in which reconstructions have been

made by individuals or small groups. These are often experimental in nature, where their attempts to make a pit dwelling are set in tandem with concerns about how Jomon people made and used their tools, which building materials were likely used, or how comfortable it was to live inside a pit dwelling (Harada 1984; Takada 1998; Sekine 2002; Amemiya 2020). What is interesting is how these accounts depict the gaps between the image of the pit dwelling presented in their designs with the challenges that came about when making the structure itself. For example, when the architectural historian Fujimori Terunobu made a pit house for a family holiday, he wrote about the near impossibility of acquiring thatch to fully cover it (1999: 60–63). At Goshono site, Takada Kazunori explained that they made changes from the original design of the pit dwellings because of leaks at the entryway and window (Takada 2005: 66). Kobayashi Kimiaki, the former director of Idojiri Archaeology Museum (Nagano), admitted to several "cheats" (*inchiki*) that came up during construction. One example was using cedar rather than chestnut logs for the posts and beams because the chestnut was too heavy to lift into place (Ertl and Yoshida 2021b).

Distinct from the reconstructions by construction firms, these experimental approaches have the potential to work themselves back into the earlier phases of excavation and analysis and design. Understanding the challenges to procure a material (thatch), lift and secure beams into place, or even the lessons learned from an accidental fire (Hansen 1959: 59) can provide hints about past activity that may work its way into archaeological excavation design. Unfortunately, there are only a handful of publications that detail these kinds of issues that come up during construction and subsequent usage. There are even fewer that try to use reconstructions to reconsider the archaeological record (see Ichinohe Town Board of Education 2017). The result is that the construction phase of reconstruction has been viewed little more than the action of bringing physical form to an architect's design.

Excavation Methodology in Postwar Japan

The Excavation Manual: Awareness of Issues and Standardization of Methodology

When an archaeologist writes about an archaeological excavation, there can be at least two kinds of texts. The first are manuals providing detailed instructions on how to excavate different kinds of sites and features. The second are reflexive commentaries on excavation methodology. Currently, the former is the dominant. From the Japanese archaeological community, the former type of books includes *Field Archaeology* (Oi 1966), *Archaeological Survey and Research Handbooks: Field Work* (Iwasaki et al. 1984), and *Knowledge of Excavation and Post-excavation Works* (Hattori 1985).

Among the earliest excavation manuals is Oi's *Field Archaeology* (1966). He argues that the topographic survey (*sokuryō*) is the basis for scientific excavations and key to distinguishing archaeology from treasure hunting. Certainly, topographical surveying is essential in archaeological excavation, and one could argue it was even more important in the 1960s when surveying instruments were analog-based. Surveying of topography and archaeological features was done by archaeologists who used an alidade or tape measure to draw the results of their survey with a pencil on a sheet of graph paper. Today, archaeologists often outsource the basic surveying techniques taught by Oi to electronic surveying instruments.

From the 1980s, several books on how to excavate different kinds of archaeological features were published (Iwasaki et al. 1984; Hattori 1985). They often point to the rapid increase in the number of rescue archaeological excavation projects at the time. This can be seen in the graph of Statistical Data on Buried Cultural Properties, where the number of rescue archaeological excavations jumped from 1,571 in 1976, to 5,555 in 1986, and peaked at 11,738 in 1996 (Agency for Cultural Affairs 2021: 15). Amid this rise, the authors of these manuals

realized one of the most important subjects was how to ensure the academic quality of every rescue excavation. In these books, the authors commonly assert that excavators should have a "*mondai ishiki*" (awareness of issues) as they excavate.

