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Boat Building, Navigation, And West African Indigenous Knowledge

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***BOAT BUILDING, NAVIGATION, AND
WEST AFRICAN INDIGENOUS KNOWLEDGE***

**(AN EXAMINATION OF THE BOAT BUILDING
AND NAVIGATION PRACTICES OF
GHANA'S SEMI INDUSTRIAL AND ARTISANAL
CANOE FISHERMEN)**

WILL CONNELL

**SCHOOL FOR INTERNATIONAL TRAINING
INDEPENDENT STUDY PROJECT
FALL 2001**

TABLE OF CONTENTS

Acknowledgements	...	...	3
Abstract	...	...	4
Note to the Reader	...	...	4
Chapter 1: Introduction	...	...	5
Chapter 2: Methodology	...	...	9
Chapter 3: Semi-Industrial Boat Construction	...	...	13
3.1 - The Business	...	...	13
3.2 - The Process	...	...	17
3.3 - Transfer of Knowledge	...	...	21
Chapter 4: Semi-Industrial Boat Navigation	...	...	23
4.1 - Going to Sea	...	...	23
4.2 - Orientation	...	...	25
4.3 - Returning Safely to Port	...	...	26
4.4 - Migration	...	...	27
4.5 - Transfer of Knowledge	...	...	27
Chapter 5: Artisanal Canoe Construction	...	...	29
5.1 - The Business	...	...	29
5.2 - The Process	...	...	32
5.3 - Transfer of Knowledge	...	...	37
Chapter 6: Artisanal Canoe Navigation	...	...	39
6.1 - Going to Sea	...	...	39
6.2 - Orientation	...	...	41
6.3 - Returning Safety to Port	...	...	43
6.4 - Migration	...	...	44
6.5 - Transfer of Knowledge	...	...	46
Chapter 7: Conclusions and Recommendation	...	...	48
7.1 - Conclusion	48
7.2 - Recommendations for Further Study	49
Bibliography	50yc

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Furthermore, I would like to thank all the members of the various Ghana Fisheries Department that I visited from Tema, to Accra to Cape Coast, and finally to Elmina. These individuals were more than helpful and were willing to set up meetings for me as well as accompany me to those meetings, and to help with clarification and some translation. In particular, I would like to thank Mr. George H. Anyane, the Directorate of Fisheries in Accra. Mr. Emmanuel Aryee, the Regional Officer for Fisheries in Tema, and Mr. Joseph Eshun of the Elmina Fisheries Department.

Additionally, I would like to thank Mr. Dennis Percival Quaicoo who was invaluable to my research in Komenda. Here, he was willing to devote an extremely generous amount of time and energy to setting up interviews and interpreting for me throughout my stay in his hometown.

Finally, I would like to thank Dr. Naana Opoku-Agyemang and Dr. Eric Quaye for their guidance and Ebo Sam for opening his home to me during my weeklong stay in Komenda. Most of all, thanks to the fishermen and boat builders all along Ghana's coast who gave up their time to speak with me and for whom I have such great respect and admiration.

ABSTRACT

This paper focuses on the boat building and navigation practices that are currently involved in constructing and navigating both the semi-industrial and artisanal canoe vessels along Ghana's coastline. In order to make a fisherman's journey to sea physically possible, productive, and safe, there are many processes that must take place. Boat construction and navigation are two of the most important of these processes and it is in these two areas that the most changes have taken place since the first fisherman went to sea. By examining these activities in detail, and by comparing my findings with regard to the differences that exist between semi-industrial and artisanal canoe construction and navigation. I was able to make some conclusions about the use of indigenous knowledge as it relates to these two age-old fishing practices.

NOTE TO THE READER

Through this paper, the pronouns "he" and "his" are used almost exclusively. Here, it is not my intention to disclose, but rather, it is the reality that women are simply not to be found in either the boat building or fishing industries anywhere in Ghana.

CHAPTER 1

INTRODUCTION

To be a fisherman has also been simple. The fisherman must catch fish to feed his family and to sell what remains in order to purchase goods and services necessary for daily life. This is true today, and has been so since the earliest of human civilizations. There has been an evolution, however, with regard to the methods and equipment used to go to sea, to find fish, to bring them on board, and to return safely to shore. This evolution has resulted from advancements in marine technology and the mechanization of tasks previously done by hand. Along Ghana's coast, the entire spectrum of this evolution can be easily observed. It is a marvel of the human experience to see four meter dug-out canoes, powered only by the strength and skill of the fisherman alone, going out to sea alongside mammoth, fifty meter, iron, deep sea-going vessels. It is in this microcosm that I have been fortunate enough to study the boat construction and navigation practices of Ghana's coastal fisherman.

Along this coastline, there are three basic types of fishing vessels, each category considerably larger than the next, and considerably more endowed with the time and labor saving devices of modernization and the communication/information age. The largest and most "advanced," from a Western, industrially inclined point of view, would be the so-called Industrial vessels. These Boats are 35 to 50 meters in length and are usually deep-sea trawlers or inshore tuna boats. They are powered by 600 horse power engines, and in the years between 1982 and 1988, they accounted for 21 percent of the total marine fish catch along Ghana's coast. These are large, technically advanced boats, none of which are constructed within Ghana.¹

The next category in descending order of size is the semi-industrial vessel. Unlike the industrial vessels, the construction of these boats does take place within Ghana. Between 1981 and 1988, these semi-industrial vessels comprised the smallest annual fish catch percentage, at seven percent. These are wooden, 10 to 30 meter boats powered by 90 to 400 horsepower engines. They are usually crewed by either 12 to 20 men or 28 to 35 men

¹ Acquay, Herbert K. Implications of Structural Adjustment for Ghana's Marine Fisheries Policy. (Amsterdam: Elsevier Science Publishers B. V., 1992), 61.

depending on the type of fishing being done.² These boats use mechanical winch devices to reel in nets and lines and are equipped with compasses, and sometimes radios and echosounding depth gauges.³ These semi-industrial vessels are either trawlers, where hook and line are dragged behind the boat, or purse seiners, where nets are dropped in a ring which is then reeled in after the fish are trapped inside.⁴ These boats usually operate out of major ports such as Tema, Elmina, and Takoradi, but also can be used in the freshwater of the Volta Region. They usually travel an average of 20 nautical miles off the coast and are generally owned and operated exclusively by Ghanaians.⁵

The third and final category is the artisanal canoe fleet. These are the smallest of the three and usually measure 4 to 10 meters in length. In 1988, these vessels numbered over 8,000 and accounted for, by far, the largest portion of Ghana's annual fish catch between 1981 and 1988, a number that averaged 73 percent annually. These dugout canoes are crewed by between 2 to 20 people who engage in a variety of fishing techniques such as beach seining, purse, drift gillnetting, and hook and line.⁶ These vessels, which are all constructed in Ghana, operate in the inshore waters off of the Ghanaian coast but also migrate to Cote D'Ivoire and Liberia to follow the seasonal nature of their fishing industry.⁷

Given the fact that no industrial vessels are constructed in Ghana, I chose to focus my boat construction and navigation research on the semi-industrial and artisanal canoe fleets exclusively. It was here, in examining the construction and navigation methods of these two distinctly different types of vessels, that I was able to observe this evolution that has taken place in the fish industry since its origination. What became clear is that artisanal canoe construction and navigation are two practices that are very nearly indigenous to this region and very purely West African. While the semi-industrial vessels are owned, operated, and built by Ghanaians, the master boat builders are trained in Europe or America and the navigation equipment on board these boats is not made in Ghana and did not originate from

² Ibid. 61.

³ Adekpu, David. Semi-Industrial Captain, Interview: notes by author. 19 April 2001.

⁴ Acquay, Herbert K. Implications of Structural Adjustment for Ghana's Marine Fisheries Policy (Amsterdam: Elsevier Science Publishers B.V., 1992), 61.

⁵ Adzei, Sam. Acting Manager of Ghana Boat Yard Company Ltd. Interview notes by author. 18 April 2001.

⁶ Acquay, Herbert K. Implications of Structural Adjustment for Ghana's Marine Fisheries Policy (Amsterdam: Elsevier Science Publishers B.V., 1992), 60.

⁷ Kuma, Nana Kwame. Chief of Fishermen: Komenda. Interview: Notes by author. 28 April 2001.

