An Ethnoarchaeological Study of the Blacksmithing Technology in Cebu Island, Philippines
Adaptation is a key concept used in Cultural Anthropology to explain the adjustments and response of people to the environment they live in. It refers to the ability of a living system – organisms, populations and/or communities, in an ecological context – to regain stability under conditions of environmental change\(^{20}\).

A glimpse of the map of Philippines shows an archipelagic country. In fact this is considered to be the largest archipelagic country in the world. It has about 7,100 Islands spread over 30 million hectares of land. The size would be about that of the former West Germany before the reunification in 1989. As an archipelago sitting on a very active Pacific tectonic plate, it has about two million kilometres of sea and has its share of very active volcanoes. It is bounded to the north and West by the South China Sea, the Celebes Sea to the south and on the east by the Pacific Ocean. It has three major group of Islands: Luzon, Visayas and Mindanao. Of the three major group of islands Visayas is the smallest of the three in terms of land area. The Visayas group of islands is geographically situated in Central Philippines and comprise the islands of Cebu, Bohol, Leyte, Masbate, Negros, Panay, Samar.

### 2.1 The Geology

The Visayan group of islands sits on the Visayan Basin. It is one of the largest basins in a tectonically active archipelago. The basement of the

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Visayan Basin is comprised mainly of Cretaceous volcanic flows and intrusives and folded Cretaceous sediments.\textsuperscript{21} 

The uplifting and tilting of Cebu as a result of geological activity over time has resulted to a differentiated topography of the island. The central part of Cebu Island has very steep mountain range running in a North-South direction reaching up to 1,000 meters from sea level. As one goes southward the margin of land between the coast and the mountain is narrow. It is in the northward direction that one can find large alluvial land. The coastal part as well as a large part of the northern sector is dominated by the Carcar limestone formation which is a very porous, coralline limestone. The Carcar Limestone based on its topographic position indicates a major uplift of the island since the Pleistocene\textsuperscript{22}. In geological time this is considered as the as the most recent formation. The oldest dated sediment in Cebu is the Tuburan Limestone of the Early Cretaceous\textsuperscript{23}.

The geological information\textsuperscript{24} at hand will show that although Cebu has some ore resources such as Copper, Gold, Silver and Iron, these can only be harnessed with modern mining technology. This data has also a big impact on the livelihood of the people. One can therefore infer that since there is a lack of arable land and that the soil cover has the tendency to erode this makes the environment of Cebu very fragile. That means that the population has to adapt their livelihood to the limitations of the environment.


\textsuperscript{23} Gramann in H. Porth et. al. p.36

\textsuperscript{24} P.C. Momongan. “Mineral Resources of Cebu Province and their Industrial Uses” (Typscript) Department of Environment and Natural Resources, Region 7, Mandaue, Philippines (December 1992)
2.2 The People

In 1521, a small fleet arrive at the coast of Cebu headed by Ferdinand Magellan, a Portuguese sailor who offered his services to the King of Spain, King Phillip II. This is where the Philippines got its name given by Magellan in honour of the king of Spain. His was welcomed to the shores of Cebu by Humabon, the local chief of the barangay or community in what is today Cebu City. It must have been a warm welcome because Magellan was even allowed to plant the first Cross ever to stand on this side of the Pacific, sowing the seeds of Christianity and marked the start of Spanish colonization in the Philippines which was to last for 400 years.

Magellan wanted to extend his contact to the chief Lapu-lapu of Mactan, a neighboring island of Cebu, separated by a narrow strait. History records present that these two chiefs were in a feud so that the visit of Magellan was met with hostility and great resistance by the local people. In a battle on the shores of Mactan, Magellan was killed and this forced the retreat of the crew back to their ship.

The colonization of the Cebu and the rest of what is today the Philippines has also herald the introduction of written history. Documents on the history of the Philippines starting in the 16th century are mostly written by the clergy.

The Alzina documents describe the native population as heavyset, huskier and taller than the natives of Luzon. He noted down that those living near the coast have a darker skin than those living in the interior part. Men and women both wear earrings and those in the affluent classes wear plenty of gold. Even the teeth was adorn with gold. This will give us an idea that social stratification was in place and a defined social class structure was in place. The document also presents the reader a people which took great care in hygiene. Alcina observed that houses were built along the coast and that the entire plain back to the mountains was dotted with houses but not arranged in any particular manner.

2.3 Economy

Since the islands are separated by bodies of water, small planked-built boats\textsuperscript{26} – locally called \textit{banca, baroto} is the natural means of transportation. This supports the observation of Alzina that the local population lived along the coastal area or where navigable body of water was available. It could be inferred that these communities were also engaged in fishing, shell collecting to augment the resources that they get from farming and collecting wild fruits from the forest.

Bruce Fenner in his book\textsuperscript{27} wrote based on the accounts of various 16th century documents showed a moderately sized, busy port, where trade with China, other parts of Southeast Asia as well as a thriving inland trade. This may be due to the fact that Cebu is centrally located for the other neighboring islands to come by boat. The port is also well-sheltered from tropical storms making it possible for boats to come and go even in the typhoon season. The good traded by the Chinese include porcelain, gold, slave and food supplies like rice, millet, sugar cane, palm wine (local name, \textit{tuba}) local fruits as well as pigs raised by the Cebuanos. It could be inferred that through the Chinese the local “pandays”-blacksmiths, also a term used for carpenters- got hold of iron that they smithed to different kinds of tools.