The foremost concern for these authors is adopting a scientific approach that adds information to excavated objects such as artifacts, animal and botanical residues, and soil. The accumulation of "information" begins with the location derived from surveying. It also includes records of how artifacts were excavated from the site, measurement drawings of artifacts made in the laboratory, as well as the appraisals of animal and botanical residues by zoo-archaeologists and archae-botanists. In *Knowledge of Excavation and Post-excavation Works* (1985) Hattori focuses on presenting the academic baseline required for each phase of archaeological excavations: preparation, initiation, and execution of the excavation, publication of the post-excavation survey report, and site utilization. In addition, the compiled volume *Archaeological Survey and Research Handbooks: Field Work* (Iwasaki et al. 1984) is notable for its patterning of archaeological sites and features. Characteristic features are presented for each of the Paleolithic, Jomon, Yayoi, and Kofun periods, with case studies described for each. Although the classification of different archaeological sites and features was made by Oi (1966), Iwasaki and his colleagues further elaborated on it.

This trend is also apparent in the *Guide to Archaeological Excavations*, which has been published several times by the Agency for Cultural Affairs (2010, 2013). The guide emphasizes the classification of archaeological features excavated in Japan based on pattern recognition, and the use of common codes for these features. For example, Akatsuka Jiro explained that he worked on the standardization of archaeological excavation information in collaboration with the Nara National Research Institute for Cultural Properties (Nabunken), which is involved in the publication of the *Guide to Archaeological Excavations*. However, he admitted that he gave up on the idea of the standardization because the "manners and norms"

(*o-sahō*) of each region remained strong (Akatsuka 2017: 211).

However, is it regional "conventions" that prevented standardization? If these conventions are derived from the characteristics of the soil rather than the stubbornness of regional archaeological practices, is standardization possible in the first place? For example, when we were about to start our research at Suwahara, Sano Takashi said to us, "The soil in this area is different from the Kanto region, so it will be difficult to find pit houses." What he meant by this was that standards for pit house excavations were based on Jomon period sites in the Kanto region, and these could not be directly adopted in Hokuto City, Yamanashi.

The Contradiction of Excavation Manuals

As mentioned above, texts on archaeological excavations are dominated by manuals, with few commentaries. However, the latter is not entirely absent. The most interesting text of this type is *Methodology, Artifacts In Situ and Distribution of Artifacts* (Doi and Kuroo 1999). Doi Yoshio and Kuroo Kazuhisa are freelance archaeologists who have joined many excavation groups (*chōsa-kai*) formed for rescue archaeological projects. The text takes the form of a conversation between Doi and Kuroo. The following remarks are notable:

> Doi: However, if the efficiency in which archaeological features is emphasized, can that truly be considered a good excavation, what does that really contribute to archaeology? I think it was necessary to have a fundamental discussion about what archaeological features are, what archaeological excavation is, and what should be recorded... That report (by the Agency for Cultural Affairs in 1998) is just aimed at the smooth coordination between public administrations and developers...
>
> Kuroo: Indeed, if the efficiency is the most important consideration in

> archaeology, and if it is sufficient to simply excavate archaeological features, then a survey that records the location of every single artifact excavated would be nonsense. (Doi and Kuroo 1999: 14)

Doi and Kuroo are directing their criticism toward a manual published by the Agency for Cultural Affairs, which discusses how to efficiently conduct a rescue archaeological project but fails to mention what the aim of such an excavation might be. With awareness of these issues, they mention that the research design of pit buildings has been the focus of excavation methodology. When Kuroo states, "a survey that records the location of every single artifact," he is pointing to an inconsistency in the messages of excavation manuals, where the best practices they prescribe are insufficient to provide meaningful results. They continue to talk about the evolution of excavation methods that led to such a policy.

They explain that efficiency was prioritized from the earliest archaeological excavations in Japan, especially at Jomon sites. Shell middens were selected for excavation to establish a chronology of Jomon pottery and to study Japanese racial origins (*Nihon jinshu-ron*), the major research themes of the time. The thick sedimentation of the shell mounds facilitated the comparison of pottery styles excavated from the deeper and shallower layers, advancing the construction of Jomon pottery chronology. Shell middens also protect bone from weathering in Japanese soils. In the early days of archaeological research, hundreds of Jomon period human bones were dug up at shell mound excavations in a short period of time. Doi and Kuroo also summarize the importance of efficiency in Jomon period settlement research.