Ghanaian designs.⁸ The artisanal fleet, on the other hand, is constructed in Ghana by Ghanaians who are using age-old West African techniques to build their boats. The only real Western influence in their work appears in the use of the chainsaw, but besides the use of this time saving devise, their techniques have remained the same for centuries.⁹ With regard to artisanal navigation, the outboard motor has replaced sail and paddle on some of the larger canoes, but their means of knowing where they are, where they have come from, and where they are going out at sea, in all types of weather, has not changed since time immemorial.¹⁰ All too often, I feel that technological advances are heralded for their ingenuity and accuracy. However, throughout the course of my research, I came to realize the inherent genius in the knowledge possessed by the men and who build and navigate the artisanal canoe. What follows, is an examination of first semi-industrial boat construction and navigation, followed by artisanal canoe construction and navigation. It is my hope that this research may work to reveal the beauty and simplicity of West Africa and indigenous knowledge in relation to these two age-old fishing related practices.

⁸ Adepui, David. Semi-Industrial Captain. Interview: Notes by author. 19 April 2001.

⁹ Kofi, Canoe Carver. Interview: Notes by author. 1 May 2001.

¹⁰ Twi, Kwame. Large Artisanal Canoe Fisherman. Interview: Notes by Author. 29 April 2001.

CHAPTER 2

METHODOLOGY

In order to obtain the necessary information regarding both semi-industrial and artisanal boat construction and navigation, it was of utmost importance that I speak with as many knowledgeable people on the subject as possible. Therefore, my most primary research tool was the interview. In order to set up interview relating to semi-industrial boat construction and navigation, members of the Ghana Department of Fisheries in Accra, Tema, Cape Coast, and Elmina, were invaluable. It was at the Accra Department that I began my research and I was then directed to the subsidiary department in Tema. Here, I was able to speak with boat builders and those who knew how these vessels re navigated at sea. I then continued on to the Cape Coast Department where I was again referred to a subsidiary department at Elmina. Through interviews arranged by these various departments, I was able to speak director with master boat builders and individual knowledgeable on the subject of navigation. In gathering information regarding artisanal canoe construction, the Tema Department of Fisheries was also helpful in setting up a meeting with representatives from the Canoe Carvers Association based in the small, nearby town of Pram. However, the bulk of my artisanal interview information came during my stay in Komenda. Here, Dennis Quaicoe, a student who had just finished Senior Secondary School, was invaluable in knowing where to find the people I want to talk to and once the interviews were arranged, he also acted as my interpreter.

Before I began my research, I took some time to brainstorm some possible questions for the interviews I was soon to begin. These questions are divided into boat building related questions and boat navigation relation questions, but they remain the same regardless of whether semi-industrial boats re being discussed. Below is a list of these questions:

BOAT BUILDING

- *Raw materials:* What kinds and from where? How are they purchased? What kinds of timber are used and from where? Unlimited supply?
- *Construction:* By whom? Where it takes place? The tools that are used? Time frame? Plans used? Problems associated with? Dimension?

- *Transfer of knowledge:* Who's knowledgeable? How are they trained? How is knowledge passed down? Apprenticeship? Specialization? Division of labor?
- *Finished product:* Selling process? Boat launching? Seaworthiness?
- *The overall process:* Interesting things to note? Unique styles, decorations, construction techniques?

NATIVATION

- *Landmarks:* The sky? The shore? Offshore landmarks?
- *Prevailing currents/winds:* From where? Direction of? Difficulties surrounding?
- *Hazards:* Reefs? Riptides? Sea creatures? Rock outcroppings?
- *Weather:* Influence of? Fog? Storms (intensity and warning signs)? Most optimal weather?
- *Sources of power:* Sails, paddles, motors (inboard and outboard)? Mileage? Range of movement? Steering?
- *Transfer of knowledge:* Who's knowledgeable? Training (formal and informal)? Importance of experience?
- *Migration:* By whom? Scale? Migratory fish patterns? The journey?
- *The overall process:* Interesting things to note?

Observation was another key tool that I used during the research process. With regard to boat construction, it was critical that I see how things were actually constructed rather than having someone simply describe the process to me. While studying semi-industrial boat building, I recorded my observation at both the Ghana Boat Yard Company Limited in Tema and at the Modern Boat Yard in Elmina on 18 April 2001 and 2 April 2001 respectively. At these two sites, I observed the tools being used as well as the general condition of the workspace. My experience in woodworking and metal works helped me to identify these tools and to know how the workspace was being used. While studying artisanal boat construction, I recorded my observations of a site in the forest region west of Obuasi where a smaller canoe was being built. This occurred on 1 May 2001 and here, I got hands on experience as to how the necessary tools are used in construction.0

With regard to navigation, I also used the tool of observation. I was unable to arrange a trip to sea on a semi-industrial vessel but I did go to sea on one of the larger artisanal canoes out of Komenda, which occurred on 30 April 2001. Here again, I got some hands on experience as to how this type of fisherman navigates his boat at sea and recorded my observations of the process.

Written sources were of secondary importance to my research. I did, however, use a few publications given to me by Professor Blay. These written sources gave me some background information on the fishing industry in general and the semi-industrial fishing industry in particular.

With regard to the limitations of my research, the lack of previous study on the subject proved to be somewhat of a stumbling block. In addition, there were a few written sources at my disposal, which could have been helpful especially if they had been in the form of plans for boat construction or nautical charts of Ghana's coast. I did find one plan for a semi-industrial vessel but it was very hard to come by. Another limitation would simply be that of the time constraints. To begin, the first weekend was taken over by the Easter Holiday, which meant that all offices at any of the Department of Fisheries were closed. Therefore, I lost the first four days of potential research time to this holiday. Additionally, I think more time only would have worked to enrich my studies, but I acknowledge the time constraints of the program and therefore know that this limitation could not have been helped.

Concerning my own methodological limitations, I think I should have left more time throughout the research process for reflection. It was not until the latter stages of this process that I began to try and form a cohesive whole out of the work that I was doing.

CHAPTER 3

SEMI-INDUSTRIAL BOAT CONSTRUCTION

To begin this compare-contrast examination of semi-industrial and artisanal boat construction and navigation, I will first address the semi-industrial vessel. In this chapter, I will discuss the semi-industrial boat building business followed by the actual construction process of this type of vessel. I will conclude this chapter by discussing transfer of knowledge as it relates to semi-industrial boat construction.

3.1 – THE BUSINESS

The semi-industrial fisherman's boat must be made large enough and seaworthy enough to travel efficiently to the offshore areas of Ghana's coast where the largest amount of the desired fish can be found. Here, holding capacity is key and these boats must be able to catch fish quickly and move without delay to the next optimal fishing ground. The design of these boats, therefore, must allow for volume and speed but must also remain cost effective. Wood is therefore the best choice of materials for construction and it is in established boatyards where boats can be built expediently where all necessary tools are readily available.¹ At the height of the semi-industrial fishing industry, there were semi-industrial boat construction yards spread out in several coastal ports stretching from Tema to Takoradi. However, as Mr. Adjei Lomo, the Deputy Director for the Accra Fisheries Department explained to me in an interview that occurred on 17 April 2001, the semi-industrial boat building industry has suffered a collapse since the late 1980s.²

As Mr. Lomo pointed out, throughout the 1960s, 1970s and 1980s, there were four boatyards operating in Tema alone. The Quansah, Yatel, Volgate and HIHOC boat building companies all were involved in semi-industrial boat construction to service the needs of fishermen living in the greater Tema area.³ Today, out of these four, only the Volgate Boat Building Works Ltd. continues to construct new vessels while the GIHOC Boatyard has

¹ Amoah, Kofi and Thompson Anthony, Master Boat Builders: Modern Boat Builders in Elmina, Interview: Notes by author. 24 April 2001.

² Lomo, Adjei, Deputy Director for the Accra Fisheries Department, Interview: Notes by author. 17 April 2001.

³ Ibid. Agbenasu, Timothy K., Managing Director of Volgate Boat Building Works Ltd., Tema: Interview: Notes by author. 19 April 2001.

reduced to only performing maintenance and repainting services; the other two have ceased operation altogether.⁴ The Modern Boat Builders Boatyard in Elmina has also scaled down production, but like Voltagate, they continue to construct new vessels.⁵

It would be difficult to underestimate the magnitude of this semi-industrial boat building collapse. In my observations of GIHOC, which stands for Ghana Industrial Holding Corporation and which has now been renamed Ghana Boatyard Company Limited since production ceased, I was overwhelmed by the feeling of decay that the place seemed to exude. Only one boat was receiving any attention as several men worked to repaint its hull as it stood in dry-dock. Other boats, what must have once been beautiful 50 footers, lay all around in waste, stripped of their decks and planking and left to rot in the sun. The workspaces were unkempt and cluttered, and several broken machines were left to collect dust after they stopped working and no money was put into their repair. Besides the few men painting, there were at least 20 others lying around idle, sleeping in doorways or on benches or talking amongst themselves. Overall, I got more an impression of a graveyard, from what must have been, at one time, a vibrant and productive boatyard.⁶

In speaking with Mr. Emmanuel Aryee, the Regional Development Officer for Fisheries, Greater Accra Region, a conversation that took place on 18 April 2001 outside the GIHOC boatyard, I was informed that the collapse in the semi-industrial boat building industry was directly related to the reduction in the size of Ghana's fisheries with particular emphasis placed on the disappearance of the Trigger Fish. As Mr. Aryee explained, during the late 1980s, this type of fish almost completely disappeared from Ghana's coastal waters. Every once in a while, there will be a sighting of the species (scientific name *Balistes capriscus*) but the potential for commercial exploitation has been lost completely.⁷ In a 19 April 2001 interview with Mr. Timothy K. Agbemasu, the Managing Director of Voltagate, I learned of some of the causes for the disappearance of the Trigger Fish and others, a disappearance that led to the decline in the semi-industrial fishing industry, which inevitable

⁴ Agbenasu, Timothy K., Managing Director of Voltagate Boat Building Works Ltd., Tema: Interview: Notes by author. 19 April 2001.

