A SURVEY OF TRADITIONAL SYSTEMS OF BOAT DESIGN USED IN THE VICINITY OF TRINITY BAY, NEWFOUNDLAND, AND HARDANGERFJORD, NORWAY

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ABSTRACT

This work is an analysis of traditional systems of boat design employed by boatbuilders in two North Atlantic regions—Trinity Bay, Newfoundland, and Hardangerfjord, Norway. It presents two case studies that apply an ethnographic approach to the study of boat design. Though covering basically the same analytical terrain, each case study offers different insights into the process of design.

Preliminary sections provide the social, historical, economic, and environmental contexts of the study areas, discuss categories of builders, and examine the most significant changes influencing boatbuilding in the past 100 to 150 years. These are followed by the core sections of the work which explore a variety of topics relative to the design process, including design conceptualization, translation of design from mental image to physical form, the use of devices and measurements to control form, the relationship between form and function, and the dynamic interplay between boatbuilders' need for self-expression and their desire to conform to tradition.

This study calls for greater attention to the process of design in material culture studies. Furthermore, it argues that basic emic concepts that define the essence of the forms of boats and other cultural artifacts can be perceived through systematic analysis of a range of data, including the physical properties of the artifact, verbal statements of artifact makers and users, documents, and observation of an artifact's design, construction, and use.

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INTRODUCTION

Vernacular boats are cultural artifacts produced by craftsmen inculcated with the rules and techniques of a local, often community-based, boatbuilding tradition. Boats of this kind--and there are probably thousands of vernacular types around the world--are the antithesis of post-industrial, mass-produced boats that are often based on the designs of formally-trained naval architects. Vernacular craft represent boatbuilders' responses, moderated by the force of tradition, to the problems posed by environmental and functional factors, factors that vary considerably from place to place and over time.

While vernacular boats are arguably one of the oldest and most significant forms of material culture on the globe, they have attracted relatively little scholarly interest over the years. Clearly, among North American material culture specialists, research pertaining to boats is greatly overshadowed by research into such topics as vernacular architecture and furniture, to mention two prominent classes of artifacts.

Most of the work that has been done in an effort to study boats has concentrated on their forms, with principal attention focused upon methods of construction and construction materials. The builder and his cultural milieu are generally of secondary concern at best. When the topic of boat design is discussed it is generally presented subjectively, with the investigator evaluating a vessel's design from his own cultural perspective, not that of the craft's designer, and using standard naval architectural terminology, not the terms operative in the area where the craft was conceived, constructed, and used. One notable practitioner of this approach was Howard I. Chapelle (1901-1975), naval architect, maritime historian, and Curator of Transportation at the Smithsonian Institution. He authored many books on American vessel design, boatbuilding, and regional boat types, and was a catalyst for the preservation of American watercraft.[1]

Chapelle's book American Small Sailing Craft is especially noteworthy because it documents over one hundred vernacular boat types, most of which are located on the Atlantic and Gulf Coasts between Maine and Texas.[2] This work, still the only survey of such scope, established a model of sorts for persons interested in documenting North American boatbuilding traditions. To a certain extent, the boats Chapelle described in American Small Sailing Craft established a canon of North American vernacular craft. In the way that ballad scholar Francis James Child's work influenced later studies of his chosen genre, the Chapelle canon led to a greater appreciation of local working craft. However, it also resulted in the elevation of some of the types he identified to a kind of super traditional status. This widely-read work (in print since its initial publication in 1951) also established a model for the description of small craft. Basically, the elements of this model are as follows: brief discussions of construction and use, speculations on provenance, and appraisals of performance characteristics. Tables of offsets and lines plans were an equally important part of Chapelle's concise descriptions. These provided the empirical data required for the construction of the individual boats selected by Chapelle as representative of a particular type.

There are a number of shortcomings in Chapelle's survey of vernacular craft. From a folklorist's perspective, the foremost weakness is a disregard for the dynamic process underlying the creation and use of regional boat types in favor of a concentration on the product of the process--the boat. Another weakness is the subjectivity of Chapelle's writing, especially in regard to evaluation of vessel performance, and in the selection of representative examples of types. Furthermore, the lines plans he drew of the craft he encountered in the field suggest that, much in the same way that early folk song collectors bowdlerized and expurgated song texts to create acceptable materials, he drew lines of ideal forms, rather than forms as they existed in situ. Finally, Chapelle's failure to provide the sources of data he cites is a serious flaw since it prevents future researchers from reviewing much of the evidence upon which he bases his hypotheses.

Despite its inherent shortcomings, American Small Sailing Craft did much to awaken interest in regional boat types. In addition, it planted the first seeds of a revival of interest in the construction of many work boat types, albeit generally for recreational uses. This revival appears to be in full flower today, and its vigorousness is evidenced by the success of the glossy magazine Woodenboat. Especially since 1970, there has also been a proliferation of schools that teach wooden boat construction, the founding of many professional boat shops, and the establishment, primarily in New England and the Pacific Northwest, of annual wooden boat festivals. This revival movement is an interesting topic in itself, but it is somewhat removed from the thrust of the present discussion. In any event, it is worth noting that Chapelle is considered to be something of a godfather of the revival movement and his books, and particularly his lines plans, have been highly influential.[3]

A multitude of North American and European scholars, much in the same fashion as Chapelle, have surveyed regional and, in some cases, national vernacular craft according to boat form, method of construction, and, usually to a somewhat lesser extent, use. Recent examples of surveys of this kind include Boats and Boatmen of Pakistan by Basil Greenhill;[4] Inshore Craft of Norway, based on a manuscript by Bernhard and Øystein Færøyvik edited by Arne Emil Christensen, Jr.;[5] Nordlandsbåter og båter fra Trøndelag (Nordlands Boats and Boats from Trøndelag) by Asbjørn Klepp;[6] Wooden Boat Designs: Classic Danish Boats Measured and Described by Christian Nielsen;[7] Inshore Fishing Craft of the Southern Baltic From Holstein to Curonia by Wolfgang Rudolph;[8] and the series of books on Swedish regional boats written by Peter Skanse and Staffan Claesson.[9] Perhaps the most comprehensive survey of vernacular craft published to date is Eric McKee's innovative Working

Boats of Britain: Their Shape and Purpose.[10]

Other scholars have been concerned with the history and evolution of the world's major boatbuilding methodologies. Due to the immensity of the topic, studies of this nature require the synthesis of prodigious amounts of archaeological, iconographic, ethnographic, and other types of data. However, as with the works noted above, these, too, tend to concentrate on boat form and methods of construction. One of the most successful works of this kind is Archaeology of the Boat: A New Introductory Study by the prolific British maritime scholar Basil Greenhill.

Some scholars, such as James Hornell, the British author of Water Transport, have taken a historic-geographic approach and attempted to demonstrate that comparisons of hull forms and construction techniques can be used to support arguments that widely separated groups possess certain cultural similarities. North American cultural geographers, such as Malcolm Comeaux, Edwin B. Doran, and William P. Knipmeyer, plus a host of Scandinavian archaeologists and ethnologists, notably Olof Haslöff and Arne Emil Christensen, Jr., have also used boat forms and construction techniques to map culture zones, but have devoted much more attention to social context.[11] Stalwart anthropologists, such as Bronislaw Malinowski, author of Argonauts of the Western Pacific, and Raymond Firth, author of Malay Fishermen, have produced magnificent studies of maritime peoples which detail elements of boat design and construction, as well as the social context of boat use.[12] Contemporary North American anthropologists who have studied boatbuilding have tended to analyze the construction of craft by aboriginal peoples. Examples of such studies include Stephen R. Braund's The Skin Boats of Saint Lawrence Island, Alaska, J. Garth Taylor's Canoe Construction in a Cree Cultural Tradition, and David W. Zimmerly's Hooper Bay Kayak Construction.[13]

A few American folklorists have also plunged into boat research. Richard Lunt's study of Maine lobster boatbuilding, Paula Johnson's work with Chesapeake Bay boatbuilders, as well as the previous work of the present author, are all mainly attempts to document the intricacies of traditional boat design, construction, and use within regional contexts.[14] These writers have looked not only at form and construction, but also at the builders and their reactions to and impact upon regionally-specific traditional practices. Janet C. Gilmore, another folklorist, has taken a different tack in her book The World of the Oregon Fishboat: A Study in Maritime Folklife.[15] She attempts to avoid the esoteric morass into which many stumble with studies of material culture, and, following Malinowski and Firth, examines "the sphere of relationships and communicative behavior that integrate the world at sea with the world ashore through the medium of the fishboat."[16] She does not collect hull measurements or draw lines plans, or amass similar types of empirical data. Nor is she concerned with the process of creation of the boat to the extent that other folklorists have been. She is concerned with the ideas that inform fishermen and the "general context of the artifact."[17] Her approach is widely focused in an attempt to "see the boat as the fisherman does, to understand how he uses it to express attitudes about his work, the tools of the trade, fellow fishermen and water workers, and in turn to comprehend the fisherman's way of life, the nature of his work, and his worldview."[18]

As mentioned above, my own work has been primarily concerned with the builders of boats. I have not spent a lot of time, as Gilmore obviously has, examining the role that boats play in the lives of their users, although in many cases the builders whom I have interviewed have also been the users of the boats they have created. I have endeavored to be exacting in my attempts to document process as it relates to regional boatbuilding traditions. For me and, I suspect, for many other material culture specialists, the topic of traditional design is one of endless fascination. Although active participants tend to pass it off as "just the way we've always done things around here," and persons removed from the cultural context often consider its material products to be "merely the unsophisticated work of simple rural people," assiduous research will reveal the remarkable complexity of traditional systems of design.

How does one approach the subject of traditional boat design, and what are some of the major issues to be pursued toward an understanding of the "grammar of the natural language"[19] of local design systems? A very basic topic to be addressed when studying traditional design is the cognitive model, or models, recognized by most builders in a region, in other words, the "deep structure" of the boat. This sort of information is rarely articulated and is, therefore, fairly elusive.

However, folk models for design can be pieced together by: (1) asking builders to describe the important activities which precede vessel construction, (2) eliciting terms and definitions relating to hull form, and (3) carefully observing the initial steps of the construction process with particular attention to key measurements.[20] With these data, one can begin to reduce the form of a craft to its simplest structures. It is through an understanding of the deep structure, or core image, of an object that we can more successfully comprehend the form in its completed state, and, as other adherents to the structuralist approach have demonstrated, make more precise judgments about the spatial and temporal relationships between like artifacts.[21]

Another path to the comprehension of traditional design relates to tools employed by builders to create, perpetuate, and modify designs. I am referring here to the role of a multitude of artifacts employed by traditional builders, artifacts such as wooden moulds, half-hull scale models, templates, specialized measuring sticks, and drawings. I will describe some of these artifacts shortly, but first I will place them in historical perspective.

The historical development of boat and ship design techniques, or naval architecture as formal designing based on general principles is known today, has not been well documented. However, the many treatises on naval architecture written by professional ship designers since the seventeenth century provide much valuable data (as well as exceedingly technical and abstruse language) on the technical development within the field. I do not wish to delve into the history of naval architecture in detail, but, since the activities of formally-trained design specialists have exerted considerable influence upon traditional practices, I will provide a brief summary with particular attention to the use of artifacts.[22] First, however, let us consider the roots of vernacular boat design and construction.