> Doi: Even when we got out of that stage (when archaeology was focused on shell middens), it was common practice to put in trenches and expand them wherever remains were found. When you get down to it, its

> undeniable that excavation was all about digging up the artifacts left there and revealing the underground features as quickly as possible. (Doi and Kuroo 1999: 13–14)

Our Suwahara report for 2020 (Ertl and Yoshida 2021a) compared approaches to pit dwelling research at three sites in the Central Highlands. Togariishi site was identified as the starting point for pit house reconstructions, and this method of putting "in trenches and expand them when remains were found" can be seen in old photos. The same method would have been used at the Idojiri site (Fujimi, Nagano), the second of the three sites we examined. At Idojiri, the pit houses of the middle Jomon period were found to be overlapping. Taking advantage of this, the archaeologists there determined the temporal relationship of the pit dwellings and applied this relationship to the pottery assemblages excavated from the dwellings. The results crystallized in what is called the "Idojiri pottery chronology" (*Idojiri doki hennen*) (Fujimori 1965) and the names of the pottery types established in that study are still used today.

However, Doi and Kuroo criticize the practice of taking pottery assemblages excavated from a pit house as a unified "lifestyle set" (*seikatsu no setto*). When these are grouped together photographed in research reports and other publications, they present a kind of "biased view" (Doi and Kuroo 1999: 14). They point out that the starting point for this criticism was a report in the 1960s by Kobayashi Tatsuo (1965), one of Japan's most influential Jomon archaeologists today.

Jomon Settlement Theory and the New Horizon Group

Kobayashi Tatsuo explained that pottery excavated from a pit house may include both pottery from when pit houses were in use, as well as pottery discarded in a depression after the buildings fell into disuse. In this, he drew attention to the disposal patterns of pottery. Archaeologists now recognize that pottery excavated

from pit houses does not necessarily represent the "time" when a pit house was in use. Doi and Kuroo followed up on Kobayashi's concern and advocated for recording the detailed locations of pottery excavated from pit houses, calling the symposium they organized "New Horizons in Jomon Village Research." They later began to call themselves the New Horizon Group (*shin-chihei gurūpu*).

They wanted their initiative to be a counter method against the strong influence of the Jomon settlement theory that dominated before Kobayashi Tatsuo's work. This leads back to Yosukeone site, a part of Togariishi site, which is not only the starting point for the pit house reconstructions, but also for the study of Jomon settlement patterns. Mizuno Masayoshi (1969) discovered a segmented structure in the layout of pit buildings and graves at the Yosukeone site, which he thought reflected a Jomon period dichotomous social organization. Mizuno's analysis has often been criticized. Mizuno divided the pit buildings of the Yosukeone site into two periods, early and late, and pointed out that in both periods there were two groups of buildings segmented into three locations. In the following years, a more detailed Jomon pottery chronology showed that Mizuno's model was incorrect.

After Mizuno's study, however, the question of how to divide groups of pit dwellings (*jūkyo-gun*) became an issue in studies of Middle Jomon period circular settlements (*kanjō-shūraku*) across Japan. The tendency in these cases was to assign pit building groups to different periods based upon the subdivisions found in pottery chronology. Many of the analyses remained ambiguous, especially as it was unclear if the pottery excavated from the buildings indicated the time when the houses were in use or, as Kobayashi pointed out, whether the pottery was discarded in the depressions after the houses were abandoned. Based on these studies, an understanding that the Middle Jomon settlements can be divided into several periods according to the pottery chronology, and that a circular layout of pit houses can be seen in each of these periods, became established. For this reason, the prototypical Jomon settlement is still considered to have a circular layout, and these

Figure 7: 1/20 scale model of Jomon period circular settlement based on remains of Tama New Town 107 site (Hachioji, Tokyo) on display at Edo Tokyo Museum special exhibition *Jomon 2021: Jomon People Who Lived in Tokyo*. (9 November 2021)

can be seen in exhibition dioramas, drawings, and reconstructed sites (Figure 7).