Present-day Cebu’s economy has not departed so much from it being a center of commerce in the Visayas as well as the introduction of other modern industries and crafts.

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\begin{itemize}
  \item \textsuperscript{26} W.H. Scott. Cracks in the Parchment Curtain another Essays in Philippine History. (Quezon City, 1985).
  \item \textsuperscript{27} B. Fenner. Cebu Under the Spanish Flag,1521–1896: An Economic-Social History. University of San Carlos Publications. (Cebu, 1985).
\end{itemize}
3. An Ethnoarcheology of Blacksmith’s Shop

3.1 The Catalogue: Description of Blacksmith’s Shop

This chapter documents how a blacksmith shop is structured physically in relation to the type of work that is needed. There is a long description of the lay-out plan and the equipment used in the production of tools. A unique indigenous (folk) health belief is discussed in relation to the description of the water trough.

In the description of the specific equipment, the ethnoarcheologically significant residues associated with each as a result of smithing activity have been described and located. Related to the previous statement, this chapter also included a description of the frequency of the maintenance of equipment since this activity has also a significant contribution to the debris generated in the blacksmithing activity.

Two maps, namely that of Silva Blacksmith Shop and that of Molo Abarquez Garden Tools Supply, are included to orient the reader to the lay-out plan of a typical blacksmith workshop in Cebu. A description of structure and equipment needed in the processing of tools follows including the frequency of maintenance of equipment. By elucidating each of these, the specific function and location in the workshop can be shown.

The structure of the workshop can be defined as the arrangements of its equipment. A description on the frequency of the maintenance of these equipments is also given special attention for this activity was seen to have significant contributions to the archaeological record.

The smithing workshop is a beehive of activity. It is necessary that the equipment be within easy reach of the workers, but at the same time, the workshop should be wide enough for ease of movement and good ventilation. In the workshops studied this is achieved by housing all the primary and secondary equipment in one shed.
The working sheds of the shops studied have galvanized iron roofing approximately five (5) meters high with no enclosing walls. In lieu of a proper wall, old galvanized sheets are used to block the sparks from neighbor’s wood or bamboo fence, or the wall of a house that stands beside the workshop. This precaution is made due to the high population density in this area where houses are closely constructed to each other.

This is typical for Basak because over the years being located along the South Expressway of Cebu, the population grown into a proportion that there is a great demand for housing for particularly the migrant workers of Cebu City. Due to this “boom”, landowners in Basak and surrounding areas rented their land to houseowners, build apartments, and/or constructed new houses to have the possibility renting out rooms or beds. As a consequence Basak became thickly populated that one can hear what the neighbors are talking. So that during the fieldwork it would be interesting to note that as researcher one gets to have an intimate view of the lives of those living near the blacksmith shop. In the process of interaction, it is very difficult at times for them to understand why one would waste time to study a technology which is “kara-an” –meaning old and traditional.

In contrast, the Carcar blacksmith shop is located at the edge of field and away from the houses of the local population. The shed has a high roof and the sides are either loosely covered with used small sheets of plywood that are not suitable for construction or provisional fenced with bamboo.

The shed structure is most suitable to the nature of smithing activities, which are hot and dusty. The absence of walls allow the movement of people in the workshop to be unrestricted. Air can flow and circulate freely, cooling the workshop workers, since the roofs are high. The ashes that blow from the hearth can not disturb or suffocate the workers since they are not trapped in the workshop.

The space occupied by the workshop is proportionate to the bulk of jobs done. Comparatively speaking, Silva’s Hunting Knife Shop has the largest space, Mulo Abarquez Garden Tools Supply the smallest. The Basak workshops are located along Cebu’s South Expressway, a strategic place for selling the products while that of Carcar is slightly on the interior part of town but middlemen and merchants come to pick up the products.
3.2 Description of Study Sites

Silva’s Hunting Knife Shop
The shop is located beside the house of the owner but away from the road, the entrance of this establishment is on the West side of the workshop and used for exercising fighting cocks whose chicken coops can be seen right on the entrance. To the left is a pile of guava wood \((Psidium guajava)\) that is exclusively used for bolo handles. Beside the pile is a workspace for handle and case makers.

Within this workspace stands a portable wooden bench and wood blocks to anchor the wood when a handle or case is carved. Portability of these structures allows the workers to move anywhere within the designated area to seek shade from the intense midday sun, shelter from the rain, since they are on the edge of the covered area, or to seek a cooler breeze during humid days. The space for the handle and case makers is also shared with two stationary stands for a grinding machine. The grinding machine and the table for wood boring are under the roof and are not portable.

A passage through the main shed is from the edge of the bellows nearest the entrance up to the intersecting water canals that mark the northern boundary of the workshop. Dividing this passageway is a work table where vise grips are mounted and where hunting knife handles are attached and manual grinding is done.

The three bellows are located in the southern section. Since much fuel is needed during production, charcoal is stocked near each bellows or on its own platform made of clay and connected to the hearth for easier access. Charcoal is also stocked near the furnaces where aluminum or bronze is melted. See Figure 4a + 4b below.

In terms of upkeep, the workshop is swept every other day and water is sprinkled after workshop is swept to keep the dust under control. Sprinkling of water is also done when there is much production and much ash is deposited/accumulated that even a slight wind creates a very dusty workplace. This is done also because this workshop doubles as a sleeping area for the stay-in workers.