⁵ Modern Boat Builders: Elmina. Observations: Notes by author, 25 April 2001.

⁶ Ghana Boat Yard Company Limited, Tema: Observations: Notes by author. 18 April 2001.

⁷ Aryee, Emmanuel, Regional Development Officer for Fisheries, Greater Accra Region (Tema). Interview: Notes by author. 18 April 2001.

affected the construction business for these vessels. As Mr. Agbemasu described, it was over-fishing but more importantly improper methods of fishing that led to the decline in the population of these fishes. By wrong methods, it is meant that purse-seining fishermen were using improperly designed nets to catch these fish. Here, adults and juveniles were caught together, thereby preventing the juveniles from reaching production maturity where they were needed to replenish the stock.⁸ In speaking with Professor Blay of the U.C.C. Zoology Department, I learned that reef destruction by trawling vessels dragging their lines at improper depths, also contributed to the demise of the Trigger Fish. As he pointed out, these fish are bottom feeders and when the reefs were destroyed, their food source was depleted.⁹

In any event, the Ghana Fisheries Department was doing a poor job to enforce laws that were already in place, such as P.N.D.C. Fisheries Law 256 that governs appropriate net specifications, that if enforced, could have prevented, such a drastic decline. If this decline in Trigger Fish population had been prevented, the semi – industrial fishing industry might still be thriving and the boat building industry for these vessels would probably not have suffered such a rapid downsizing.¹⁰ In the one 1981 publication of the report for the triennium, 1977-1979, on the fishery Research Unit a semi-annual publication put out by the Tema Fisheries Department, it is evident that this decline in the Trigger Fish population was not going unnoticed. In the report, it states that: “It appears that, recently, *B. capricus* is decreasing in abundance. During the cold season, the species is low in the catches of coastal trawlers and seiners”¹¹ What this report could not predict, is that within ten years, this species would no longer be able to be found along Ghana’s coast.

However, the semi-industrial fishing industry still continues to operate with the only change being in lower productivity and a negative growth rate. This negative growth rate means that there is little demand for new vessels because there are very few new entrants into the industry. Despite this stunting of the semi-industrial boat building industry, both

⁸ Agbemasu, Timothy K., Managing Director of Voltagate Boat Building Works Ltd., Tema: Interview: Notes by author. 19 April 2001.

⁹ Blay, John, Professor, University of Cape Coast, Zoology Department. Interview: Notes by author. 23 April 2001.

¹⁰ Agbemasu, Timothy K., Managing Director of Voltagate Boat Building Works Ltd., Tema: Interview: Notes by author. 19 April 2001.

¹¹ Mensah, M.A. Report for the Triennium, 1977-1979, on the Fishery Research Unit, Tema, (Ghana: Fishery Research Unit, 1981) 6.

Voltagate in Tema and Modern Boat Builders in Elmina are still producing new boats and there were also plenty of knowledgeable individuals on the subject to make research into construction of this type of vessel possible. What follows is an examination of the process by which a semi-industrial boat is constructed. I compiled this information about the process through four interviews: the first on 18 April 2001 with Sam Adzei, the acting Manager of Ghana Boatyard Company Ltd. In Tema (what was once GIHOC), the second on 19 April 2001 with Timothy K. Agbemasu, Managing Director of Voltagate Boat Building Works Ltd. In Tema, and the last two occurred on 24 and 25 April 2001, both with Kofi Amoah and Thompson Anthony, master boat builders at Modern Boat Builders in Elmina. I also used my observation taken of Ghana Boat Yard Company and Modern Boat Builders, which occurred on 18th April and 25 April 2001 respectively.

3.2 – THE PROCESS

The first step in the construction of a semi-industrial vessel is for the fisherman or group of fishermen to approach the boat builders at the boatyard. This person or group must do so either with a plan already drawn up, or if this individual or group does not have an exact design in mind, the desired specifications must be given so that the boat builders can draw the plans themselves.¹² The three main types of design for the semi-industrial fleet are flat-bottomed boats (usually fresh water vessels), boats with a “V” shaped hull, and those boats designed with “U” shaped or round hull.¹³ Both the “V” and the “U” shaped boats are designed for ocean travel but the “V” shaped boats are slightly easier to construct because of the ribs or frames of the craft do not have to be bent or curved, a process that is difficult but essential to “U” shaped hull construction.¹⁴ At Ghana Boatyard Company Ltd., there is a special room called the “mouldloft” where the design is transferred onto pieces of plywood which are then cut to scale, giving the boat builders a physical model with which to work.¹⁵

¹² Adzei, Sam. Acting Manager of Ghana Boat Yard Company Ltd. Interview: Notes by author. 18 April 2001.

¹³ Agbenasu, Timothy K., Managing Director of Voltagate Boat Building Works Ltd., Tema: Interview: Notes by author. 19 April 2001.

¹⁴ Amoah, Kofi and Thompson Anthony. Master Boat Builders: Modern Boat Builders in Elmina, Interview: Notes by author. 24 April 2001.

¹⁵ Adzei, Sam. Acting Manager of Ghana Boat Yard Company Ltd. Interview: Notes by author. 18 April 2001.

Once the plan has been drafted, it is then necessary for the boatyard to acquire the necessary lumber for the project. All this lumber must come from the forest, and usually it comes from the Asante and Brong Ahafo Regions. The boatyard must purchase this lumber in bulk from various lumber mills located in these forest regions. Then when the lumber has been brought to the yard in the form of large beams, the builders are then responsible for cutting these beams to size.¹⁶ The main types of wood used by all three of the operational boatyards I visited were Kusia, and Odum. Kusia is used for the keel and the lower section of the planking. The wood is highly resistant to seawater damage and so is used for these parts of the hull, which are below the waterline. Odum is used for some planking (above the waterline only) and for the ribs or frames and the deck. This wood is not as resistant to seawater damage and so is kept away from direct contact with the ocean. It is however, more malleable and so can be bent for use as the ribs or frames of a “U” shaped hull that requires this bending.¹⁷ Also, for the deck, Ghana Boatyard uses another type of wood, Dahoma, which they feel has a special resistance to sun and rain damage: the deck being the area which suffers the most exposure to these potentially damaging elements. For the cabin, marine plywood is used which has been treated to protect it against sun and rain damage as well. Once these materials have been collected and cut to fit, construction can begin.¹⁸

Construction begins with the boat being built in dry-dock and usually follows a bottom up pattern. The keel and “backbone” of the boat are constructed first. To this, the ribs or frames are fixed along with the gunwales. If it is a “U” shaped hull, the frames must be bent after they sit in a machine called a boiler where hot water is used to make the wood pliable and ready for the bending process. To complete the frame, 4 to 12 inch lag-bolts are used at every joint, making a very sturdy structure indeed. Once the frame has been constructed, the planks are added to complete the hull. These planks are fixed to the hull using carpentry screws of varying sizes and a hand-held power drill. Now that the body of the hull has been completed, the decking is added, on top of which the cabin will be constructed.¹⁹

¹⁶ Ibid.

¹⁷ Amoah, Kofi and Thompson Anthony. *Master Boat Builders: Modern Boat Builders in Elmina*. Interview: Notes by author. 24 April 2001.

¹⁸ Adzei, Sam. Acting Manager of Ghana Boat Yard Company Ltd. Interview: Notes by author. 18 April 2001.

¹⁹ Ibid.