The New Horizon Group criticized these typical understandings. First, they established a detailed pottery chronology with more than thirty pottery types for the Middle Jomon period, a period of approximately one thousand years. A simple calculation shows that the average timespan of one pottery type is almost thirty years, or one generation. In addition, they adopted a method of using a total station to record the location for all pottery fragments excavated from the site. They called this method the "all dots survey" (*zen-ten dotto chōsa*). The "all dots survey" was useful for seeing that pottery excavated from a pit did not necessarily indicate the "time" when a pit dwelling was used for habitation, but rather the timespan when the depression was filled after being abandoned. By subdividing the Middle Jomon period settlements to numerous times like this, they found that taking a slice of any "one moment" did not result in a clear circular layout of pit houses at these so-

called “circular settlements.”

Clearly, their pride lies in destruction of the typical image of Jomon period settlement. There is a close relationship between this desire and their research methods. Kobayashi Ken’ichi, one of the members of the New Horizon Group, wrote in the preface to *New Horizons in Jomon Studies,* “There will be no tomorrow without the complete collection of information that identifies remains that existed at the same time, which is exemplified by the all-dots survey and the recovery of minute artifacts.” (Kobayashi and Setsurumento Kenkyūkai 2008: i). The reason he emphasizes identifying “the simultaneous presence of features” is that it is the starting point for criticizing the earlier Jomon settlement studies that found “structure” in the circular layout of settlements. Kobayashi Ken’ichi named his idea as “life cycle theory” (*raifu saikuru-ron*). The lifecycle of a dwelling is the process from its design to its abandonment (after its use) and to its final state as a buried depression. The feature of his concept is to ask to which part of the “life cycle” an excavated object belongs. The “all dots survey” is particularly suitable to tracing the time between the abandonment of a building and the completion of the burial, but the question of whether it might provide information about the design or use of a pit building remains.

Kobayashi’s volume is based on a transcript of a symposium.(7) In the discussion, one focus was on how to extract more and diverse information from archaeological sites, such as how to recover micro-artifacts and residues by water

(7) Kuroo, mentioned above, also contributed his chapter to this compilation. In his chapter, Kuroo writes: “If the purpose is to use the *tebiki* (excavation guidebook) as an emphasis on preventing or deterring crude excavation that is tantamount to destruction, then I welcome *tebiki*. But if *tebiki* is to force the use of a survey manual that is consistent with and assimilates the survey methods other than those described in the *tebiki*, I firmly reject it. It is fascism and the suicide of archaeology as a discipline” (Kuroo 2008: 13). This quote demonstrates that research design driven by “*mondai ishiki*” (awareness of the issues) is antithetical to standardization.

flotation from the soil deposited in depressions after pit houses have fallen into disuse. In the discussion, the only remark on pit dwelling reconstructions was by Muramoto Shuzo:

> My main interest and concern is how to empirically reconstruct pit houses based on data from excavations. For this reason, I have been exploring whether there is any information left in the overlaying soil of pit dwelling depressions. (Kobayashi and Setsurumento Kenkyūkai 2008: 146)

Muramoto also follows the principle of "all dots survey," taking a detailed location record of excavated artifacts and residues to clarify the depositional process in the depression of the pit building. In addition, Muramoto assumes that the soil filled in the depression contains information on the roofing material, which means that this soil is considered a sample and should be collected by design.

All this leads back to our research design for excavations at Suwahara site. Our research builds off the problems that the rapid development and growth in archaeological excavation in Japan from the 1970s. The need to efficiently excavate a site brought about a contradiction, where the prescribed excavation methods often failed to account for the idiosyncrasies of a site and did not allow one to engage in challenging research questions. Following the concerns of Doi and Kuroo, we find that standardization of excavation methods has led to particular views of the Jomon period pit dwelling and settlements that are not necessarily supported on further investigation. Inspired by the work of Kobayashi Ken'ichi and Muramoto Shuzo, we have adopted the "all dots method" at Suwahara site. As we have explained, the data from most excavations is limited to the size and depth of the entire pit, and the location, diameter, and depth of the pillar holes. In principle, these data are accessed only after all the buried soil in the depression had been excavated. For us,

Figure 8: Pause in the excavation of subtrench 3 to take measurements of pottery and other remains using total station at Suwahara site. (16 September 2021)

clarifying the burial process of the depression of the pit houses should be applied to the research design for the pit house reconstructions. What results we find, however, are still to come.