Most scholars of the development of the boat would agree that the oldest boat types known can be placed in four categories: raft boats, skin boats, bark boats, and dug-outs.[23] A raft boat is made by fastening logs, bundles of reeds, or other lighter-than-water materials together in the shape of a boat. A skin boat is fashioned by sewing a water-tight covering of animal skins or fabric over a framework of wood or bone (the Irish curragh, Welsh coracle, and Arctic kayak are good examples). The bark boat, such as the North American canoe, is made from pieces of tree bark formed into a cylinder and reinforced with an interior framework of wood. The dug-out is made by hollowing a log and, in some cases, narrowing its ends. Based on the actions of contemporary, traditional builders who construct any of these four ancient types, one may conclude with reasonable certainty that builders have always shaped their materials mainly by eye, but, in many cases, have also been guided by a few basic measurements or formulas based on proportional relationships.

Over time, principally as a result of the improvement of tools, more sophisticated techniques for building wooden boats emerged in different parts of the world. Utilization of these techniques resulted in boats that were constructed of wooden planks and other component parts. When analyzed on the basis of structure, these planked vessels fall into two basic categories: boats with overlapping planks fastened together along their edges; and boats with planks that abut their neighbors, but are not fastened to them. Vessels in the first category are commonly known as "clinker" or "lapstrake" boats, while vessels in the second are usually known as "carvel" or "smooth-planked" boats.

Characteristically, the construction of boats with overlapping planks involves forming a shell of planks into which timbers and other strengthening parts are later inserted. Thus, when boats of this type are to be built, their builders first perceive them as a shell of planks. In contrast, boats with abutting planks not fastened to each other are built by first erecting a framework or skeleton consisting of keel, stem, sternpost, deadwoods, and timbers. Next, planks are attached by fastening them directly to stem, stern, and timbers. Those who build boats in this manner initially think of hull shape in terms of the interior skeleton, not the exterior shell.

It is crucial to emphasize the fact that these two methodologies--shell construction and skeleton construction--define two huge, general classes of wooden boats built throughout the world.[24] It is especially important to make this point since the boatbuilding tradition of one of the present work's study areas is strongly linked to one class, and the other study area is strongly linked to the other class. Boatbuilders in the Hardanger region have always employed the shell method, and builders in the Trinity Bay region have always used the skeleton method.[25] Accordingly, to properly understand traditional design practices within the two regions, one must not lose sight of the fact that fundamental differences in construction methodology account for profound differences in the ways the regions' builders conceptualize the forms of the boats they create. Let us now return to the subject of the formal practice of vessel design (naval architecture) and its relationship to these two construction methodologies.

Over the past five hundred years, a few seminal systems have been used by design specialists in various parts of the world to create the initial designs for vessels. To varying degrees, these systems, or key elements of them, have been picked up by the builders of vernacular craft.

Probably the oldest means of defining the shapes of hulls built with the skeleton method involves the use of one, two, or three transverse frames set up on a keel with several longitudinal battens (i.e., thin, flexible pieces of wood) wrapped, or "sprung," around them to establish the basic hull form.[26] This technique is sometimes called the master frame and batten method. Today, use of master frames and battens is widespread among traditional builders, and I have observed this system in use throughout North America and Europe.

A related system, called whole-moulding, was probably developed in Europe in the sixteenth century and remained in use by ship designers until the mid-eighteenth century. This complex technique involved an essentially mathematical definition of a series of sections according to rules for their expansion based on the tangents of arcs. With this method we begin to observe the use of architectural drawings called lines plans. Until recently, it was generally believed that whole-moulding was replaced by another method and went out of existence sometime in the eighteenth century. However, recent research in Newfoundland[27] and Brazil[28] has uncovered unmistakable elements of this pivotal technique in the practices of contemporary, traditional builders of skeleton hulls.

The use of carved, wooden half-hull models led to the abandonment of whole-moulding, at least among European ship designers. These scale models served as tangible representations of hull forms and allowed the designer to obtain a three-dimensional, rather than a two-dimensional, picture of planned vessels. The measurements of the full-scale vessels were obtained by the proportional expansion of measurements taken from the models. This technique remained in general use by professional ship designers for about two hundred years. Many builders of vernacular craft continue to employ it for both shell and skeleton hulls.

The next major development in formal naval architecture took place about a century ago. At this time, certain theories of hull resistance came to be widely accepted by design specialists and the half-hull technique was supplanted by graphically-developed lines plans. Yielding measurements of far greater accuracy than those obtained from half models, this technique is now the international standard for naval architecture and can be used to derive designs appropriate for any method of construction. Although my fieldwork indicates that the development of lines plans is sometimes accomplished by traditional builders, employment of this technique appears to be somewhat less common than the other techniques mentioned earlier.

My point in this cursory review of some five centuries of naval architecture is that, since the design techniques developed by formally trained design specialists have often influenced folk tradition, these antecedent methods should be studied to better understand folk practices. Conversely, the history of naval architecture may be better understood through an analysis of traditional practices that, in some cases, are the only observable links with the past.

Published accounts of the history of naval architecture suggest a steady progression of new and improved techniques replacing the old and inadequate. Within the contexts of traditional practices, however, this chronology is rarely as progressive or as neatly defined. For example, apart from the carving of dug-out canoes, I have observed the other four seminal design techniques discussed--master frame and batten, whole-moulding, half-modeling, and graphically-developed lines plans--all in use within a relatively small region of eastern Newfoundland. To say the least, determining how this situation may have developed is not easy.

Beyond consideration of the impact of the products of elite culture upon folk culture, there are other things that can be learned by examining design-related devices. For example, we can learn the extent to which such things as moulds, models, and templates contribute to the maintenance of design conventions. We can also learn about the degree to which a builder relies on previous designs when building a new craft, and especially in cases where these devices are handed down from one generation to the next, or lent by one builder to another, we can gain insight into the nature of design evolution.

Another large question that can be addressed is: To what extent is the traditional builder bound by the design conventions of his region? Underlying this question is the concept of the "twin laws," or forces, of folklore process.[29] These opposing forces are conservatism, represented by local, traditional practices, and dynamism, represented by a person's desire for innovative, individual expression. At issue is the degree to which the individual builder's products reflect not only his own particular tastes and skills, but also the aesthetics of the folk group for whom he performs. Determining a group's aesthetic domain seems a daunting task at first, but it does not have to be. Localized notions of correctness apply to nearly all aspects of a boat, including such things as form, construction, use, outfitting, decoration, and even the sound of its engine. These local rules are well-known by experienced boatbuilders and boat users, but are seldom verbalized.

Perhaps the easiest way to ascertain these rules is by noting instances where rules are clearly broken. For example, while I was interviewing a number of Norwegian builders from the Hardangerfjord region, several of them casually asked if I had seen a boat built by another local builder to his own unique design. When I replied that I had not, most began to ridicule the unorthodox design. Clearly, it broke so many long-held rules about acceptable hull shape that they felt compelled to point out that it did not represent their cherished tradition. I have seen the same sort of thing take place around North American harbors when "strange" boats come into view. On one occasion, I was walking along the harbor of a Newfoundland community with a local builder in order to solicit his views on the designs of the boats moored there. When we came to one craft he told me, in no uncertain terms, that it was a disgrace. "Why?", I asked. "Well, just look at that stem," he said, "with a shape like that you can tell that she wasn't built here." In short, then, one can begin to flesh out a group's aesthetic domain by carefully noting negative reactions such as these. Misfits help define, often in a very noticeable, unequivocable manner, what does fit.[30]

In a paper read at the 1985 meeting of the American Folklore Society, Gerald Pocius startled a few in the audience by asserting that "furniture gossips."[31] I maintain that boats also gossip; that they communicate much to the builders and their audiences. As Gilmore has observed:

> People who talk boats together pass among themselves certain ideas about boats and a detailed vocabulary specifying boat behaviors, shapes, parts, construction techniques, and features and locations in the boat's environment. How people think about boats, and where and to whom they choose to talk boats in depth express as well important folk networks of individuals. Forming "conduits" through which certain kinds of information

are promulgated, circulated, and kept alive, these networks explain the existence of several schools of thought regarding fishing, fishing technology, and boat building practices, indicate the seats of personal power and influence within the fishing and waterfront community, and provide clues to the forms boats do take.[32]

In summary, it is my contention that our understanding of the creation of an artifact, such as a vernacular boat, within its social context can be enhanced by examining the mechanisms of traditional systems of design. Much insight may be gained by: (1) attempting to ascertain the "deep structure" of an artifact as perceived by its maker, (2) examining the relationship between the activities of formally trained design specialists (e.g., naval architects) and those of informally trained, traditional boatbuilders, (3) by investigating the use of certain devices in the design process (e.g., moulds, models, templates, measuring sticks), (4) by charting the aesthetic domain recognized by the form maker and his audience, and (5), as Gilmore as admirably demonstrated, by examining the communicative networks that link builders, users, and other residents of maritime communities through the medium of the boat.

The present study is an attempt to demonstrate the application of this approach. Specifically, it seeks to examine the systems of tradition design employed by boatbuilders in two North Atlantic regions: Trinity Bay, Newfoundland, and Hardangerfjord, Norway. The selection of these two study areas does not result from any direct connection between their respective boatbuilding traditions. And, while there are general similarities between environment, population density, and maritime occupations, these were not deemed to be of central importance. Of primary importance, however, was the fact that both regions possess boatbuilding traditions of great longevity (over 300 years in the case of Trinity Bay, and over 1,000 years in the case of Hardanger), and these traditions, though diminished over the past century, are still vital and distinctive elements of their respective cultural landscapes.

Because an ethnographic approach is essential for the gathering of critical data concerning builders' thoughts and actions about the design process, the majority of the data used in this study were collected during the course of interviews with 24 builders in the two study areas. Fieldwork in the Trinity Bay region was undertaken intermittently between 1980 and 1984. Fieldwork around Hardangerfjord was undertaken in the spring of 1983.[33]

This study is divided into three main sections, one section for each study area, followed by a Conclusion. Each of the first two sections consists of four sub-sections. The first sub-section is an overview of the study area's geography, geology, topography, climate, vegetation, history, and economy. The second is a discussion of the area's boatbuilders, and explores such topics as occupational training, categorization of builders, types of boats constructed, and the marketing strategies builders use to sell their products. The third sub-section examines the principal changes that have affected boatbuilding practices within the past 100-150 years, changes such as new forms of technology, new designs, new construction techniques, government boat financing programs, and the revival of interest in traditional products and skills. The fourth and concluding sub-section is a detailed exploration of the central elements of the design systems employed in each study area. Topics discussed in this sub-section include measurement formulas, the use of design-related devices, the interrelationship of design techniques, the aesthetic dimension of design, the expression of builders' individuality through design, adherence to traditional design conventions, and builders' perceptions of the relationship between aspects of hull form and aspects of hull performance. While the organization of each of the two chapters is identical, the configuration of discussions within the sub-sections differs. These differences stem mainly from constraints on the time that could be spent in the field in Norway, as well as the author's lack of total fluency in the Norwegian language. The second main section is followed by the Conclusion, the Bibliography, eight Appendices, and a Glossary.