At this point, most of the woodwork has been finished and now the builders can turn to the internal workings of the craft. A hole is bored through the stern-most section of the keel (the “shaftlodge” portion of the keel) where the “tube” or engine shaft will be installed connecting the propeller to the inboard engine. Hatches are prepared and the engine seat is constructed, upon which, the engine will be installed. Finally, the engine and fuel wells are brought in and the winch is secured to the deck. Now that the internal workings of the boat are ready, the boat is ready to be caulked and painted. Anti-fouling paint, which usually comes in red and green, is used for below the waterline. This is a very resilient paint and protects against seawater and crustacean (i.e. barnacle) damage. The fisherman can then have his choice of paint colors for everything above the waterline including the upper hull, deck and cabin. Once the compass, and any other piece of electrical equipment, has been installed, the boat is ready to be launched.²⁰

However, before the construction process is fully complete, payment must take place. According to Mr. Adzei of Ghana Boatyard Company Ltd., most fishermen must get considerable loans from a bank to make payment for their boat.²¹ Mr. Agbemasu of Voltagate quoted the total price for a 13-meter “U” shaped boat at 220 million Cedis. The hull, deck, and cabin comprise the greatest portion of the cost at around 110 million.²² The engine and winch are also very expensive, each costing around 40 million and both having to be imported from abroad.²³ When the costs of minor carpentry, engine installation, and other equipment installation are added, the total price is achieved. Total construction time for one of these 13-meter semi-industrial boats is six to eight months, on average. However, lack of availability of funds and materials, especially concerning the engine, can postpone the process indefinitely.²⁴

To complete the construction process, each of the three boatyards I visited used a similar set of hand tools to get the job done, including: hammers, handsaws, hand drills,

²⁰ Ibid.

²¹ Ibid.

²² Agbenasu, Timothy K., Managing Director of Voltagate Boat Building Works Ltd., Tema: Interview: Notes by author. 19 April 2001.

²³ Amoah, Kofi and Thompson Anthony. Master Boat Builders: Modern Boat Builders in Elmina. Follow-up Interview: Notes by author./ 25 April 2001.

²⁴ Adzei, Sam. Acting Manager of Ghana Boat Yard Company Ltd. Interview: Notes by author. 18 April 2001.

planes, clamps, mortises, and measuring tools. However, the use of mechanical cutting and drilling tools, such as table saws, ripping saws, and drill presses, was absent from Modern Boat Builders. Here, all cutting, even the planking and decking, is done by hand. An impressive feat considering the amount of wood that needs to be cut to size to complete these two parts of the construction process.²⁵

3.3 – TRANSFER OF KNOWLEDGE

During the course of my research on semi-industrial boat construction, I realized that the entire body of knowledge concerning the trade is not indigenous to West Africa. Indeed, as Mr. Lomo of the Accra Department of Fisheries said, all boat builders of semi-industrial vessels are trained in Europe or America. Some assistants of master boat builders may only have some carpentry training that was gained solely in Ghana, but the men who really have the know-how to build these boats had to travel outside the continent to gain this knowledge²⁶. Mr. Timothy Agbemasu, the Managing Director of Voltagate, received all his studies at his training in England. In the early 1960's he traveled to England and began his studies at the Westpark College of Further Education at their Boat Building School located in Sunderland near Newcastle. He studied boat design and construction techniques for two years before returning to Ghana where he got a job as the Production Manager at GIHOC. He worked there until 1975 when he left to start his own business, Voltagate Boat Building Works Ltd., which is also in Tema.²⁷ Mr. Agbemasu's educational and professional career is a good example of how Ghana semi-industrial boat builders are typically trained.

In addition, even when these builders return to Ghana as master craftsmen having all the necessary knowledge to construct these vessels, they bring with them plans and designs for boats that were originally drafted by Europeans or Americans. There is no attempt to use their knowledge to create new designs specifically adapted to the Ghanaian coastline.²⁸ The two master boat builders, Mr. Amoah and Mr. Anthony of Modern Boat Builders, rely very

²⁵ Modern Boat Builders: Elmina. Observations: Notes by author. 25 April 2001.

²⁶ Lomo, Adjei. Deputy Director for the Accra Fisheries Department. Interview: 17 April 2001.

²⁷ Agbenasu, Timothy K., Managing Director of Voltagate Boat Building Works Ltd., Tema: Interview: Notes by author. 19 April 2001.

²⁸ Amoah, Kofi and Thompson Anthony. Master Boat Builders: Modern Boat Builders in Elmina. Interview: notes by author. 24 April 2001.

heavily on the work of an Italian boat designer named J. O. Fiasen for the construction of one of their most common constructed boats. The design is for a 13 meter “V” shaped vessel called a Chine Boat. These builders have several copies of Fiasen’s design for this boat and rely very heavily on them whenever an order is placed for this type of vessel.²⁹ Given this fact, and given the aforementioned training process that these builders undergo, it is clear that Western influence is very prevalent in all aspects of semi-industrial boat construction. Once this body of Western knowledge has been passed to these Ghanaian builders, it remains unchanged from its original form despite the difference in setting under which the knowledge is being exercised.

²⁹ Ibid.

CHAPTER 4

SEMI-INDUSTRIAL NAVIGATION

Now that the construction process for the semi-industrial vessel has been discussed, I will now turn to the process by which this type of fisherman navigates his boat at sea. This chapter also includes a section on the potential for migration of the semi-industrial vessel. I will conclude with an examination of how the transfer of knowledge takes place with regard to semi-industrial boat navigation.

4.1 – GOING TO SEA

In semi-industrial fisherman, once he has obtained the proper vessel, will make his home near one of the major port cities along Ghana's coastline, such as Tema or Takoradi. Here, the fisherman will find plenty of wharf space available for the mooring of his boat. He will leave this homeport around 3:00 or 4:00 in the morning and will stay at sea all through these early morning hours and will return home in the afternoon to sell his catch at market. When the fisherman sets out in the morning, he does so with more than enough fuel for the entire day. He will usually bring along 1 and 2 drums of fuel with each drum holding approximately 50 gallons. Depending on the engine type, he will either use gasoline or diesel fuel and his quantity will allow him to travel more than 50 nautical miles out to sea in search of fish and will allow him to return shore with plenty of fuel to spare.¹ As mentioned in the introduction, these fishermen use 90 to 400 horsepower inboard engines, which allow them a considerable range of movement.² However, these fishermen usually stay within 12 to 15 nautical miles from shore because it is in this range that they find the most optimal fishing ground.³

After the semi-industrial fishermen have left port, the next step is simple: they have to find the fish. They will usually take a southerly course and will begin looking for surface signs of fish within one and a half to two hours of leaving port. By surface signs, it is meant

¹ Adekpu, David. Semi-Industrial Captain. Interview: Notes by author. 19 April 2001.

² Acquay, Herbert K. Implications of Structural Adjustment for Ghana's Marine Fisheries Policy. (Amsterdam: Elsevier Science Publishers B.V., 1992), 61.

³ Adekpu, David. Semi-Industrial Captain. Interview: Notes by author. 19 April 2001.

that the fishermen watch for disturbances made on the surface of the water that are caused by the movement of the fish as they travel in schools. It looks almost as though rain is falling on a small, somewhat circular patch on the ocean as the fish play and feed just below the surface. What is interesting is that most of these fishermen habitually violate an international boating law by turning off their navigation lights. This violation occurs at night when the fishermen are concerned that their lights will scare the fish away. They do turn them on periodically to check for movement, but for most of the early morning hours, they travel in darkness. The law that they break is an International Maritime Organization (IMO) law that requires that all vessels of this size must keep their navigation lights on at all times. When they turn these off, they run the risk of collision with another vessel, and it is especially dangerous when they come in the path of a huge and poorly maneuvered tankers and industrial vessels. Despite this risk, they continue to violate this international law and usually, they are able to go about their job without incident. After all, it is only a problem during the morning hours before the sun rises. When it does get light, they continue to watch for signs of fish, and when they see them, they cast their nets or drop their hook and line rigs hoping as always to make a good catch.⁴

4.2 - ORIENTATION

The primary means that these fishermen use to orient themselves at sea is the compass. Every one of these vessels has one on board and the captain, or “coswain,” and several of the senior crewmembers are trained to chart a course using this simple but essential device. Using the compass, they always know in which direction their homeport lies, as well as the direction they are currently traveling.⁵ Some of the wealthier captains also have echo sounding devices on board which display the exact depth to the ocean floor for the boats current position. Only slightly more common is the radio, which some captains have been able to purchase and are useful in case of an emergency.⁶

Besides these pieces of technical equipment, the fishermen also use prevailing winds and currents to orient themselves. The Gulf of Guinea Current runs to a West and East

⁴ Ibid.

⁵ Ibid.