Conclusion: Why won't you just let me dig?

Archaeological excavation is a lot of fun. It is also exhausting, as the heat and uncomfortable positions one digs in can take a toll. Our field season in 2021 overlapped with the hottest weeks of the year. Periodic breaks were necessary to make it through the day, and the time between breaks shortened as the day went on. Other times, we would stop to take measurements with the total station (Figure 8) or to take photographs of the trench as we reached a new depth (-10cm, -20cm). With each pause, we would stretch out and take some reprieve from the sun. The combination of the "all dots survey" method and our need for breaks made the digging go slower than hoped.

One of our new team members was Dorothy, a student whose only experience with archaeology was a semester-long class. Dorothy was most enthusiastic to dig. Every morning and after each break, she would bounce over to whichever pit or

trench we were working on and quickly get to work. As we called for everyone to break, she looked disheartened. Checking if everything was okay, she said, “yeah, I just want to dig.” More than once she imagined digging a pit two meters deep and she asked if she could dig somewhere unimpeded. When we made cut-outs at pits 1 and 3, she was vocally disappointed about how shallow they were. And once when we paused to take measurements, she sighed: “it’s just another rock, why do we need it?”

Digging subtrench 3, we would stop every ten centimeters to take photographs and bag the smaller potsherds. Checking the depth as we dug, we would prepare the trench by flattening the bottom and cleaning out the loose dirt. One time, as everyone worked in concert to carefully remove this dirt, Dorothy was busy scraping away, oblivious that she was pushing new dirt into a clean section of the trench. Told off by her neighbor, she stood up exasperated. “Why won’t you just let me dig?”

Dorothy never grasped the “all dots survey” method. Even though she knew what we were doing, she never saw how measuring the location of a stone or potsherd could be meaningful to our desire to reconstruct a pit house in the future. It was not enough to tell her that it might be useful to identify some quality about the structure of the pit house. Certainly, her frustration was due in part to a lack of inclusion. Dorothy was not privy to the long conversations between Yoshida, Ertl, Sano, Miyao, Kunugi, and the others whose ideas were incorporated into our excavation methodology. One might hope that reading this report could prevent similar frustration for any new excavation team members.

But then again, looking at the results from the two weeks we spent in the field, we share Dorothy’s frustration at the apparent lack of progress. Fieldwork during a pandemic is not easy, if for no other reason than it is difficult make plans not knowing if another state of emergency is right around the corner. Even so, reflecting upon the pace of progress during our first two field seasons, we have wondered just

how many more years it might take us.

New Horizon at Suwahara

Closing out our third year, we received interesting news from Sano Takashi. He explained that Kobayashi Ken'ichi from Chuo University was looking for an excavation that he could join with his students next summer. Of course, this is the same Kobayashi Ken'ichi who helped pioneer the "all-dots method" we have been using at Suwahara. Having worked out some details with Kobayashi in a couple of online meetings, it seems he is keen to join us in 2022. This is a relief, if for no other reason than the assistance that Kobayashi and his students will provide. As for our ethnography, we believe this collaboration will open new and exciting opportunities. What will we learn from Kobayashi and his years of excavation experience? How do we negotiate the addition of new team members and their various experiences and expectations? How will these new additions influence our latter work in laboratories or in the presentation of results? Whatever the case, we are excited to see what change lies on our new horizon.

Acknowledgements

This research was supported by JSPS Grants-in-Aid for Scientific Research (19H01394) and Keio University Matsunaga Memorial Fund for the Research of Cultural Assets (Principal Investigator, John Ertl). We thank Sano Takashi, Kunugi Tsukasa, and the other individuals from Hokuto City Archaeology Center and the Kayagatake History and Culture Institute whose assistance has made this project possible.