Notes

1. Chapelle's work is the subject of JoAnn J. King's doctoral dissertation: "Howard I. Chapelle: Maritime Scholar and His Contribution to Maritime Preservation," Ph.D. diss., George Washington University, 1985. See also: Peter H. Spectre, "The Legacy of Howard Chapelle: The Study of the Maritime Past and the Preservation of the Maritime Present," Woodenboat 84 (Sept.-Oct. 1988), 76-88.

2. Howard I. Chapelle, American Small Sailing Craft: Their Design, Development and Construction (New York: W. W. Norton, 1951).

3. An interesting outcome of the popularity of American Small Sailing Craft is that many of the boat types depicted in the book have been built, far from the regions where they were developed, by amateur and professional builders using Chapelle's lines and construction plans.

4. Basil Greenhill, Archaeology of the Boat: A New Introductory Study (Middletown, Ct.: Wesleyan University Press, 1976).

5. Arne Emil Christensen, Jr., Inshore Craft of Norway from a Manuscript by Bernhard and Øystein Færøyvik (Oslo: Grøndahl & Søn Forlag A. S., 1979).

6. Asbjørn Klepp, Nordlandsbåtar og båtar fra Trøndelag, Norske Båtar bind IV (Oslo: Grøndahl & Søn Forlag A. S., 1983).

7. Christian Nielsen, Wooden Boat Designs: Classic Danish Boats Measured and Described, translated by Erik J. Friis (New York: Charles Scribner's Sons, 1980). This work was originally published as Danske Bådtyper: Opmålt og Beskrevet af Christian Nielsen (Copenhagen: Høst & Søns Forlag, 1977).

8. Wolfgang Rudolph, Inshore Fishing Craft of the Southern Baltic from Holstein to Curonia, Maritime Monographs and Reports no. 14 (London: National Maritime Museum, 1974).

9. Peter Skanse, Torsösnipan (Skärhamn: Båtdokumentationsgruppen HB, 1985); Peter Skanse and Staffan Claesson, Båtar i Blekinge (Skärhamn: Båtdokumentationsgruppen HB, 1983); Peter Skanse and Staffan Claesson, Båtar i Halland (Skärhamn: Båtdokumentationsgruppen HB, 1984); Peter Skanse and Staffan Claesson, Båtar i Dalsland (Skärhamn: Båtdokumentationsgruppen HB, 1985); Peter Skanse and Staffan Claesson, Båtar i Skåne (Skähamn: Båtdokumentationsgruppen HB, 1986); Peter Skanse and Staffan Claesson, Båtar i Bohuslän (Skärhamn: Båtdokumentationsgruppen HB, 1987).

10. Eric McKee, Working Boats of Britain: Their Shape and Purpose (London: Conway Maritime Press in association with the National Maritime Museum, 1983).

11. See, for example: Malcolm Comeaux, Atchafalaya Swamp Life: Settlement and Folk Occupations (Baton Rouge: Louisiana State University Press, 1972); Malcolm Comeaux, "Origin and Evolution of Mississippi River Fishing Craft," Pioneer America 10 (1978), 73-97; Edwin Doran, Jr., Noa, Junk, and Vaka: Boats and Culture History, University Lecture Series, Dec. 11, 1973 (College Station, Texas: Texas A & M University, [1974]); William P. Knipmeyer, "Folk Boats of Eastern French Louisiana," edited by Henry Glassie, in American Folklife, edited by Don Yoder, 105-149 (Austin: University of Texas Press, 1976); Olof Haslöff, Henning Henningsen, and Arne Emil Christensen, Jr., eds., Ships and Shipyards, Sailors and Fishermen: Introduction to Maritime Ethnology (Copenhagen: Rosenkilde and Bagger, 1972).

12. Bronislaw Malinowski, Argonauts of the Western Pacific, 1922, rpt. (New York: E. P. Dutton, 1961); Raymond Firth, Malay Fishermen: Their Peasant Economy (London: Kegan Paul, Trench, Trubner and Co., 1946).

13. Stephen R. Braund, The Skin Boats of Saint Lawrence Island, Alaska (Seattle: University of Washington Press, 1988); J. Garth Taylor, Canoe Construction in a Cree Cultural Tradition, Canadian Ethnology Service paper no. 64 (Ottawa: National Museums of Canada, 1980); and David W. Zimmerly, Hooper Bay Kayak Construction, Canadian Ethnology Service paper no. 53 (Ottawa: National Museums of Canada, 1979).

14. See: C. Richard K. Lunt, "Lobsterboat Building on the Eastern Coast of Maine: A Comparative Study," Ph.D. diss., 1976; Paula J. Johnson, ed., Working the Water: The Commercial Fisheries of Maryland's Patuxent River (Charlottesville, Va.: University Press of Virginia and the Calvert Marine Museum, 1988); David A. Taylor, Boat Building in Winterton, Trinity Bay, Newfoundland, Canadian Center for Folk Culture Studies paper no. 41 (Ottawa: National Museums of Canada, 1982).

15. Janet C. Gilmore, The World of the Oregon Fishboat: A Study in Maritime Folklife (Ann Arbor, Mi.: UMI Research Press, 1986).

16. Gilmore, The World of the Oregon Fishboat, 16.

17. Gilmore, The World of the Oregon Fishboat, 13.

18. Gilmore, The World of the Oregon Fishboat, 13.

19. Noam Chomsky, Syntactic Structures. Janua Linguarum, 4 (The Hague: Mouton, 1957), 50-1.

20. David A. Taylor, "What Makes a Good Boat? Toward the Understanding of a Model of Traditional Design," Canadian Folklore Canadien 4, nos. 1-2 (1984), 77-82.

21. See, for example: Henry Glassie, Folk Housing in Middle Virginia: A Structural Analysis of Historic Artifacts (Knoxville: University of Tennessee Press, 1975).

22. In making this summary, I have been aided by Letcher's concise and lucid discussion of the history of vessel design. See: John S. Letcher, Jr., Mathematical Hull Design for Sailing Yachts (New York: The Society of Naval Architects and Marine Engineers, 1981), 1-3. The evolution of watercraft is extensively discussed in Greenhill, Archaeology of the Boat, and Wolfgang Rudolph, Boats--Rafts--Ships (New York: Van Nostrand Reinhold Co., 1974).

23. See, for example, Greenhill, Archaeology of the Boat, 91-152. He refers to these four vessel types as "the four roots of boatbuilding."

24. Within these two general categories many sub-categories exist. See, for example, the chapter "Shells, Skeleton and Things-in-Between" in Greenhill's Archaeology of the Boat, 60-88. In addition, though rare, instances of vessels built with a combination of shell and skeleton methodologies have been documented. See: Olof Hasslöf, "Main Principles in the Technology of Ship-Building," in Ships and Shipyards, Sailors and Fishermen: Introduction to Maritime Ethnology, ed. Olof Hasslöf, Henning Henningsen, and Arne Emil Christensen, Jr. (Copenhagen: Rosenkilde and Bagger, 1972), 57-60.

25. Currently, some Hardanger builders employ the skeleton methodology. However, as will be discussed in a later section, this is a fairly recent development.

26. Since the provenance of the skeleton construction method is unclear, it is not possible to date the introduction of the master frame and batten.

27. Taylor, Boat Building in Winterton; David A. Taylor, "The Contemporary Use of Whole-Moulding in the Vicinity of Trinity Bay, Newfoundland," paper presented at the 4th International Symposium on Boat and Ship Archaeology (Lisbon and Porto, Portugal, 1985).

28. John P. Sarsfield, "From the Brink of Extinction: Mediterranean Molding," Woodenboat 66 (Sept.-Oct. 1985), 84-9; John P. Sarsfield, "Survival of Pre-16th Century Mediterranean Lofting Techniques in Bahia, Brazil," paper presented at the 4th International Symposium on Boat and Ship Archaeology (Lisbon and Porto, Portugal, 1985).

29. Barre Toelken, The Dynamics of Folklore (Boston: Houghton Mifflin, 1979), 34-6.

30. Christopher Alexander, Notes on the Synthesis of Form (Cambridge: Harvard University Press, 1967), 23-4.

31. Gerald L. Pocius, "Furniture as Gossip," paper read at the annual meeting of the American Folklore Society, Cincinnati, Ohio, 1985.

32. Gilmore, The World of the Oregon Fishboat, 16.

33. Interviews were tape recorded with most informants. The original recordings, along with accompanying fieldnotes, are on deposit at the Memorial University of Newfoundland Folklore and Language Archive (MUNFLA).

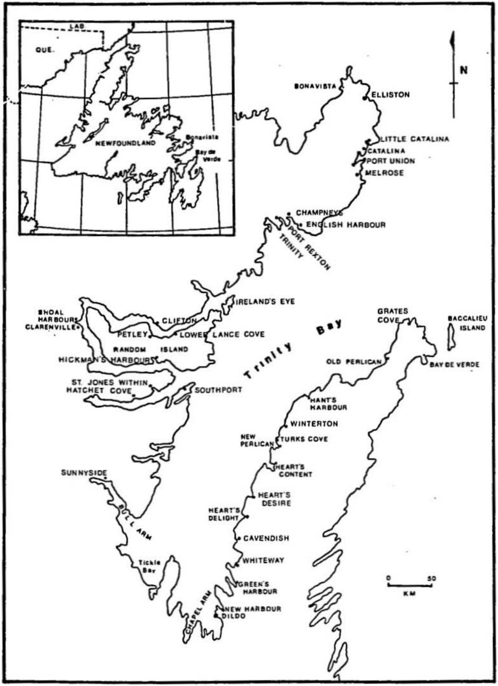
CHAPTER 1, SECTION 1: The Study Area—Trinity Bay

Research in Newfoundland was carried out in several communities ("outports") situated along the shores of Trinity Bay, one of the principal bays of the Avalon Peninsula in the southeast corner of the island of Newfoundland. It is separated from Conception Bay, to the east, and Bonavista Bay, to the northwest, by long peninsulas. To the south, it is separated from Placentia Bay by the narrow Isthmus of Avalon. The 48th line of latitude runs through the center of the bay, neatly dividing its northern and southern halves.

Running in a north-northeasterly direction, the bay is approximately 80 kilometers in length, and about 30 kilometers across where it opens to the North Atlantic. On the eastern side of the bay, situated adjacent to nearly every cove of appreciable size, from Grates Cove, at the mouth of the Bay, to Old Shop, at the head, are 23 small fishing communities. These communities are connected by a single coastal road (Route 80). About 8 kilometers south of Old Shop, this road connects with the Trans-Canada Highway, Newfoundland's sole continuous east-west highway and main route for ground transportation.

The orientation of the 55 communities of the western shore is quite different from that of eastern shore communities. Instead of

Figure 1: ***TRINITY BAY*** , **NEWFOUNDLAND**



being spaced along the shore at relatively regular intervals, they are concentrated in four primary areas: at the head of the bay, in the middle of the bay (along both shores of Southwest Arm, on Random Island, and on the mainland opposite Random Island), in the western side of the bay in a cluster around the community of Trinity, and a little further north in a cluster around the community of Catalina. As with the eastern shore communities, communities along the western shore are all located very close to the water. The Trans-Canada Highway parallels the western shore until it reaches Clarenville, where it turns northwest and away from the bay. From Clarenville, several paved and dirt roads (including Routes 230, 231, and 232) provide access to communities along the northern half of the western shore.