⁶ Adzei, Sam. Acting Manager of Ghana Boat Yard Company Ltd. Interview: Notes by author. 18 April 2001.

course and the fishermen can usually feel its effect about 5 to 7 nautical miles from shore. With regard to prevailing winds, it is most common that the wind is blowing out of the West. This Westerly is a very favorable wind in that it is usually not destructive or violent. Winds out of the East, on the other hand, are infrequent but usually mean a storm is on the way. Sure enough, the afternoon after my interview with Captain David Adekpui in Tema, I was traveling back to Accra when a storm rolled in and it had come out of the East. A Northerly or Southerly wind is infrequent, but a wind out of the North is more likely during the Harmattan while a wind out of the South is more likely during the rainy season⁷

These semi-industrial fishermen also use some man-made landmarks to orient themselves by which are most common in the form of lighthouses and offshore oil exploration rigs. Lighthouses can be found in several locations along Ghana's coastline and all are staffed and maintained by the Ghana Ports and Harbors Authority (GPHA). The most reliable of the lighthouses, are those that run on generators and these can be found in Takoradi and Axim in Western Region, Tema Newtown and Accra Jamestown in Greater Accra Region, and finally Cape St. Paul in Volta Region. The offshore oil exploration rigs are two, semi-permanent structures located about 10 nautical miles off of the Saltpond shoreline and the Tano River Basin shoreline respectively. Both the oil rigs, as well as the lighthouses are very helpful indeed to the fishermen as they try and orient themselves at sea or while trying to return to port whether it is light out or not.⁸

4.3 – RETURNING SAFELY TO PORT

When the weather is good and the fisherman have caught all the fish they can and are ready to return home, they must simply chart their compass course towards their port of call and get underway. They do need to be careful, however, of offshore hazards such as reefs and rock outcroppings. As Captain Adekpui said, there are wreck up and down Ghana's coast that resulted from a boat running across just this type of hazard. Unfortunately, the GPHA has made no attempt to chart or mark these problem areas and the fishermen must rely on their own knowledge as to the whereabouts of these rocks and reefs so that they may return

⁷ Adekpui, David. Semi-Industrial Captain. Interview: Notes by author. 19 April 2001.

⁸ Ibid.

safely to port. In fact, there are no charts of the Ghanaian coastal waters that have been drafted by Ghanaians. These charts can be found in Europe but they are very expensive and only Ghana's industrial fleet can afford to carry them onboard.⁹

When the weather does turn sour, the semi-industrial fisherman must determine the severity of the storm. If the storm is not too fierce or if he is close enough to port, he will try to return home despite the unfavorable weather. However, if the storm is severe enough, he will have his crew drop the sea anchor overboard and will wait the storm is out at sea before returning home. Additionally, these fishermen pay very attention to the weather before they even leave port. If the weather looks ominous, they will not go to sea that morning. Also, they listen very carefully to radio weather forecasts on the FM for any sign of a storm on the way. Therefore, usually, they can avoid the problem of being caught out at sea during a storm altogether.¹⁰

4.4 – MIGRATION

The semi-industrial vessel, given its size, seaworthiness, powerful inboard engine, and fuel capacity, is very capable of traveling to Cote D'Ivoire or Liberia. However, the semi-industrial fisherman has no need make this journey. The fish that this type of fisherman seeks to catch can always be found in appropriate quantities and therefore, he does not need to leave Ghana's coastline at anytime during the year.¹¹

The knowledge necessary to operate and navigate a semi-industrial vessel comes mostly with experience under the tutelage of an older fisherman. Quite often, fishing in the semi-industry stays within families. Here, a young man is brought up to work on his father or uncle's boat alongside his brother and or cousins. Given this setup, a young fisherman can learn from the captain and senior member of the crew about weather; landmarks, winds and currents, and potentially hazardous areas. However, what is most important is that this individual learns how to read and chart a compass course. So valuable is tool to the navigation of a semi-industrial vessel that these skills are essential if one wishes to purchase

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

and become the captain of his own boat. It is important to note for the purpose of this paper, that the compass is not an indigenous tool to Ghana. Therefore it was once necessary for the early Ghanaian navigators of these boats to learn from Western sources about the skill of compass orienteering.¹²

¹² Ibid.

CHAPTER 5

ARTISANAL CANOE CONSTRUCTION

Now that the processes involved in semi-industrial boat construction and navigation have been addressed, I will now turn my focus to the uniquely West African artisanal canoe. I will begin by discussing the artisanal canoe construction business, followed by the actual construction process, and finally, I will discuss the transfer of knowledge that relates to this construction process.

5.1 – THE BUSINESS

It is the simplicity of design that is the hallmark of the artisanal canoe. These boats may vary by size in order to service the individual needs of the different types of artisanal fishermen, but essentially, every one of these boats follows the same design. This design begins with a dugout hull, to which, planks are added to increase the freeboard for planking about the waterline) of the vessel. Here then, are the two different processes that go into creating an artisanal canoe: the digging out phase, and the finishing off or plank addition phase. To complete the first phase, work is done in the forest regions, where the appropriate tree is felled, by a selected group of specialized carpenters called canoe carvers. With regard to the second phase, which takes place when the boat has been transported to the coast in its rough form, the work can be done by these carvers but also can be done by the fishermen themselves if they have the necessary knowledge and tools. When these two portions of the construction process have been completed, the fisherman is left with a relatively inexpensive but totally seaworthy vessel. A vessel that cannot only operate safely and effectively along Ghana's coast, but can also bring the fisherman and his crew to as far as Liberia where he may need to travel in order to follow the seasonal nature of his business.¹

About three years ago, the Ghanaian government became concerned about conservation issues surrounding the exploitation of the Wawa tree, the tree used exclusively for the construction of these vessels² (Scientific name *Triplochiton scleroxylon*³). All

¹ Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

² Ibid.

artisanal canoes are made from this tree's wood and the government wanted to put in place regulations so that they could keep track of the number of these trees being cut down, and also to prevent these trees from being used for purposes other than canoe construction. To accomplish this goal, the government chose to recognize an organization called the Canoe Carvers Association (CCA) and to require that all fishermen needing a wawa tree to be cut down, must go through this organization. Here, the government required that all fishermen submit an allocation permit request form to one of the three CCA branches located in Pram in Greater Accra Region, Essarkyir in Central Region and Sefwi in Western Region. The CCA was then in turn required to turn all these request forms into the nearest Forest Department Office for review. The Forestry Department reviews these forms and determines the actual need of the fisherman as well as the exact purpose for which the boat will be used. As long as the application is a genuine fisherman, and as long as he pays the 200,000 Cedis permit application fee, it is almost assured that he will be granted approval.⁴

Once the fisherman gets approval through the CCA from the Forestry Department, he can then arrange with a particular carver from the CCA to begin construction of the boat. It is the carver who will cut down the tree and begin construction of the first phase, but it is the fisherman's responsibility to arrange transport of the roughly completed boat to the cost where the second phase of construction will take place. If the fisherman is qualified, he may choose to complete this second phase of construction himself, otherwise he will hire the carver to do this work for him.⁵

What became clear during my conversation with one carver who operates near Obuasi, is that while this allocation process may look reasonable on paper, it is actually not being enforced adequately and trees are being cut down without the governments notice or consent. This man, I will refer to him as Kofi to protect his anonymity, is not a registered canoe carver with the CCA. Therefore, he does not require an allocation permit from the fishermen who approach him and is therefore operating illegally. Kofi has chosen not to join

³ Aryee, Emmanuel. Regional Development Officer for Fisheries: Greater Accra Region (Tema). Interview: Notes by author. 18 April 2001.

⁴ Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

⁵ Ibid.

the CCA for several reasons. The first is that to do so would cost money.⁶ To register for membership costs 500,000 Cedis and beyond this, monthly dues of 5,000 Cedis per month must be paid to the association.⁷ Another reason is that the Ghanaian government has forbidden wawa trees to be cut in the area in which Kofi lives and operates. The government feels that the only areas of substantial reserve for this tree are in the deep forest areas of the Brong Ahafo and Asante Regions. To comply with these government regulations, Kofi would have to move his home and operation to these areas of the forest considering that he is only doing this carving work temporarily for a few years until he gets enough money to continue his education, this is out of the question. Lastly, Kofi has yet to be caught and therefore feels that he can continue doing what he does without joining the CCA.⁸

By operating without a CCA membership, Kofi runs the risk of being caught by one of the Forest Department Task Forces that patrol for exactly this type of unauthorized activity. If caught, Kofi would have his chainsaw confiscated by the Forestry Department and they would hold this until he paid a fine of anywhere between 5 and 10 million Cedis. While Kofi imagined that he would not be able to pay this anyway, the fact remains that if he could, the Forestry Department would simply give him back his machine and leave it at that. Therefore, this penalty of a fine is only so that the government receives money, and it ignores the real issue; it ignores the point of this entire allocation permit process, which is conservation. If Kofi was caught and could pay the fine, he saw would be given back to him and there would be nothing to prevent him from continuing to illegally deplete the stock of Ghana's wawa reserve.⁹

In any even, the process of actually constructing an artisanal canoe remains the same regardless of the legal status of the man doing the bulk of the work. What follows is an examination of this process.