Bibliography

Akatsuka Jiro. 2017. An NPO center to functionalize cultural heritage (*Bunka-isan wo kinōka suru NPO sentā*), in Yoshida Yasuyuki and John Ertl (ed.) *Japanese Archaeological Dialogues: Cultural Resource Studies Seminar "Archaeology and Contemporary*

Society": 210–223. Kanazawa: Center for Cultural Resource Studies Kanazawa University.

Agency for Cultural Affairs, ed. 2010. *Guide to Archaeological Excavations* (*Hakkutsu chōsa no tebiki*). Tokyo: Doseisha.

Agency for Cultural Affairs, ed. 2013. *Guide to Archaeological Excavations: On Survey of Various Archaeological Sites* (*Hakkutsu chōsa no tebiki: kakushu iseki chōsa hen*). Tokyo: Doseisha.

Agency for Cultural Affairs, ed. 2021. *Statistics on buried cultural properties 2020* (*Maizō bunkazai kankei tōkei shiryō: Reiwa 2 nendo*). Tokyo: Bunkacho bunkazai-bu kinenbutsu-ka. Available at: https://www.bunka.go.jp/seisaku/bunkazai/shokai/pdf/r1392246_13.pdf

Aoyagi Norimasa. 2010. Concept and method of architectural reconstruction shown in the Masaru Sekino's restoration of primitive dwellings at the remains of Toro (*Sekino Masaru no Toro-iseki jūkyo fukugen-an no keiseikatei to "fukugen" no kihon hōshin*). *Journal of Architecture and Planning* 75(654): 2073–2080.

Amemiya Kunihiro. 2020. *I am a Jomon Carpenter: Building a Hut and Wooden Canoe with a Stone Axe* (*Boku ha Jōmon-daiku: sekifu de tsukuru maruki-bune to koya*). Tokyo: Heibonsha-shinsho.

Appadurai, Arjun. 2013. *The Future as Cultural Fact: Essays on the Global Condition*. New York: Verso.

Asakawa Shigeo. 1998. The Issues and Achievements of the Symposium (*Shinpojiumu no seika to kadai*), in Asakawa Shigeo (ed.) *Prehistoric Dwellings in and Around Japan: Symposium Report, Nara National Cultural Properties Research Institute* (*Senshi Nihon no jūkyo to sono shūhen: Nara kokuritsu bunkazai kenkyūjo shinpojiumu hōkoku*): 509–534. Tokyo: Doseisha.

Callon, Michel. 2004. The Role of Hybrid Communities and Socio-Technical Arrangements in the Participatory Design. *Journal of the Center for Information Studies* 5(3): 3–10.

Doi Yoshio, and Kuroo Kazuhisa. 1999. Methodology, Artifacts In Situ and Distribution of Artifacts: After the Discard Pattern Theory and the In situ Theory (*Hōhō-ron, ibutsu no shutsudo jōtai to shutsudo bunpu-ron: haiki patān-ron, gen-ichi-ron igo*). *Jomon Period* 10(3/5): 13–21.

Edgeworth, Matt, ed. 2006. *Ethnographies of Archaeological Practice: Cultural Encounter, Material Transformations.* Oxford: AltaMira Press.

Ertl, John. 2017. Archaeological diversity and Jomon dwelling reconstructions (*Kōkogaku no tayōsei to Jōmon jūkyo fukugen*), in Yoshida Yasuyuki and John Ertl (ed.) *Japanese Archaeological Dialogues: Cultural Resource Studies Seminar "Archaeology and Contemporary Society"*: 22–29. Kanazawa: Center for Cultural Resource Studies Kanazawa University.

Ertl, John. 2021. Survey of Prehistoric and Ancient Period Architectural Reconstructions in Japan. *Japanese Journal of Archaeology* 8: 157–199.