The Trinity Bay region is sparsely populated and has a total population of slightly more than 27,000. Most communities have a population of less than 400.[1] Clarenville, the bay's most populous community, serves as a regional center for much of the western shore. In addition to a number of large food, clothing, and furniture stores, Clarenville also boasts a shipyard with haul-out facilities (Clarenville Shipyard), a large lumber company (Newfoundland Hardwoods), and a Canadian National Railway freight yard. Catalina, approximately 80 kilometers north of Clarenville, is a community of economic importance mainly because of the large Fishery Products International Ltd. fish plant located there. The town of Bonavista, the principal community on Bonavista Bay to the north, also functions as a service center for the communities between Trinity and Spiller's

Cove. Along the eastern shore of the bay, no community fills the role of a regional center. The nearest communities that serve this function include Carbonear, Harbour Grace, and Bay Roberts, all of which are located along the western shore of Conception Bay. Residents of the eastern shore occasionally make shopping trips "to town," meaning St. John's, the provincial capital and largest city in the province (population: 84,000).

Preliminary fieldwork was carried out in every community of the bay. More intensive fieldwork, consisting of interviews with boatbuilders, observation of boatbuilding techniques, photography, and measurement of boats and design-related artifacts, was conducted in thirteen communities, namely: Grates Cove, Old Perlican, Winterton, New Perlican, Whiteway, Hatchet Cove, St. Jones Within, Hickman's Harbour, Clifton, Trinity, Port Union, Catalina, and Little Catalina.

Topography, Geology, Vegetation, and Climate

With the exception of a few low-lying marshlands (particularly in the areas south and west of Catalina), nearly all the land that abuts Trinity Bay consists of bluffs that, from water-level, resemble huge, blunt fists. On the eastern side of the bay, these bluffs rise steeply, achieving heights of 200-400 feet within a quarter mile or less from water's edge. This topography is also characteristic of the western side of the bay, but elevations are somewhat greater there, particularly along the middle third of the shore. The 808 foot high bluff at the southeast corner of Random Island is the point of highest elevation on both shores of the bay.

The shoreline of the eastern side of the bay is relatively regular, and is interrupted only by coves of modest size, many of which afford little protection for boats. The harbor at Heart's Content, at the midpoint of the shore, is the largest on the eastern side of the bay. The shoreline of the western side of the bay is much more irregular. Particularly striking geographical features include Bull Arm, a large inlet to the south, and three deep, fjord-like sounds in the middle section of the shore known as Southwest Arm, Northwest Arm, and Smith's Sound, respectively. Southwest Arm and Northwest Arm bracket a long peninsula. To the north of the peninsula, bounded by Northwest Arm on the south and Smith's Sound to the north, is Random Island, the largest island in the bay.

Hundreds of small lakes, ponds, and streams dot the region's landscape, and are undoubtadly signs of glaciation. Some are found close to the shore of the bay, within the boundaries of communities, but most are located further inland, in the marshy and boggy uninhabited center portions of the eastern and western peninsulas called "barrens." Many lakes and ponds are local residents' prime "trouting" spots.

The depth of the waters of the bay drops off quickly. Within a kilometer of the shore, depths of 30-40 fathoms are achieved. Further out, along the centerline of the bay, depths average 140-160 fathoms. The deepest water in the entire bay is found off Random Island, where depths of over 300 fathoms have been recorded. Smith's Sound, Northwest Arm, and Southwest Arm are deep in places and their maximum depths are 142, 89, and 166 fathoms, respectively.[2]

Geologically, the Trinity Bay region falls within the Avalon Fold Belt of the Appalachian Orogen, the latter being a band of mountains produced 50-500 million years ago during a period of geological activity known as the Phanerozoic Orogenies.[3] The Avalon fold belt, composed of sedimentary and volcanic rocks with intrusions of granite, includes all of the Avalon peninsula and extends offshore as far as the Atlantic continental shelf. The entire territory of Trinity Bay, with the exception of a small area at the head of the bay, was created during the Hadrynian period of the Proterozoic geological age. The area at the head of the bay is slightly older, having been formed during the Cambrian period of the Paleozoic age.[4]

With the exception of the tips of the peninsulas that bracket Trinity Bay, all the natural vegetation around the bay falls within the category known as "boreal forest." Within this vegetation zone, coniferous trees predominate. The most common types of trees found are white spruce (Picea glauca), white birch (Betula papyrifera), larch (Larix laricina), and balsam fir (Abies balsamea). Within the areas known as the barrens, small trees, shrubs, lichens, mosses, and a variety of flowering plants are found. The tips of the peninsulas lying to the east and west of the bay fall into the vegetation zone called "open woodland," that consists mainly of stunted coniferous trees, such as spruce and fir, as well as patches of heath.[5] On the eastern shore of the bay, much of the coastal band where communities are situated has been virtually denuded of trees as a result of the cutting of trees for firewood and building materials that has gone on for nearly 300 years. Consequently, stands of timber of any size are usually found several miles inland. On the western shore of the bay, forested areas are both closer to the shore and more substantial. Those circumstances are probably due to the fact that the topography of the western side of the bay is much more irregular than the eastern side's, thus making it considerably more difficult to harvest trees, and also because the deep sounds, especially those at the middle section of the shore, provide a more favorable growing environment than the exposed headlands characteristic of the remainder of the bay's shores. In any event, the forest resources of the western side of the bay are much more robust than those of the opposite shore and boatbuilders from both sides often go there to harvest trees to use as boatbuilding material.[6]

The climate of Trinity Bay, like that of eastern Newfoundland in general, is influenced by the cold waters, propelled by the Labrador current, that flow along the coast. These waters inhibit high temperatures in the summer. During the winter months, the temperature of the sea moderates the air temperature, creating warmer conditions than are commonly found at the same latitude on the mainland. Maximum temperatures recorded for the Trinity Bay region are: about 32°F for January, 36°F for April, 63°F for July, and 50°F for October.[7] Because there are, on average, only 100-120 frost-free days per year, the growing season is short. It usually begins in the middle of May and concludes around the middle of October.[8]

During the late spring and sometimes as late in the year as June, icebergs formed off Labrador are carried south along the coast by the Labrador current. Frequently, enormous blue-white bergs and other, less stunning, formations of ice enter Trinity Bay.[9] Typically, fishermen wait for the ice to leave the bay before setting out their valuable cod traps and other static fishing gear so as not to risk losses.

Precipitation is a common feature of Trinity Bay's climate and there are approximately 200 days per year when it occurs. The annual rate of precipitation ranges from 76 to 152 centimeters, with winter recordings slightly higher than summer recordings.[10] During the winter snow storms are common occurrences, but, owing to the warming effect of the sea, snow seldom accumulates in large quantities along the coast, except in especially severe winters. Fog is extremely common, especially during the warmer months.

History and Economy

The first contact Europeans had with Trinity Bay probably occurred during the latter third of the sixteenth century when migratory fishermen from several nations, including England, France, Spain, and Portugal, spent summers fishing for cod off the shores of Newfoundland. Prior to 1584, no nation had laid claim to Newfoundland since the rich cod stocks were seen to be of paramount value, not the resources of the island itself. Consequently, little importance was then placed on permanent settlement. The English, though not always present in numbers greater than the fleets of other nations, seem to have been able to assert a kind of informal authority over fishing harbors along the eastern shore of the Avalon Peninsula.

English fishing activities were concentrated all along the shore from Cape Race (about 100 kilometers south of present-day St. John's) northward to Cape Bonavista. The type of fishing they carried out involved men fishing with baited handlines in small boats close to shore.[11] In many areas along the shore, particularly near coves where land was relatively flat, the processing of catches was carried out. This consisted of splitting, washing, and salting the fish, then laying it out to dry. By the 1670s, around the shores of Trinity Bay seven places were regularly employed as fishing bases: Old Perlican, New Perlican, Silly Cove (later Winterton), Hant's Harbour, Heart's Ease, Heart's Content, and Trinity. Old Perlican appears to have been the most active site at this time with over 400 individuals and 50-60 boats involved. Next came Trinity, with between 100 and 250 fishermen, and 20-40 boats. The number of participants at the other communities varied between 40 and 100 per season.[12] Activity of lesser intensity was probably carried on at other spots with sheltered harbors near Trinity, including Ireland's Eye, Bonaventure, Trouty, Salmon Cove, English Harbour, Ragged Harbour, and also further up the western shore at Catalina.[13]

While most of the fishermen returned to England at the end of the fishing season in September or October, a few generally stayed behind in order to maintain their fishing companies' claims to the best fishing berths. Such men (usually referred to as "planters") were the first Europeans to live year-round in Trinity Bay. Following the conclusion of the fishing season, they shifted their energies from the sea to the land and involved themselves in such activities as cutting trees for firewood and building material (for houses, fishing premises, and boats), and hunting and trapping game.

Year-round settlement of Newfoundland was first advocated by English merchant Anthony Parkhurst in 1578, who argued that this was a more economical and productive manner of exploiting the fishery than the migratory system.[14] In 1584, Humphrey Gilbert landed at St. John's and claimed Newfoundland in the name of Queen Elizabeth I. However, this grandiloquent act, which asserted the value of the land and implied future settlement, did not have any significant impact on settlement at the time. By the first half of the seventeenth century, however, attempts at colonization were made at a number of locations along Conception Bay and the Southern Shore.[15] From these often fitful beginnings, and despite opposition from those who viewed permanent settlement as a threat to the migratory fishery, the number of permanent inhabitants gradually increased.[16] Early census records show that in the 1670s, approximately 1200 people stayed the winter (about 15% of the summer population), and by the 1770s there were nearly 12,000 (about 50% of the summer population).[17] By the end of the eighteenth century, almost 90% of those who fished during the summer stayed on the island through the winter.[18]

In the Trinity Bay region, population growth was slow during the seventeenth and eighteenth centuries. In 1700, the population was a mere 839.[19] By 1772, the permanent population was more than 1,500, with 600 residing in and around the community of Trinity.[20] Between 1800 and 1830 a new wave of English immigration more than doubled the bay's population. During this period, "virtually all of the contemporary hamlets in the outer bay area were established and a seasonal cycle of work, focusing on a summer cod fishery, subsistence agriculture, and winter logging operation was followed."[21]

A striking characteristic of the settlement of Newfoundland during the eighteenth and nineteenth centuries is that immigrants came from highly localized regions in southwestern England and southeastern Ireland.[22] As Mannion notes, "It is unlikely that any other province or state in North America drew such an overwhelming proportion of its immigrants from such localized source areas in the European homeland over so substantial a period of time."[23] The majority of English immigrants to Trinity Bay between 1650 and 1850 came from Devon and Dorset.[24] Many Irish migratory laborers came to the region in the middle of the eighteenth century, but most did not settle permanently. Immigrants from England were recruited by West Country firms to work in the Newfoundland fishery, however, they were also engaged with other types of work in the off-season. As Mills explains in an article on Trinity Bay folk architecture:

From the outset, men from all parts of the Bay were employed in the woods. Some received their orders directly from West Country mercantile firms at Trinity or indirectly through their agents in smaller communities such as Hant's Harbour or New Perlican; others operated independently, moving to various parts of the Bay in late fall to cut firewood and to saw logs which would later be used for boatbuilding, house construction or general maintenance of their property, bartering only their surplus to the commercial firms. Before they came to Trinity Bay, many of the West Countrymen had little experience working with wood, but local timber became the dominant--indeed virtually exclusive--medium of house construction from the very inception of settlement and winter logging often served as a useful introduction.[25]

Throughout the nineteenth century and up until the 1950s (and even more recently in some parts of the bay), the subsistence activities of the majority of Trinity Bay residents followed the cyclical pattern established long ago. From May until October, men fished in the bay, on the Grand Banks, or off the coast of Labrador. Meanwhile, the womenfolk looked after the home and children, tended small kitchen gardens consisting mainly of root crops (e.g., potatoes, carrots, turnips) and cabbage, looked after a small number of livestock, and made hay for winter fodder. If a fisherman fished in the bay and returned home regularly with his catch, his wife and any of their children who were old enough often pitched in to help him gut, head, split, wash, and salt the fish. Women also helped "make" the fish, that is, dry the lightly salted fish in the air by spreading it out on "flakes" in the morning and gathering it up at the end of the day.[26] During the fall, after the end of the fishing season, and throughout the winter, men cut trees in the local forests to be used for home heating and for building materials. They also hunted and trapped game in the same territory. Many men also hunted for seals during the winter, either out in the bay from small boats, or (especially after 1814) as crew members ("swilers") aboard large sealing vessels that went to meet the seal herds on the ice off Labrador. During the months of spring, men prepared boats and gear for the upcoming fishing season.