⁶ Kofi. Canoe Carver. Interview: Notes by author. 1 May 2001.

⁷ Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

⁸ Kofi. Canoe Carver. Interview: Notes by author. 1 May 2001.

⁹ Ibid.

5.2 – *THE PROCESS*

Once the fisherman has gained approval of his allocation permit request and he made arrangement with the carver, construction of the first phase can begin in the forest.¹⁰ All wood for construction is taken from the wawa tree and it is used for its seawater damage resistance as well as its size and straightness. These trees can grow up to 150 meters high and its branches only grow at the very uppermost portion of the trunk, thereby allowing for the maximum amount of useable, straight, material for construction. The size tree that is cut depends on the size of the boat the fisherman requires. These artisanal canoes come in two basic sizes and are distinguished, beyond their length, by what propellant is used to power the vessel. The smaller of the two are used around 4 to 5 meters in length. They are cut from trees about 50 meters in height and will be propelled by sail and paddle alone. The larger boats are usually around 9 to 10 meters in length and are cut from trees 100 to 120 meters in height. They are propelled by outboard motors of around 40 horsepower. Regardless of the size, each of these canoes follows the same construction process.¹¹

Once the tree has been felled, construction begins on the ground right at the forest site. First, an industrial chainsaw with a 2.5 to 3 foot blade is used to make a straight cut, horizontally to the ground, of the uppermost wood and bark (this tool is also used to fell the tree). When this wood is cut away, a flat tabletop-like surface has been made out of the remaining tree trunk. The surface of this tabletop is flat, except towards the ends, with slant up. This slanting allows for the bowsprit/bow deck and stern to be raised, thereby giving the canoe its arced shape (this upward arc is visible when hull is looked at from a single angle). Upon this tabletop, the outline for the inner hull and outer hull are drawn with a piece of charcoal. Everything within this inner hull outline will be dug out and everything outside the outer hull outline will be cut away. What will remain is the rough body of the canoe's hull. The outer hull outline is drawn first in the oval-like shape of a canoe (seen from a top angle) and then hull outline is drawn inside of this first outline is exactly the same shape, but smaller to allow for the desired thickness of the hull. This distance between outlines is usually 2 inches for the smaller class of artisanal canoe and 4 inches for the larger class.¹²

¹⁰ Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

¹¹ Kofi. Canoe Carver. Interview: Notes by author. 1 May 2001.

¹² Ibid.

With the outlines drawn, the outside of the hull is cut way following the outer hull outline. To do this, two cuts are made down the sides of the tree, perpendicularly to the round, to form the outer sides of the hull. These cuts are also made with the chainsaw. Next, relief cuts are made within the inner hull outline to facilitate the digging out process. Once these cuts are made with the chainsaw, the digging out process can begin using a sharp, hoe-like tool called “sosow” by the Akans. The carvers use this tool in a chopping motion that chips the wood away as it makes contact with tree trunk. It is swung in an arc from above the carvers head. The tool is most effective when used with the grain of the wood. They also make cross-grain cuts with this tool but do so only when necessary. The digging out process goes on until the inner hull has been dug out to the desired depth. Then, the outside of the hull can be completed.¹³

To complete the outside of the hull, the chainsaw is used to make a series of cuts along the sides and bottom of the boat in order to “round-off” the previous square edges. To complete this last series of cuts, the boat needs to be rotated onto one side and then rotated back onto the other before it is rooted completely upside down. To do this, the carvers use a 50-ton strength “monkey” jack. Regardless of the boats size, these portable jacks can assist the builders in rotating the boat into any position that is necessary to complete the job. After this stage, the hull is now roughly complete. The inside has been dug out, and on the outside, the excess wood has been cut away leaving the hull in the standard canoe shape.¹⁴

Since the arrival of the chainsaw to West Africa, the timeframe for this first phase of construction has been drastically reduced. However, neither the design nor the process of artisanal canoe construction, have been changed since this introduction. Before the chainsaw, the carvers used handsaws and an axe-like tool, called an “asenkewe” by the people of Pram, a small town east of Tema, to fell the tree and make all the necessary cuts. With the chainsaw, it now takes the carvers approximately 2 to 3 weeks to complete the first phase.¹⁵

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

After the hull has been dug out and cut to shape, it is then the fisherman's job to arrange for its transport to the coast. The hull is taken, in this rough state, to the fisherman's town of residence, where work then begins on the second phase of construction. Here, as mentioned earlier, the work can either be done by the fisherman and his crew or by the carver, if these fishermen are not qualified. During this second phase, the sides are raised, the hull is dug out to its finished depth, and the boat is painted and prepared for its first voyage to sea. This process takes approximately a week, depending on availability of materials and the size of boat being completed.¹⁶

When the boat arrives, the first step is to add wawa planks to the sides of the roughly completed hull to increase freeboard and volume. The sides are raised according to the size boat being constructed, and 2 x 4 inch plank are usually used for the smaller class of canoes while 2 x 12 inch planks are used for the larger boats.¹⁷ These planks are cut to fit in what first, appeared to be a rather crude fashion, as I saw in my observations of renovations taking place to the vessel "Sompayie" that occurred on 27 April 2001. Here, measurements were eyeballed; charcoal was used to make marks and cutting outlines, and cuts were made and re-made until the piece fit in its appropriate place. Overall, it seems a very "trial and error" oriented process. However, despite this outwardly crude procedure, a procedure that seemed foreign to my eye accustomed to rulers, tape measures, and protractors, all the pieces fit exactly as they should and did so to prevent the possibility of leaks when the boat goes to sea.¹⁸

These planks are added vertically, one on top of another, until the boat has reached its desired size, each board firmly nailed to the one below with 8 to 10 inch carpentry nails (the lowermost planks being nailed directly into the dugout hull). Also, between each layer of planks, lies strips of cotton wool that were soaked in wet paint. This acts as caulking as the paint and wool fill any gaps between the two pieces of wood. When the boat's sides have been raised, and the hull is smoothed both inside and out, other carpentry goes on to complete the construction process. For the smaller boats, seats, paddles, and the mast (which will carry a square rigged sail) are prepared. For the larger boats, the deck is constructed as

¹⁶ Kofi, Canoe Carver. Interview: Notes by author. 1 May 2001.

¹⁷ Ibid.

¹⁸ Renoveations of the Artisanal Canoe "Sompanyie". Observations: Notes by author. 27 April 2001.

well as hatches for fish and equipment storage. Also with the larger boats, an engine seat is added to the starboard side, towards the stern to which the outboard motor will be attached.¹⁹

Other carpentry tools not mentioned above, such as handsaw, hammers, hand planes, and the continued use of the aforementioned “sosow” are used to complete this second phase of construction. These tools are used to ensure that the planks lie flush, to dig the hull out further, and to smooth the hull’s underside. The final step is the painting, decorating and naming of the finished canoe.²⁰ This last step culminates in a christening ceremony where libations are poured to the ancestors, after which, the crew, family, and friends celebrate the coming launch of the vessel.²¹

Payment for the construction of an artisanal canoe varies by the size of the vessel. For one of the larger boats, cost is usually set around 5 million Cedis and this includes the allocation permit request fee, construction costs for the second phase.²² Some fishermen choose to apply for loans from a local bank to make payment for their newly constructed vessel. Others however, like Kwamena Twi, owner and senior crewmember of the vessel “Ohye Wo Bo”, choose other means of payment. Mr. Twi chose to pay for his 9.5 meter canoe in cash, cash that he had been accumulating in his house for several years prior to the date of purchase.²³ This type of payment results from what must be a strong distrust of a formal banking system, and I got the impression that Mr. Twi is not the only fisherman who chooses to save for major purchases in this fashion.

5.3 – TRANSFER OF KNOWLEDGE

The artisanal canoe begin has been around as long as fisherman have been leaving Ghana’s shore to go to sea. It is a simple design but one that suits the needs of the people who use it without exception. There is no written plan or formally drafted blueprints for the builders of these vessels to use.²⁴ They use only the unwritten knowledge that has been

¹⁹ Ibid

²⁰ Ibid.

²¹ Pogu, Kwesi. Small Artisanal Canoe Fisherman. Interview: Notes by author. 1 May 2001.

²² Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

²³ Twi, Kwamena. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

²⁴ Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

passed down through the ages and which has changed little from its original form. The chainsaw has sped up the process and the outboard motor has required some slight modifications, but otherwise, neither the design, nor the building process has changed at all.²⁵

The transfer of knowledge for construction of this type of vessel usually takes the form of the craftsman/apprentice relationship. In order to become a member of the CCA, one must not only pay the entrance fee and monthly dues, but also have been an apprentice under a master carver for at least four years. Therefore, these master craftsmen will work with 5 to 6 apprentices at a time, and it is from him, that these young men will learn the trade.²⁶ Even, Kofi, who runs a somewhat unconventional business to say the least, worked as an apprentice for several years before leaving to start his own business.²⁷ It is through this craftsman/apprentice relationship, that the artisanal canoe design and construction process has been kept alive. Not only is this design alive and well today, but it continues to be applicable to the tasks these fishermen must perform everyday they go to sea.

²⁵ Kofi. Canoe Carver. Interview: Notes by author. 1 May 2001.

²⁶ Bothway et al. Canoe Carver Association Members: Pram. Interview: Notes by author. 18 April 2001.

²⁷ Kofi. Canoe Carver. Interview. Notes by author. 1 May 2001.

CHAPTER 6

ARTISANAL CANOE NAVIGATION

Imagine setting out for a day at sea, in the early morning hours before the sun has had a chance to dissolve the fog that has settled over the shoreline, in a 9-meter canoe equipped with no navigational equipment and no means of contacting those left on shore. This is the reality that exists for the artisanal canoe fishermen every morning that they leave homeport. What follows is an examination of how they find their way to sea, how they orient themselves, how they return safely to port, how they are able to travel distances of several hundred kilometers, and finally how they learned all these necessary navigation skills.

6.1 – GOING TO SEA

Like the semi-industrial fishermen, the artisanal canoe fisherman also leaves to go to sea around three or four in the morning, and is also primarily concerned with locating the fish he must catch. The artisanal fisherman also uses similar methods of determining where the fish are to be found.¹ In addition, both the semi-industrial fleet and the artisanal canoe fleet take a southerly course when they head out to sea and both operate in the same area of Ghana's coastal waters. On a clear day, the shoreline is early is easily observed from either of these two types of vessels as they peruse this most optimal fishing ground.² However, what is unique to the artisanal fisherman is, that he has no mechanical devices onboard whatsoever, that would help him to orient himself if this shoreline becomes no longer visible. Therefore, he must be ever mindful of his position and direction of travel, and must be conscious, at all times, of the physical properties of his natural surrounding which could help in orientation should visibility be impaired.³ Thus, when the artisanal canoe fisherman leaves the shore, his primary objective is to catch fish. But somewhere in the back of his mind, must be kept the necessary knowledge to aid him in an emergency, knowledge that is uniquely necessary to his position as the navigator of an artisanal canoe.

¹ Trip to Sea on the Large Artisanal Canoe "Bone Nsuma". Observations. Notes by author. 30 April 2001

² Adekpui, David. Semi-Industrial Captain. Interview. Notes by author. 19 April 2001.

³ Trip to Sea on the Large Artisanal Canoe "Bone Nsuma". Observations. Notes by author. 30 April 2001.

The process of going to sea is different depending on the size and means of propulsion of the canoe that is leaving port. With regard to the smaller class of artisanal vessels, wind and physical effort through the use of a paddle, are the only means of propulsion available. His range of movement is therefore markedly more limited than that of the larger boats, which are powered by outboard motors. The sails used on these smaller vessels are square rigged, and can only be used for downwind travel. When these fishermen need to travel upwind, they are forced to use their paddles, which is a considerably more difficult and time-consuming enterprise. Therefore, if the fishermen go out to sea under sail, with the wind at their back, they must turn around earlier to come home, given that their return trip will be all the more difficult as they battle the headwinds with their paddles.⁴

Whether the artisanal fisherman leaves port under sail, using a paddle, or using a 40 horsepower outboard engine, he is looking for the same signs of fish. Like the semi-industrial fisherman, the artisanal fisherman looks for disturbances on the water as the fish play at the surface. When he sees this, he casts his net or drops his hook and line overboard.⁵ The smaller artisanal canoe fishermen have the technique that is unique to their type of fishing: they place a paddle vertically in the water and put the other end to their ear. They are listening for a reverberation in the wood of the paddle to alert them of fish swimming nearby. If they hear the sound they are looking for, they simply cast their nets in that exact spot.⁶

It is important to note, that the artisanal fisherman, whether traveling on a small or large canoe, must reel in his net by hand. There is no winch onboard, as with the semi-industrial vessels, and so all this work must be done by hand as the crew works as a team to pull in the net hand over hand. This is an incredibly impressive feat when one considers the difficulty and the duration of this task (it usually takes about two hours to get the net, with all the fish in it, onboard), as well as the fact that this process is done at least twice a day, six days a week for a lifetime.⁷ In any case, when the fishermen have caught all the fish they can for the day, they can start heading home...but which direction is home?

⁴ Pogu, Kwesi. Small Artisanal Canoe Fisherman. Interview: Notes by author. 1 May 2001.

⁵ Twi, Kwamena. Large Artisanal Fisherman. Interview: Notes by author. 29 April 2001.

⁶ Pogu, Kwesi. Small Artisanal Canoe Fisherman. Interview: Notes by Author. 1 May 2001.

⁷ Trip to Sea on the Large Artisanal Canoe "Bone Nsuma". Observations. Notes by author. 30 April 2001.

6.2 – *ORIENTATION*

On the day that I went to sea on one of the larger artisanal canoes, I could see the land to the North the entire time I was on the boat.⁸ On days like this, orientation is easy. But what happens when it is dark or when visibility is impaired by weather or when the fishermen must travel too far out to sea to be able to see the land? At night, or during the early morning hours, the stars are invaluable, as the fishermen know from experience where a particularly bright star can be found at a particular time of year. For example, in September, there is a very easily recognizable star that appears in the South. In May, they use an especially bright star that appears in the West. If they are traveling during this early morning period and it is cloudy, they need only to wait until dawn when the sun will invariably rise in the East. Even in the thickest of morning fog, East can be determined as the sun slips above the horizon.⁹

It would be difficult to overestimate the importance of the sun's path across the sky as a navigation tool for these fishermen.¹⁰ This East/West arc has been guiding people at sea for thousands of years, and in this respect, while watching these artisanal fishermen at work, it is as if time has stood still all these years.¹¹ However, clouds can hide the sun's path of travel, and then, these fishermen can rely on wind direction to orient themselves. Information that I gathered concerning wind direction and favorability, was the same regardless of whether it was a semi-industrial or artisanal fisherman with whom I was speaking. These artisanal fishermen also recognize the favorable prevailing wind out of the West, referred to as "Ahwow" by Akans. They are also slightly apprehensive about the storm carrying Easterly called the "Ehum" (also by the Akan). It is important to note that even if the wind direction is too unpredictable to navigate by, no amount of clouds can hide the consolidation of light that occurs in the East at dawn and the West at sunset. As long as the fisherman has kept track of his orientation and distance traveled, throughout the day, he will know in which direction he should head to reach his homeport.¹²

⁸ Ibid.

⁹ Twi, Kwamena. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

¹⁰ Ibid.

¹¹ Trip to Sea on the Large Artisanal Canoe "Bone Nsuma". Observations: Notes by author. 30 April 2001.

¹² Twi, Kwamena. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

6.3 – RETURNING SAFELY TO PORT

Once the fisherman has caught all the fish he can for the day, or is forced to finish early by time constraints such as unfavorable wind direction, he will take a Northerly course and set off for home. This Northerly course will be slightly to the East or West depending upon the direction the fisherman traveled while search for fish. In order to locate exactly where homeport is, the fisherman keeps his eye out for the onshore landmarks such as castles, coastal towns, water towers, etc.¹³ As we neared the coastline on my return trip from sea en route to Komenda, I could clearly see several of these onshore landmarks. We approached Komenda out of the Northeast and I first saw the Cape Coast Castle, followed by the Castle at Elmina. Just before gaining sight of Komenda, I could also make out the water tower near Brenu Beach.¹⁴ The poorer the visibility, the more trial and error is involved in the artisanal fisherman finding his homeport. However, he is so familiar with the coastline on either side of this destination that will rarely find himself lost when the coast is finally in sight.¹⁵

Besides being familiar with the coastline near his homeport, these artisanal fishermen are also very familiar with any hazard that might lay just off the coast in this same area. They have an intimate knowledge of these danger zones, which usually take the form of reefs or rock outcropping, and know where the navigable water is, as they approach the shore. Another potential hazard is the possibility of a storm coming up unexpectedly. Like the semi-industrial fishermen, these fishermen pay close attention to the warning signs of a storm even before they leave the shore. However, these fishermen rely much more heavily on their own intuition than on a radio broadcast, to determine if it is safe to go out that morning. If they caught out at sea in a storm, they will wait it out after throwing a jury-rigged sea anchor overboard.¹⁶ This sea anchor is usually made of large rocks and or pieces of scrap iron that are strung together and kept at the bottom of the boat until needed.¹⁷ They will wait at sea, with the bow pointed into the wind, until the storm has abated and then they will continue on home.¹⁸

¹³ Ibid.