Ertl, John, and Yasuyuki Yoshida. 2020. Archaeological Craftwork: Ethnography of Archaeology at Suwahara Site, Hokuto City, Yamanashi 2019. *The Hiyoshi Review of the Humanities* 35: 135–170.

Ertl, John, and Yasuyuki Yoshida. 2021a. Archaeological Craftwork 2020: Ethnography of Archaeology at Suwahara Site, Hokuto City, Yamanashi 2020. *The Hiyoshi Review of the Humanities* 35: 37–76.

Ertl, John, and Yasuyuki Yoshida. 2021b. Approaches to experimental pit dwelling reconstructions in the Japanese Central Highlands: Architectural history, community archaeology, and ethnology. *EXARC Journal* 2021(4). Persistent Identifier: https://exarc.net/ark:/88735/10599

Ertl, John, and Yasuyuki Yoshida. 2022. Prehistoric Architectural Reconstructions in Kansai, Chugoku, and Shikoku Regions in Japan. *The Keio University Hiyoshi Review of Social Sciences* 32: 1–50.

Fujimori Eiichi, ed. 1965. *Idojiri site* (*Idojiri-iseki*). Tokyo: Chuokouronbijyutsu.

Fujimori Terunobu. 1999. *Up to the Completion of Tampopo House* (*Tanpopo-hausu no dekirumade*). Tokyo: Asahi Shimbunsha.

Fukushima Masayoshi. 2005. Excavation Research of Pit Dwellings from the Viewpoint of Reconstruction (*Fukugen-teki shiten ni yoru tateana jūkyo-ato no hakkutsu chōsa*). Bulletin of Cultural Property Center of Fukushima Prefecture 2004: 71–100.

Gatt, Caroline, and Tim Ingold. 2013. From description to correspondence: anthropology in real time. In Wendy Gunn, Ton Otto, and Rachel Charlotte Smith (ed.) *Design Anthropology: Theory and Practice*: 139–158. London: Bloomsbury.

Goodwin, Charles. 1994. Professional Vision. *American Anthropologist* 96(3): 606–633.

Hansen, Hans-Ole. 1959. *I Built a Stone Age House*. Translated by Maurice Michael. New York: The John Day Company.

Harada Mitsuo. 1984. The Thermal Environment of the Rebuilt Sunken Floor ("TATEANA") House (*Genshi-kodai jūkyo no on-netsu kankyō: suribachi-gata fukugen tateana jūkyo*). *The Educational Sciences, Journal of the Yokohama National University* 24: 209–231.

Hattori Keishi. 1985. *Knowledge of Excavation and Post-excavation Works* (*Hakkutsu to seiri no chishiki*). Tokyo: Tokyo Bijutsu.

Ichinohe Town Board of Education, ed. 2017. Goshono Site Environmental Improvement Project Report 3 (*Goshonoiseki kankyō seibi jigyō hōkoku-sho 3*). Ichinohe: Ichinohe Town Board of Education.

Ingold, Tim. 2011. *Being Alive: Essays on Movement, Knowledge and Description*. London: Routledge.

Ingold, Tim. 2012. Introduction: The perception of the user-producer. in Wendy Gunn and Jared Donovan (ed.) *Design and Anthropology*: 19–33. London: Routledge.

Iwasaki Takuya, Kikuchi Tetsuo, and Mogi Masahiro. 1984. *Archaeological Survey and Research Handbooks: Field Work* (*Kōkogaku chōsa kenkyū hando bukkusu: yagai-hen*).

Tokyo: Yuzankaku.

Kato Masahiko. 1998. Management and Utilization of Cultural Properties (Problems of Restoration) (Special Issue: Restoration of Ancient Architecture) (*Bunkazai no kanri-katsuyō (fukugen no shomondai) (tokushū: kodai-kenchiku no fukugen)*). *Journal of Architecture and Building Science* 1426: 34–35.

Kobayashi Ken'ichi, and Setsurumento Kenkyūkai, ed. 2008. *New Horizon in Jomon Studies (The Sequel): Research Design for Pit Houses and Settlements* (*Jōmon kenkyū no shin-chihei (zoku): tateana jūkyo, shūraku chōsa no risāchi dezain*). Tokyo: Rokuichi Shobo.