Up until the start of the twentieth century, the economy of outport society was based on a truck system initially established by English merchants. Under this system, the merchants imported a variety of goods from England and elsewhere which they used to barter for the fish produced by the local residents. Typically, a fisherman was bound to sell his fish to the merchant to whom he was indebted. The local merchants, in turn, usually sold the fish they had obtained to a larger mercantile house in a nearby regional center or in St. John's in exchange for goods shipped in from abroad. Clearly, the merchants wielded enormous power over the fisherman, power that was often subject to egregious abuse. As recently as 1933, a report of a Newfoundland Royal Commission stated that the organization of the islands fisheries was "largely feudal" and that "large fortunes were made by the merchants; the fishermen though saved from the danger of destitution, were little more than serfs with no hope of becoming independent."[27]

The twentieth century brought vast changes to Newfoundland, the most prominent being confederation with Canada in 1949. Other changes (many the direct result of confederation) affected life on the island tremendously, and these included improvements in communications, education, health care, and transportation, and the implementation of rural electrification. Also, the provincial government embraced a program of industrialization and, as part of this plan, many Newfoundlanders were encouraged to break away from the old traditional economy and obtain employment in this sector. In addition to these efforts, in order to consolidate the population for the enhancement of the delivery of social services, the government initiated a controversial program of centralization (also known as "resettlement"). Although it was intended to improve the quality of life in isolated communities by moving people from these communities to larger "resettlement centers," many of the consequences of this program were negative.[28]

Technological change in the fishing industry was and continues to be a significant feature of the twentieth century. During the first quarter of the century, engine-powered vessels began to replace sailing craft. By the 1960s, large steel trawlers became the predominant vessels in the offshore fishery, and, at about the same time, wooden longliners began to be major harvesters in the near-shore fishery. Nylon and monofilament replaced cotton and other less durable materials used to fashion trawls, gillnets, and longlines, and, coupled with electronic navigation and fish-finding equipment, made fishing considerably more efficient. In recent years, the provincial government's fishery policy has tended to favor the larger, more efficient mid-shore and off-shore fishing vessels over the hundreds of small, open inshore boats. Also, by mid-century, the advent of the "quick freeze" fish plant, combined with an increase in the market's demand for frozen fish, led to the rapid acceptance of freezing technology by fish plants and a concomitant sharp decline in the demand for lightly salted, air-dried fish. Consequently, family involvement in the "making" of fish, a practice that had gone on for generations, virtually came to an end.

While the trends of the past few decades suggest that the inshore fishery, around which outport life has revolved for generations, is declining steadily, it still plays a significant role in the lives of many Newfoundlanders, including residents of Trinity Bay. While the number of commercial fishermen has declined over the years, as of 1983 there were 1,978 licensed fishermen in the region. Of this number 1,053 were full-time fishermen and 925 were part-timers.[29] Altogether they operate a total of 1,111 fishing boats of which 85% are under 35 feet in length.[30] Currently, there are 21 fish plants of various sizes along the shores of the bay, plus three plants just beyond the limits of the bay--two in Bonavista and one in Bay de Verde. In addition to handling the catches of local fishermen, these plants employ over 4,000 workers.[31] Many residents of Trinity Bay who do not work in the fishing industry are employed in a variety of government or private sector service occupations based in their communities or in larger regional centers such as Bonavista, Catalina, Clarenville, Carbonear, and Harbour Grace. Some residents of the eastern shore of the bay commute to work in St. John's or the towns that surround it.

The Boatbuilding Industry

It is likely that boat and ship building occurred in Trinity Bay villages not long after initial European contact. Many studies of Newfoundland's early history suggest that the first Europeans to build boats were migratory fishermen who spent winters on the island in order to protect fishing equipment, to be in place to claim fishing berths, and to build and repair boats and buildings.[32] However, little data has surfaced that can be used to provide specific answers to the most elementary questions about the boat and ship building. When were the first vessels built? Who built them? Where were they built? What vessel types were built? It is likely that documentary evidence exists (probably in archives in Newfoundland and the United Kingdom in the form of business records, diaries, vessel registries, and newspapers) that would shed light on these matters, but, to my knowledge, no scholar has yet explored these data comprehensively with the goal of illuminating the early history of the Trinity Bay boat and ship building industry.

Nonetheless, a small amount of helpful data has been published and provides at least a partial view of these activities. For example, Melvin Rowe writes that archival records show that shipbuilding began

Plate 1: Fred Jackson's boatbuilding facility, Whiteway

in the town of Trinity in the middle of the eighteenth century when Benjamin Lester, a local merchant, began to build ships for use in his import-export business.[33] Rowe also states that shipbuilding commenced in Heart's Content, on the opposite side of the bay, in 1783, when construction activities were initiated by James Rowe of Trinity.[34] According to the commercial journal of the Slade and Kelson firm of Heart's Content, Rowe "not only built schooners for his own use, and for sale, but for his sons to engage in the seal fishery."[35] Rowe acknowledges that while there is no record extant of the number of schooners James Rowe built during "the first 20 years he operated the dock," it is known that Rowe's operation built two vessels in 1804: the schooner Falcon (67.5 tons), and the schooner Flora (47 tons).[36] In passing, Rowe notes that the only other shipbuilding operations in Trinity Bay that year were at Trinity, Heart's Content, and New Harbor. The yard at New Harbour was operated by the Newhook family.[37] In addition, geographer C. Grant Head notes that around 1770 "some seventy men kept busy at shipbuilding in Trinity Bay, probably at Trinity itself, and this is the largest percentage of a bay's winter population to be so employed anywhere in Newfoundland for this time . . . ."[38] According to Harold A. Innis, "small ships were built chiefly at Trinity and Harbor Grace. Eighteen of 1,743 tons were built in 1787, 34 in 1788, and 22 in 1789."[39]

A short article published in the June 8, 1875, issue of the newspaper The Newfoundlander provides interesting and detailed observations on the state of Trinity Bay shipbuilding at the time. Its anonymous author writes:

> . . . Having done Trinity Bay, I wish to place before you a few remarks touching the progress of ship-building along the South Shore . . . . I remained a day or two in Heart's Content . . . I watched with gladsome eyes the moulding of crude material into stately vessels . . . . The first shipyard I inspected was that of Mr. Joseph Hopkins, where two fine vessels were finished, one about 80, the other about 50 tons. This is the class of ships we require the more effectually to prosecute our valuable fisheries . . . . I betook myself to the yard of Mr. Alfred Hopkins, who has turned out a splendid vessel about 80 to 90 tons . . . . Mr. Alfred Hopkins has another vessel on the stocks about 40 tons, and in the same yard Mr. Rowe has launched a perfect gem, about 30 tons, for fishing and trading purposes. Several skiffs have been built, all adding to the growing wealth of our fishing fleet . . . . Having cursorily glanced at Heart's Content, I strolled along to New Perlican where I was ushered into the presence of His Imperial Highness, Mr. R. Bemister, who took great pains to point out his large Leviathan on the stocks, about 120 tons, built for Jon Munn & Co. Alongside this magnificent ship, which is copper fastened and bolted, stands another vessel not so large but equally important to the development of our fisheries . . . .

> Trinity Bay has great facilities for ship-building, the material being easily procurable at very moderate cost, and plenty of skilled labor can be had to build good substantial vessels . . . . I did not go down the shore farther than New Perlican, but from reports I am led to believe that Messrs. Watsons are doing well and have turned out a couple of beautiful vessels. Hants Harbor is a progressive place, owing to the energy of Messrs. Watsons, one of whom is member for Trinity Bay . . . .[40]

This fascinating account paints a vivid picture of the bay's very active shipbuilding industry. It is interesting to note the author's observation that Trinity Bay is well suited to shipbuilding because of the availability of skilled laborers and raw materials, since these are the two central factors behind the establishment of the bay's reputation as a shipbuilding center, and are the factors that are still cited today in support of the claim that the region is the home of some of Newfoundland's most able boatbuilders.

Despite the lack of supporting documentation, it is probably safe to conclude that throughout the eighteenth and nineteenth centuries a number of commercial boat and shipbuilding enterprises were operated by merchants and by small family-run firms devoted primarily to vessel construction. Apart from commercial operations, it is a certainty that many fishermen in dozens of communities periodically built craft for their own use: small fishing boats, such as skiffs and punts, and large fishing and coasting vessels, such as schooners. As will be discussed at length in the following section, these two classes of boatbuilding operations (those run by full-time professionals and those run by part-time or "backyard" builders) have been maintained throughout the twentieth century.

Early in the twentieth century, a unique shipyard was established at Port Union. This yard, opened in 1916, was the shipbuilding facility of the Fishermen's Protective Union of Newfoundland, and the first fisherman-run yard in the province. In reviewing the progress of the yard during from 1916 to 1919, F. P. U. president W. F. Coaker wrote:

> In 1916 a Union shipbuilding plant was established by a Union Company at Port Union on the premises of the Trading Company, and has turned out a success under the supervision of Capt. James Jones, a noted ship-builder from Little Bay Islands. Up to the present the following ships have been launched: "Fisherman," 138 tons; "Nina L. C.," 408 tons; "Mintie," 125 tons; "F. P. Union," 84 tons—an auxiliary schooner used as a coaster by the Trading Company; "President Coaker," 304 tons, and a fishing schooner 70 tons. The keels will shortly be laid for two tern schooners of 150 tons each to be built for the Trading Company.[41]

By 1930, the F. P. U. shipyard had turned out a total of 30 schooners, plus three motor vessels.[42]

Another yard of particular prominence during the twentieth century is Clarenville Shipyard at Clarenville. Established by the Newfoundland Commission of Government in 1942, this illustrious yard has constructed many types and sizes of vessels. Of particular note are the "Splinter Fleet," ten 130 foot wooden trading vessels built at the yard during the 1940s, the fishing schooner Philip Lake (the last Grand Banks schooner built in Newfoundland), and a multitude of wooden longliners built in the 1970s.[43] After a period of decline in the late 1970s and early 1980s, in 1984 the yard was sold by the provincial government to a private firm, thus making it the largest privately-held shipyard in Newfoundland.[44]

Many yards of smaller scale have operated around the bay throughout the present century with varying degrees of success. Occasionally, some of these small yards achieved fine reputations as a result of a body of work or because of the construction of a vessel of particular significance. For example, Henry Stone's now defunct shipyard in Monroe is still famous as the yard that produced the Norma & Gladys, the fishing schooner built in 1945 that was reborn in the 1970s when purchased by the provincial government and used, literally, as a vehicle for the promotion of Newfoundland's distinctiveness.