¹⁴ Trip to Sea on the Large Artisanal Canoe “Bone Nsuma”. Observations. Notes by author. 30 April 2001.

¹⁵ Twi, Kwamena. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

¹⁶ Ibid.

¹⁷ Kuma, Nana Kwame. Chief of Fishermen: Komenda. Interview: Notes by author. 28 April 2001.

¹⁸ Twi, Kwamena. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

6.4 – MIGRATION

It is the seasonal nature of the artisanal fishing industry that requires some Ghanaian vessels to travel as far as Cote D'Ivoire and Liberia. During my conversation with Nana Kwame Kuma, the Chief of Fishermen for the Komenda area, I was able to get a sense of this migration. The migration takes place beginning in late September when the fish, such as the herring, make their way West. These fish find optimal feeding and breeding grounds off these foreign coastlines during this time of year and so it is to these areas that the fishermen must travel. They stay until early April when the fish return to the Ghanaian coast and it is then the fishermen can return home. Mr. Kuma stated that, given the difficulty and duration of this journey, it is usually only the larger canoes that make the trip.¹⁹ The smaller boats are capable, but they must stop many times along the way and they can usually find all the fish they need, such as octopus, crabs, and shrimp, off the Ghanaian coast year-round.²⁰

Not all the larger boats make the journey however. Some find the trip too expensive or cannot assemble an adequate sized crew to make the trip feasible. To make it to Liberia, one of the larger boats must bring along 4-5, 50 gallon drums of fuel, each costing 400,000 Cedis, to make the weeklong voyage. This cost is financially unrealistic for some fishermen so they stay behind and benefit from the absence of the other vessels as they try and catch enough fish to feed their families with some leftover to sell at market.²¹

The prospect of navigating one of these canoes becomes all the more daunting when one imagines a journey of several hundred kilometers lasting for a week. In order to reach Liberia or Cote D'Ivoire, they must keep an almost due West course. They do so by staying within sight of land, about 15 kilometers out to sea. By staying so close to shore, they run the risk of running aground on a reef or rock outcropping whose whereabouts is unknown to them. Back at home in the coastal waters off their homeport, they know where all the problem areas are and how to get around them. To make up for the lack of this intimate knowledge while traveling such a long distance, they periodically send a crewmember overboard to listen underwater. This crewmember is instructed to listen for the sound of

¹⁹ Kuma, Kwamena. Large Artisanal Fisherman. Interview: Notes by author. 28 April 2001.

²⁰ Pogu, Kwesi. Small Artisanal Canoe Fisherman. Interview: Notes by author. 1 May 2001.

²¹ Twi, Kwamena. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

waves breaking on a reef or rock, and if they hear it, to alert the rest of the of the crew so precautions can be taken.²²

At night, they use the stars to help guide them on their proper Westerly course. They do this the first night by picking three especially bright stars that appear in a line perpendicular to the shore. They make sure that one of these stars is directly in front of them or directly overhead. To either side, is the first and third star in the series and if, during that night and the subsequent nights, they should find themselves pointed towards one of these two stars, they know they are off course and need to make the appropriate adjustments, so that they are pointing towards the center star. Each time they make the journey, it can be a different set of three stars that are in this North/South line. What is important is that each night, they recognize and use the same three stars for the duration of the journey. When it is cloudy at night, they slow their speed and keep their eye on the wake behind them to see that it remains in a straight line. If the line of the wake bends or zigzags, they straighten themselves out.²³

After a week, when they catch a glimpse of their port of destination, they head to shore, establish a semi-permanent residence, and begin fishing, only to return a few months later. The nature of this migration is such that not only Ghanaians are being dispersed to other areas of West Africa. Fishermen and canoes from Cote D'Ivoire or Liberia will appear in Ghana's coastal waters and villages throughout the summer months as the fish return to this area of the African coastline.²⁴

6.5 – TRANSFER OF KNOWLEDGE

All the knowledge pertaining to artisanal canoe navigation is unwritten. Therefore, this knowledge must be gained through experience and through instruction from an older fisherman. It is the familial structure of the artisanal fishing industry that makes this transfer of knowledge possible. From the age of 12 or 13, boys are taken out of school for the purpose of working on their father's boat alongside their brothers, cousins, uncles,

²² Ibid

²³ Kofi, Daniel. Large Artisanal Canoe Fisherman. Interview: Notes by author. 27 April 2001.

²⁴ Kuma, Nana Kwame. Chief of Fishermen: Komenda. Interview: Notes by author 2001.

grandfathers, etc.²⁵ Indeed, aboard the vessel “Bone Nsuma,” the boat that I took to sea, there were four generations being represented. It was incredible to watch the older men decide on where to go to look for fish or where to go when it was time to head home, while the younger men and boys watched and contributed when they could. I got the feeling that there was not a hypothetical situation realistically conceivable, that one of these men would not be able to handle. Between the nineteen of them, they were prepared for anything and would have known just what to do or where to go if a storm hit or a thick fog rolled in.²⁶

One of the fisherman with whom I spoke, had been going to sea for over 50 years and had begun his fishing career aboard his fathers boat.²⁷ Undoubtedly, it was from his father that he learned about using the stars, the wind, the sun, and the land to navigate such a boat, a boat without any equipment to make his process of navigation easier. During this 50-year period, he undoubtedly shared this knowledge with countless young men who accompanied him to sea. I still have this image of the oldest member of the “Bone Nsuma” crew looking for signs of fish as a boy of about twelve, who could have been his great grandson, stood next to him, and who also had his eyes glued to the rolling waves.²⁸

²⁵ Twi, Kwamena. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

²⁶ Trip to Sea on the Large Artisanal Canoe “Bone Nsuma”. Observation: Notes by author. 30 April 2001.

²⁷ Pogu, Kwesi. Large Artisanal Canoe Fisherman. Interview: Notes by author. 29 April 2001.

²⁸ Trip to Sea on the Large Artisanal Canoe “Bone Nsuma”. Observation: Notes by author. 30 April 2001.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 – CONCLUSION

Fishing today is essentially the same as it has always been. Fishermen leave to go to sea and return home with fish. In order for these fishermen to go to sea, it has been, and still is necessary for them to own a seaworthy vessel. For them to return home, it has always been and still is necessary for them to have the knowledge that will bring them safely to shore. Boat building and navigation then, are two of the most essential practices that make the fisherman's life possible. It is also in these two areas, that the fisherman's life has changed the most since the first men went to sea in search of fish. Today, boats are bigger, faster and stronger and have equipment on board, to aid the fisherman in any kind of emergency and in any kind of weather.

While Ghana's semi-industrial fishing fleet is constructed, navigated, and operated by Ghanaians, the boat building and navigation practices that accompany this type of vessel are not indigenous to West Africa. By comparing the design and navigation equipment of this type of vessel, with that of the artisanal canoe, it became apparent that certain things are missing in the artisanal fleet. These canoes do not have a formal, carefully detailed set of plans, drafted by formally trained boat designers, from which they are built. They not have radios or any electrical pieces of equipment available. All these things the semi-industrial vessel has and all these things the artisanal canoe lacks. However, in the place of all these things, is a body of knowledge that has remained unwritten, yet has been practiced with the utmost effectiveness for hundreds of years. It is a body of knowledge that is completely indigenous and very purely West African. Today, these boats are made with the assistance of the chainsaw and are propelled with the assistance of the outboard motor, all this mechanization made possible through West influence. These two changes have indeed sped up the process of both building and navigating the artisanal canoe. However, the design of these boats, and the overall process of building them, has not changed since before the first Westerner set foot on Ghanaian soil. In addition, the process by which these boats are navigated, despite the change in the power source of some of these canoes, has not changed

at all. Indeed, while watching one of these small dugout canoes being pushed off from shore, as the fishermen climb aboard and head out into the breaking waves, it seems as though only the ocean itself could have changed less.

7.2 – RECOMMENDATIONS FOR FURTHER STUDY

If I were to make a recommendation for further study on the subject of semi-industrial and artisanal boat building and navigation, it would be simply to spend as much time as possible, with the fishermen themselves. They live an incredibly hard life, but one that is somehow beautiful and very admirable, especially to me coming from such a different place and lifestyle. There is such a large amount of knowledge that can be gained in just a short conversation with one of these fishermen, and I hope that this body of knowledge is not lost as the world cruises onward, along its often poorly charted course of modernization.

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