Kobayashi Tatsuo. 1965. Conditions of artifact disposal and related problems (the problem of pottery disposal) (*Jyūkyo-shi no maibotsu jōtai oyobi sore ni hasei suru mondai (jyūkyo haizetsu shobun no mondai)*) in Komejima Shell Midden (*Komejima Kaizuka*), Showa Town Board of Education (ed): 12–15. Showa: Showa Town Board of Education.

Kuroo Kazuhisa. 2008. Recent Trends of Jomon Settlement Studies: From Perspective of "New Horizon Style". (*Jōmon jidai shūraku kenkyū no kinkyō: "shin chihei sutairu" no shiza kara*), in Kobayashi Ken'ichi and Setsurumento Kenkyūkai (ed.), *New Horizon in Jomon Studies (The Sequel): Research Design for Pit Houses and Settlements* (*Jōmon kenkyū no shin-chihei (zoku): tateana jūkyo, shūraku chōsa no risāchi dezain*): 3–14. Tokyo: Rokuichi Shobo.

Miyazaki, Hirokzau. 2004. *The Method of Hope: Anthropology, Philosophy, and Fijian Knowledge*. Palo Alto: Stanford University Press.

Mizuno Masayoshi. 1969. Basic investigations for the reconstruction of Jomon settlement (*Jōmon jidai shūraku kenkyū he no kiso-teki sōsa*). *Cultura Antiqua* 21(3/4): 1–21.

Murphy, Keith M. 2016. Design and anthropology. *Annual Review of Anthropology* 45: 433–449.

Obayashi, Co. 1998. Reconstruction of Sannai-Maruyama site (*Sannai-Maruyama iseki no fukugen*). Tokyo: Gakuseisha.

Oi Haruo. 1966. *Field Archaeology* (*Yagai kōkogaku*). Tokyo: University of Tokyo Press.

Sato Ryuma. 2018. Chapter 4: Original Architecture (*Dai-4 shō: nemoto no kenchiku*), in The Kagawa Museum (ed.) *Portraits of Architecture in Japan : Stories of Its Protagonists* (*Nihon kenchiku no jigazō: tankyūsha-tachi no monogatari*): 59–76. Takamatsu: The Kagawa Museum.

Sekine Hideki. 2002. *Becoming Jomon! Instruction Manual for a Jomon Lifestyle* (*Jōmonjin ni naru! Jōmon-shiki seikatsu gijutsu kyōhon*).

Shanks, Michael, and Randall H. McGuire. 1996. The Craft of Archaeology. *American Antiquity* 61(1): 75–88.

Stanley-Price, Nicholas. 2009. The Reconstruction of Ruins: Principles and Practice, in Alison Richmond and Alison Bracker (ed.) *Conservation: Principles, Dilemmas and Uncomfortable Truths*: 32–46. Amsterdam: Elsevier.

Takada Kazunori. 1998. Experimental Reconstruction of Jomon Sod Roof Dwellings (*Jōmon*

tuchiyane no jikken-teki fukugen). *Jinruishi shūhō* 1998: 131–139, 145.

Takada Kazunori. 2005. *The Landscape of Jomon Homes and Villages: Goshono Archaeological Site* (*Jōmon no ie to mura no fūkei: Goshono iseki*). Tokyo: Shinsensha.

Unno Satoshi. 2017. *Reconstructing Ancient Architecture: Bridging the Past and Present* (*Ko-kenchiku wo fukugen suru: kako to genzai no kakehashi*). Tokyo: Yoshikawa Kōbunkan.

Unno Satoshi, ed. 2019. Cultural Heritage and "Reconstructionology": Theory and Practice of the Reconstruction of Archaeological Sites, Buildings, and Gardens (*Bunka-isan to "fukugen-gaku": iseki, kenchiku, teien fukugen no riron to jissen*). Tokyo: Yoshikawa Kōbunkan.