Suffice it to say that Trinity Bay has, for a very long period of time, enjoyed one of the most esteemed reputations (if not the most esteemed reputation within the province) for the construction of boats and ships of high quality and as a cradle for boatbuilders. As many

Newfoundlanders suggested when I began this study: "Go to Trinity Bay. That's where they build the boats." The next section discusses the bay's contemporary builders—who they are, where they live, the vessels they build, the scale of their operations, and the marketing strategies they employ.

Notes

1. For population figures for all Trinity Bay communities, see Appendix D.

2. Water depths are taken from the nautical chart Newfoundland-East Coast, Cape Bonavista to St. John's. Map #14360. 34th edition (Washington: Defense Mapping Agency Hydrographic/Topographic Center, 1985).

3. The island of Newfoundland is part of the physiography of the Appalachian mountain chain that runs along the entire eastern coast of North America.

4. Government of Canada, The National Atlas of Canada. 4th rev. ed. (Ottawa: Macmillan Company of Canada, in association with the Department of Energy, Mines and Resources and Information Canada, 1974.), 27-28.

5. Government of Canada, The National Atlas of Canada, 45-6. For more detailed information about the plants and trees of Newfoundland, see: Ernest Rouleau, List of the Vascular Plants of the Province of Newfoundland (Canada) (St. John's: Oxen Pond Botanic Park, 1978); and A. Glen Ryan, Native Trees and Shrubs of Newfoundland and Labrador (St. John's: Parks Division, Department of Tourism, Government of Newfoundland and Labrador, 1978).

6. It is noteworthy that the presence of favorable conditions for timber growth in this area was commented upon as early as 1684 when the captain of the storm-damaged H.M.S. Tyger had to send a vessel from St. John's all the way to Smith's Sound in order to obtain suitable trees for masts. For an account of this incident, see: C. Grant Head, Eighteenth Century Newfoundland: A Geographer's Perspective, The Carleton Library no. 99 (Toronto: McClelland and Stewart in association with the Institute of Canadian Studies, Carleton University, 1976), 47.

7. Government of Canada, The National Atlas of Canada, 63-70.

8. Government of Canada, The National Atlas of Canada, 52.

9. Categories of ice types recognized by Newfoundlanders are legion. These are well-documented in G. M. Story, W. J. Kirwin, and J. D. A. Widdowson, eds., Dictionary of Newfoundland English (Toronto: University of Toronto Press, 1982).

10. Government of Canada, The National Atlas of Canada, 48, 57.

11. According to Head, ships that brought fishermen from England also carried "from three to forty" smaller fishing boats that were "open craft, about thirty or forty feet long with a burden perhaps of three or four tons. They were propelled by sail where possible, but were equipped with oars for calm weather. Such boats normally carried a crew of three or four men—the master, the midshipman, and one or two foreshipmen." (Head, Eighteenth Century Newfoundland, p. 3)

12. Head, Eighteenth Century Newfoundland, 15.

13. Head, Eighteenth Century Newfoundland, 15.

14. Head, Eighteenth Century Newfoundland, 31.

15. These attempts included the London and Bristol Company's colony at Cupids, Conception Bay, under the direction of John Guy (1610), Lord Baltimore's colony at Ferryland, Southern Shore (1621), and extension of the Ferryland colony by David Kirke (1637).

16. Head notes the principal objections to settlement regularly advanced during the final third of the seventeenth century: (1) the island was not suited to settlement because of the barrenness of its resources, (2) settlement was a drain on the number of available West Country seamen, (3) fishing activities carried on by settlers would steal trade and industry from the West Country, (4) a fishery carried on by settlers would be less profitable than a migratory fishery, and (5) since the migratory fishery was seen as a training ground for seamen, anything that drew participants away (such as permanent settlement) would ultimately be injurious to the national defense. See: Head, Eighteenth Century Newfoundland, 37-8.

17. Head, Eighteenth Century Newfoundland, 82.

18. Head, Eighteenth Century Newfoundland, 82. Handcock argues that in 1825 Trinity Bay's permanent population was equivalent to 81.7% of its total population. See: W. Gordon Handcock, "English Migration to Newfoundland," in The Peopling of Newfoundland: Essays in Historical Geography, edited by John J. Mannion, 15-48 (St. John's: Institute of Social and Economic Research, 1977), 24.

19. Harold A. Innis, The Cod Fisheries: The History of an International Economy, rev. ed. (Toronto: University of Toronto Press, 1978), 110.

20. Head, Eighteenth Century Newfoundland, 169.

21. David B. Mills, "The Development of Folk Architecture in Trinity Bay, Newfoundland," in The Peopling of Newfoundland: Essays in Historical Geography, edited by John J. Mannion, 77-101 (St. John's: Institute of Social and Economic Research, 1977), 78.

22. According to Handcock, four basic patterns emerge linking regions of origin in England with areas of settlement in Newfoundland: "(i) the attraction of the St. John's region to immigrants from all origins, but more particularly to those from Devon, Cornwall, London, Liverpool, other English regions, Scotland, and Wales; (ii) a basic similarity between the immigrant structure of St. John's and Conception Bay, except that St. John's attracted more Devonians and relatively fewer individuals from Dorset, Somerset, Hampshire, and Bristol than did Conception Bay; (iii) the widespread and relatively even distribution of Dorset, Hampshire, and Somerset immigrants in all regions of Newfoundland--with greater concentration in Trinity Bay, Bonavista Bay, Notre Dame Bay, the South Coast, and Northern Newfoundland/Labrador; (iv) a concentration of Channel Islanders in St. John's, Conception Bay, and the South Coast." See: Handcock, "English Migration to Newfoundland," 26, 28.

23. John J. Mannion, "Introduction," in The Peopling of Newfoundland: Essays in Historical Geography, edited by John J. Mannion, 2-13 (St. John's: Institute of Social and Economic Research, 1977), 7.

24. These and other patterns of English emigration to Newfoundland are discussed extensively in W. Gordon Handcock's meticulous study, "English Migration to Newfoundland."

25. David B. Mills, "The Development of Folk Architecture in Trinity Bay, Newfoundland," 79-80.

26. A richly detailed description of fish processing activities carried on by inshore fishermen and their families at the start of the nineteenth century is provided by L. A. Anspach in his book A History of the Island of Newfoundland (London: printed for the author, 1819), 429. The salient passage from this work is quoted in E. R. Seary, G. M. Story, and W. J. Kirwin, The Avalon Peninsula of Newfoundland: An Ethno-linguistic Study, National Museum of Canada bulletin 219 (Ottawa: National Museum of Canada, 1968), 16-7.

27. Newfoundland Royal Commission 1933 Report (London: H. M. Stationery Office, 1933), 79-80. (Cited in Seary, Story, and Kirwin, The Avalon Peninsula of Newfoundland: An Ethno-linguistic Study, 20-1.)

28. These consequences are discussed in the next section of the present study.

29. Statistics concerning Trinity Bay commercial fishermen furnished to the author in personal communication from R. A. Russell, Statistics Officer, Statistics and Systems Branch, Fisheries and Oceans Canada, February 17, 1984. The communities with the highest number of fishermen (full-time and part-time) are: Old Perlican-179, Catalina-149, Little Heart's Ease-99, Hickman's Harbour-91, Gooseberry Cove-76, Dildo-62, Grates Cove-61, Southport-60, Hant's Harbour-50.

30. Statistics furnished by R. A. Russell in personal communication to the author, February 17, 1984. The break-down of boat sizes is as follows: boats under 35 ft.=941, boats 35-64 ft.=143, boats 65-99 ft.=0, boats 100 ft. and greater=27. Although data on boat types are not available, it is likely that the boats less than 35 feet in length are mostly wooden trap skiffs, motor boats, rodneys, and speedboats. Of those 35-64 feet in length, the majority are probably wooden longliners. Those 100 feet in length and longer are probably steel trawlers.

31. Fish plant statistics furnished to the author by the Newfoundland Department of Fisheries, April 26, 1989. Plants are located in the following Trinity Bay communities: Catalina-2, Trouty-1, Hickman's Harbour-2, Southport-1, Clarenville-2, Chance Cove-1, Long Cove-1, South Dildo-3, New Harbor-2, Heart's Desire-1, Winterton-1, Hant's Harbour-1, Sibley's Cove-1, Old Perlican-2.

32. For example, see: Handcock, "English Migration to Newfoundland," 18; Head, Eighteenth Century Newfoundland, 18-9, Harold A. Innis, The Cod Fisheries: The History of an International Economy, rev. ed. (Toronto: University of Toronto Press, 1978), 55-6, 294, 298, 470; R. G. Lounsbury, The British Fishery at Newfoundland 1634-1763 (New Haven: Yale University Press, 1934), 206-8; 172-3; Mills, "The Development of Folk Architecture in Trinity Bay, Newfoundland," 78.

33. Melvin Rowe, I Have Touched the Greatest Ship (St. John's: Town Crier Publishing Company for Heart's Content Retired Citizens Club, 1976), 69.

34. Rowe, I Have Touched the Greatest Ship, 69.

35. Rowe, I Have Touched the Greatest Ship, 70.

36. Rowe, I Have Touched the Greatest Ship, 70. Although Rowe does not provide a source for these data, it is likely that the construction of these vessels was recorded in some fashion due to the novelty of two large vessels being constructed in the same yard during the same year--no mean feat.

37. Rowe, I Have Touched the Greatest Ship, 70. On page 71 of the same work, Rowe observes that the surnames of four generations of Heart's Content shipwrights are: Rowe, Hopkins, Moore, and Budgen.

38. C. Grant Head, Eighteenth Century Newfoundland: A Geographer's Perspective, The Carleton Library no. 99 (Toronto: McClelland and Stewart Limited in association with the Institute of Canadian Studies, Carleton University, 1976), 173. Head obtained these data from the "Schemes" and "Returns" sections of manuscript CO 194, housed at the Public Record Office, London.

39. Innis, The Cod Fisheries, 298.

40. "Ship-Building in Trinity Bay," <u>The Newfoundlander</u>, June 8, 1875, 2-3.

41. W. F. Coaker, ed. <u>Twenty Years of the Fishermen's Protective Union of Newfoundland</u> 1930, rpt. (St. John's: Creative Printers and Publishers, 1984), 192. The union shipyard eventually went out of operation. The Port Union premises of the F. P. U.'s trading company are still intact. The site of its shipyard is now occupied by the privately-owned Carpenter's Shipyard, founded by Reuben Carpenter in 1965. For a brief discussion of the union's founding and early activities, see: Innis, <u>The Cod Fishery</u>, 463-4.

42. Innis, <u>The Cod Fishery</u>, 470.

43. These details supplied by Reuben Carpenter of Port Union, who worked at Clarenville Shipyard for 23 years.

44. The shipyard is currently operated by Austin Burry, the founder of a successful boatbuilding enterprise (Burry's Marine Division) at Glovertown, Bonavista Bay. During periods of peak employment, the yard hires up to twenty boatbuilders. (These data furnished by Catherine Burry in personal communication to the author, August 21, 1989.)

CHAPTER 1, SECTION 2: Trinity Bay Boatbuilders

In the past, especially before Confederation, boatbuilding knowledge was fairly widespread throughout the study area. Adult males who participated in the inshore fishery commonly possessed the ability to construct reasonably adequate craft for their own use. There was, however, some variation in the distribution of these skills, and some communities enjoyed better boatbuilding reputations than others. For example, the communities of Little Catalina, on the western shore of the bay, and Winterton, on the eastern shore, achieved particularly strong reputations as the homes of able and prolific boatbuilders. Several western shore communities along the three sounds that bracket Random Island and the peninsula directly to the south acquired reputations of similar strength.[1] In addition to the transmission of boatbuilding knowledge from one generation to the next in these communities, a central factor underlying their acquisition of strong reputations as active boatbuilding centers is the abundance of trees (especially birch, fir, and spruce) suitable for use as boatbuilding material.[2]

Frequently, builders from boatbuilding centers found a ready market for new and used boats among fishermen from communities that did

Plate 2: Boat under construction by Russell Bishop

not have strong boatbuilding traditions. As veteran builder Alex Burridge of New Perlican recalled:

> Nearly every year I'd sell a boat. I, I fish in her one summer [and I'd say], "I don't know, I think I'll sell she." And [I'd] sell she and build another one. And the next summer I'd have another boat. Always had a new boat. Next summer I'd always have a new one, see. 'Cause in them times it was no trouble to sell a boat. No, b'y, it was no trouble to sell them small boat[s]---20, 22, and 23 feet.[3]

Despite the marketability of their boats, skillful builders, such as Alex, rarely became full-time specialists. Instead, they opted to adhere to several economic pursuits (e.g., fishing, lumbering, carpentry, boatbuilding). Those few who did become specialists generally founded, or were employed by, yards mainly involved with the construction of large craft, such as fishing and coasting schooners.

Since Confederation, the character of the Bay's boatbuilding tradition has changed markedly and today, while it is not uncommon to observe the spring-time construction of small craft by non-professional builders, far fewer boats are being constructed by non-specialists than in the past.[4] Increasingly, fishermen have turned to professional builders when new craft are required rather than building boats for themselves. As previously discussed, much of the impetus for this trend has come from the availability of attractive subsidies, loans,

Plate 3: Motor boat built by Edward Toope

and bounties provided to qualified fishermen through federal and provincial vessel acquisition assistance programs. Given access to such programs, most fishermen prefer to invest in the proven abilities of experienced professional builders rather than tackle boatbuilding projects on their own.[5] In view of the substantial sums required for the construction of boats, especially large vessels, the wisdom of this choice is obvious.[6]

If we are to obtain a clear understanding of Trinity Bay boat design, it is appropriate at this point to examine the major distinctions between the study area's professional and non-professional builders.[7] The non-professionals exemplify what may be termed the pre-Confederation traditional process. In other words, they are economic pluralists who take designs from moulds, half-hull models, or other patterns and fashion boats out of locally available materials with the use of common hand and power tools. Their products, usually built in small buildings (e.g., "stores," garages, or temporary shelters), or out-of-doors during the late winter and early spring, are built to provide the builder with a fishing craft for his own use, or to be sold for profit. Depending on their other economic pursuits, non-professionals may build as many as four or five small boats (usually under 30 feet) in a year, or as few as one boat every ten or fifteen years.

Another significant characteristic of non-professional builders is the way they perceive themselves with regard to the activity of boatbuilding; that is, the extent to which they identify themselves as

Plate 4: Trap skiff built by Austin King

boatbuilding specialists. Generally, they perceive boatbuilding to be no greater or lesser a skill than others they possess, and do not attach special significance to their boatbuilding activities. The fact that non-professionals invariably suggest that the researcher contact a professional builder if he really wants to learn about boatbuilding demonstrates their lack of self-identification as specialists.

Given the sporadic nature of their activities and the lack of pertinent statistics, it is impossible to estimate the number of non-professional builders within the study area. However, fieldwork indicates that non-professional builders can be found in most communities along the bay, and especially in communities that are the homes of significant numbers of fishermen. The non-professional builders interviewed for the present study include: Harold Barrett of Old Perlican, Alex Burridge of New Perlican, Joseph Dalton of Little Catalina, Marcus French of Winterton, Austin King of Hickman's Harbour, Llewellyn Meadus and Obediah Meadus of Grates Cove, George Penney of Catalina, Clement Stone of Lower Lance Cove, and Edward Toope of Trinity.

Trinity Bay's professional builders construct craft for customers from around the bay and beyond and derive all, or at least a substantial portion of their incomes from this activity. At the time fieldwork for the present study was completed (1984) there were eight active professional building enterprises within the study area. The proprietors of these concerns were: Russell Bishop of Hatchet Cove, Warren Brookings of Petley, Reuben Carpenter (Carpenter's Shipyard) of

Plate 5: Rodney in use

Port Union, Herbert Carberry of Burgoynes Cove, Fred Jackson of Whiteway, Kevin King of St. Jones Within, Henry Vokey of Trinity, and Wilson Vokey of Trinity. These businesses range in complexity from one- and two-man backyard operations that primarily produce craft in the 28-35 foot range, to sizeable shipyards employing crews of workers for the construction of craft from 28 to 65 feet or larger. Bishop, Brookings, Carberry, and King run small operations that produce mainly motor boats, trap skiffs, and small longliners. Fred Jackson, also the proprietor of a modest operation, builds robust longliners in the 35-45 foot range. Reuben Carpenter, Henry Vokey, and Wilson Vokey all have substantial facilities and are involved in the construction of vessels of many types and sizes. All but Brookings, Carberry, and Henry Vokey were interviewed in connection with the present study.

With the exception of Fred Jackson, who fishes during part of the year, all the professional builders endeavor to secure contracts for vessel construction throughout the year. However, it is noteworthy that contracts for small craft are usually not secured until the fall, after the termination of the fishing season, when fishermen have determined the feasibility of purchasing new boats for the next fishing season. Consequently, for those who build motor boats, trap skiffs, and small longliners, activity is particularly intense between January and May. For example, during the winter of 1982-83 and the spring of 1983, Russell Bishop and his helpers built four 28 foot motor boats simultaneously so that, in keeping with customers' requests, the boats would be completed in time for the start of the 1983 fishing season.

None of the builders contacted use formal advertising to obtain contracts. It was their unanimous opinion that formal advertising is unnecessary and that informal, word-of-mouth advertising by satisfied clients is sufficient. Although the majority of the builders' clients are from fishing communities along Trinity Bay and adjacent Bonavista and Conception Bays, it is not uncommon for fishermen from distant regions of the province to order boats from Trinity Bay builders. For example, fishermen from as far away as southern Labrador, the Great Northern Peninsula, and the South Coast have been frequent customers.[8] The fact that clients often travel hundreds of miles to obtain Trinity Bay boats (frequently bypassing other builders along the way) underlines the strong reputation of the Bay's builders, as well as the effectiveness of informal networks of communication maintained by fishermen.[9] Appendices A and B contain data on vessels built by professional builders in the study area during the period 1978 to 1984.

Professional builders tend to construct smaller craft (e.g., motor boats and trap skiffs) using traditional designs that have been handed down in their families, and construct larger craft using designs they have developed during their careers, or plans drawn by naval architects.[10] While most professional builders contacted have some ability to interpret standard lines and body plans, only one--Reuben Carpenter--has the ability to draw up his own plans according to standard naval architectural practices.[11] Another important difference between professional and non-professional builders relates to their use of patterns. In order to maximize profits by improving

Plate 6: Kevin King's timber moulds

construction efficiency, professionals attempt to develop a limited number of stock designs. So that these designs may be executed quickly and accurately with a minimum of wasted material, builders prepare moulds and other patterns for as many boat parts as practicable. Patterns for timbers, deadwoods, stern posts, aprons, breasthooks, and stems are common. While a certain amount of time, energy, and materials are required to fabricate these aids, over the long term this investment is repaid many times over. However, for the non-professional builder who builds infrequently, there is little advantage in expending the time, effort, and money required for the fabrication of many patterns. For him, as we shall see, a few basic patterns, along with elementary measurement formulas, are usually all that is required for the construction of a satisfactory craft.

It is not surprising that professionals differ from non-professionals in regard to their personal attachment to boatbuilding. Occupationally, professionals tend to think of themselves primarily as boatbuilders. Because of this attitude, and because of the greater amount of boatbuilding experience they have compared to non-professionals, they are usually much more reflective about their work and can often provide lengthy, carefully considered responses to queries about the nature of their work.[12]

There appear to be few differences in the initial boatbuilding training of professionals and non-professionals. Almost all the builders within the study area learned in an informal manner characterized by an emphasis on observation and imitation rather than

Plate 7: Longliner under construction at Henry Vokey's yard

verbal interaction. As boys they watched their fathers or other males in their communities build boats, and sometimes assisted them by performing simple tasks. If their interest in boatbuilding remained strong, as they got older they acquired more advanced skills. Eventually, they picked up the basic knowledge needed to undertake boatbuilding projects on their own. Llewellyn Meadus recalls his early learning experiences.

> I always had that bit of interest in the boatbuilding. And because I was there at this--the rest of the boys were away, gone skating somewhere, up on the pond or somewhere skating--and I'd have to hold onto the plank for [my father]. And by doing that, and I'm not sorry about it today, by doing that I learned how to plank, and got the idea of the shape of the bends and the frames and everything, and learned a lot.[13]

Nearly all informants, professionals and non-professionals alike, recounted experiences like Llewellyn's. Most were content to allow boatbuilding to remain a part-time, non-professional activity, but some, for various reasons, went into business as professionals. Many of the latter started out by building a few boats for themselves, moved on to building a few for profit, and then, having realized some measure of success, decided to become more deeply involved with boatbuilding. A large number of these aspiring professionals gained valuable experience as employees of other professionals, many of whom were kinsmen.[14]

The level of boatbuilding activity maintained by professionals and non-professionals has varied considerably over time. This has usually been due to the economic ups and downs of the fishery as well as changes in general economic conditions. Simply stated, during lean years fishermen have tended to resist making sizeable capital expenditures, while in boom years they have been more inclined to invest profits in such things as boats and gear. Since the principal customers of the study area's builders are fishermen, the fortunes of the builders generally reflect those of their clients. For example, during the period 1978-80 --a time of optimism and prosperity for the Newfoundland fishery-- the number of fishermen swelled and a great demand was created for fishing boats. As Kevin King remembers:

> We were building then, we were at it, you know. We were really involved in it then, but we couldn't just keep up with the orders. You know, we'd have five or six at one time, you know, and we'd be turning away so many fellows, you know, just send[ing] them off somewhere else.[15]

Just as part-time fishermen rushed to take advantage of profit-making opportunities in the fishery during this period, so too did part-time boatbuilders attempt to capitalize on the unusually high prices being paid for fishing boats of all descriptions. Nowhere was this activity more apparent than in the small (population: 136) community of St.

Jones Within, where in 1980 eight trap skiffs were under construction concurrently. Most of these boats were being built by part-time builders. Since 1980, however, the economic condition of the fishery has declined and this has resulted in a diminution in the numbers of fishermen and a sharp drop in the demand for fishing vessels. With easy profits no longer attainable, many part-time builders have ceased their activities. A few of Trinity Bay's professional builders have also gone out of business (at least temporarily) since 1980, but some of these closings have been caused by other factors, such as retirement due to age or poor health. In short, Trinity Bay boatbuilding activity tends to be quite cyclical in nature. This characteristic is evidenced in particular by periodic start-ups and closures of professional boatbuilding enterprises in response to various economic factors.[16]

Notes

1. From north to south, the three sounds are: Smith's Sound, Northwest Arm, and South West Arm. Random Island communities of note include Hickman's Harbour, Britannia, and Lower Lance Cove. On the peninsula directly to the south of the island, the principal boat building communities are Hatchet Cove and St. Jones Within. The boatbuilding communities of Southport and Gooseberry Cove are located south of Hatchet Cove and St. Jones Within, on the northern shore of Southwest Arm.

2. Boat builders who live in parts of the Bay less well endowed with forest resources often make treks to the Random Island region, or other well-forested parts of the Bay, in order to procure trees of sufficient size for their boat building projects. With regard to the procurement of raw materials, it is interesting to note that the Vokey brothers of Trinity harvest trees from forests in and around the community of Little Harbour, site of the family homestead before the family resettled in Trinity, ca. 1963.

3. Interview with Alex Burridge by David Taylor, June 15, 1982. MUNFLA accession number C6704.

4. Indeed, the author's impression that a very high percentage of part-time builders employing traditional skills are individuals fifty years of age or older suggests that there has been a decline in the number of persons acquiring such skills.

5. In fact, nearly all boats over 35 feet which have been constructed with funding from the Fisheries Loan Board are built by specialists. See Appendix B.

6. For example, the estimated cost of a 60 foot fishing vessel under construction by Wilson Vokey in 1984 was $625,000. Vessel cost and other concerns were expressed by Vokey's client, fisherman Cecil Rideout of Fortune, on the May 24, 1984 broadcast of the CBC Radio (St. John's) program, "Fishermen's Broadcast."

7. The distinction between professional and non-professional builders is an arbitrary one, but one that tends to follow emic conceptions. It is best, perhaps, to view the area's builders as being positioned on an continuum of activity with a low level of activity at one pole and a high level of activity at the other.

8. Henry Vokey and his brother, Wilson, have been especially successful at attracting customers from distant communities.

9. For a thorough analysis of fishermen's communicative networks that relate to boatbuilding, boat maintenance, fishing, and other topics, see: Gilmore, The World of the Oregon Fishboat.

10. These architects are usually those in the employ of the Fisheries Loan Board or the Newfoundland Department of Fisheries. In rare instances, independent naval architects have been retained by fishermen to execute custom designs.

11. Carpenter's longliner plans have achieved great popularity among Newfoundland fishermen and are often used by other boatbuilders. The sale of the one-time use of his plans to other builders is an important source of income for Carpenter. When he was interviewed in connection with the present study (1983), his fee for the one-time use of lines and construction plans for a 65 foot fishing vessel was $5,000.

12. For an interesting examination of the occupational identities of amateur and professional musicians, and levels of career development within the field of music, see: Neil V. Rosenberg, "Big Fish, Small Pond: Country Musicians and Their Markets," in Media Sense: The Folklore-Popular Culture Continuum, edited by Peter Narvaez and Martin Laba (Bowling Green, Ohio: Bowling Green State University Popular Press, 1986), 149-166. Rosenberg's work is pertinent to the present study because it offers a model for the achievement of expert status in the field of music that, in many respects, parallels the model of Trinity Bay boatbuilders.

13. Interview with Llewellyn Meadus by David Taylor, November 3, 1983. MUNFLA accession number C6707.

14. For example, Wilson Vokey learned from his older brothers, Henry and Sam; Kevin King took over his father's boat building business; and Reuben Carpenter's two sons, Joe and Bruce, work closely with him.

15. Interview with Kevin King by David Taylor, February 25, 1983. MUNFLA accession number C6958.

16. For a detailed analysis of factors influencing the development of the Newfoundland boatbuilding industry, see: Newfoundland Design Associates, Ltd. in association with Acres Consulting Services, Ltd., Status of and Prospects for the Newfoundland Fishing Boat Building Industry to 1985 (St. John's: Dept. of Industrial Development, Government of Newfoundland and Labrador, 1980).

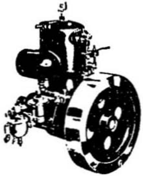
CHAPTER 1, SECTION 3: Changes Affecting Trinity Bay Boatbuilding in the Twentieth Century

This section explores the most significant changes made in the way boats are designed, constructed, and used during the twentieth century and the factors which gave rise to these changes.[1] The types of changes to be discussed include: technological innovations (e.g., the internal combustion engine, and new hull forms), a provincial centralization program, federal unemployment insurance regulations, and federal and provincial subsidy, loan, and bounty programs for vessel acquisition.

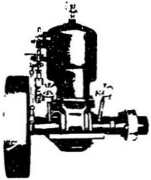
Descriptive materials found in pre-twentieth century literature provide an overview of daily life in outport Newfoundland and illuminate the pattern of annual subsistence activities of which boatbuilding was an integral part. Through scattered references in this literature and oral history, it is possible to reconstruct several major characteristics of the Trinity Bay boatbuilding tradition prior to 1900. It is clear that knowledge of boatbuilding skills was widespread among males dwelling in coastal communities, and that these skills were acquired through observation and imitation with a minimum of verbal interaction. In most cases, boats (particularly inshore fishing craft) were constructed by part-time, non-professional builders who were the initial users of the vessels they built. Boatbuilding was usually carried out at times of the year (usually late winter and spring) when profit-making opportunities were limited, and, more often than not, boatbuilding activities took place out-of-doors. Invariably, builders used locally-available wood and other construction materials that could be obtained at little or no monetary cost. They built a small number of vernacular boat types which were broken down into a large number of localized (often community-specific) sub-types. Finally, all of the activities of the builders were, in most cases, guided by traditional concepts and practices. With regard to boat design, the force of tradition ensured that hull forms evolved gradually.

The Internal Combustion Engine

Up until the second decade of the twentieth century, nearly all the fishing boats built and used in the Trinity Bay region were propelled by sails, or by a combination of sails and oars ("paddles"). Small boats in the 16 to 21 foot range, such as punts and skiffs, typically carried one or two unstayed spritsails ("spread sails"), plus oars which were used in the absence of wind. Many older fishermen can give vivid accounts of the long distances they had to row in order to return home after the wind shifted or died. Larger inshore fishing boats, especially those over 30 feet, were often gaff-rigged and carried jib, fore, and main sails on two masts.

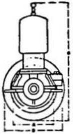


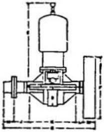
Starboard Side, 3 H. P. Make and Break Spark.



Port Side, 3 H. P. Make and Break Spark.

3 H. P. Make and Break Spark





GENERAL DIMENSIONS IN INCHES

H.P.	A	B	C	D	E	F	G	H	J	K	L	M
3	8	12	20	3	17	13	19	2½	4½	7	2	3

GENERAL PARTICULARS

Bore of Cylinder	Inches	4
Stroke of Cylinder	Inches	3½
Diameter of Crank Shaft	Inches	1¼
Diameter of Propeller 2 Blade	Inches	15
Diameter of Propeller 3 Blade	Inches	14
Capacity of Fuel Tank	Gallons	6
Weight of Engine Only	Pounds	150
Average shipping weight complete with outfit	Pounds	300

Figure 2: Early type of "make and break" engines used in boats

Early in the second decade of the twentieth century, a new device began to be marketed in Newfoundland which would revolutionize fishing boat propulsion: the internal combustion engine in the form of single-cylinder "make-and-break" engines. Sold under a profusion of trade names, such as Acadia, Atlantic, Bridgeport, Britannia, Fraser, Grey, Hubbard, Lockwood-Ash, Mianus, and Regal, this innovation seems to have been welcomed enthusiastically by fishermen.[2] The advantages of engine use were considerable. Fishermen were freed from having to depend on the vagaries of the wind, and they were relieved of the arduous chore of rowing. In addition, engines enabled them to enlarge the size of their boats and their fishing territories which, in turn, increased the potential for greater catches.

Data included in the Census of Newfoundland and Labrador, 1921, the first census to provide information about engine-powered vessels, indicates that the acceptance of engines was rapid and widespread within the fishing communities of the bay. For example, in the prosperous fishing community of Winterton, out of a total of 140 boats, 80 were engine-powered.[3]

On the heels of the change in vessel propulsion came concomitant changes in form and construction. The first boats to be equipped with engines were those in use at the time: craft 19 feet and larger designed for sailing and rowing. When engines were installed in these boats the shortcomings of the old hull forms became apparent to fishermen. For example, it was discovered that scantlings (dimensions of structural members), especially those of the stern assembly, were not of sufficient size to endure the constant vibration caused by an engine. Consequently, new boats specifically designed to carry engines were built with heavier sternposts, stern knees, quarter knees, and keels. Slowly, other changes were made. In the trap skiff type, a fairly upright stern profile was replaced by an over-hanging transom stern in order to give the craft more "bearing" while under power. In general, boats gradually became longer, wider, and deeper. Other changes brought about by the acceptance of the inboard marine engine included increases in total vessel cost, an increase in operating costs, the obsolescence of sailing skills, and the need for engine maintenance and repairs skills. There is little doubt that the introduction of the early marine engine was the single most galvanic technological innovation to confront boatbuilders and users up to that time.

Although attempts were made to market it to fishermen earlier, another type of gasoline engine--the outboard motor--did not gain acceptance until the 1950s. As this type of motor became lighter and more reliable, it quickly replaced sails and oars as the means of propelling 16-18 foot craft, such as the rodney, which were too small to be equipped with heavy inboard engines. Changes in form and construction followed, but these changes were few in number and fairly minor in scope. The stern profile was made more upright in order to correctly align the motor shaft, and the top of the counter was cut down to ensure that the propeller would be deep enough in the water for maximum thrust. It is clear that the acceptance of the outboard motor did not precipitate alterations in the forms of smaller boat types of the magnitude of those made to larger types. This was due, perhaps, to the relative lightness of the externally-mounted outboard, versus the heaviness of the internally-installed inboard. However, in both instances, change came about very slowly and was a direct result of the testing of the boats by their builders through use in the fishery.

Hull Forms

Technological change relative to new hull forms has also had substantial impact upon traditional practices. Two designs, neither a product of the bay's pre-twentieth century process, are particularly noteworthy: the speedboat (or "flat"), and the longliner.

The speedboat, probably introduced to the study area no earlier than the 1950s, is a beamy craft with a relatively flat bottom, straight sides and a broad stern. In overall length, it ranges from 15 to 20 feet. As its name implies, when propelled by one or two outboard motors, it is very fast over the water, faster than other inshore boat types. Of major significance is the fact that the speedboat possesses what, in naval architectural parlance, is known as a planing hull form. This constitutes a revolutionary departure from the displacement hull forms of the older boat types (e.g., rodneys and trap skiffs).[4]

In regard to ease of construction, speedboats also differ greatly from the older types. Speedboats require less boatbuilding expertise to construct, and this is due to two principal factors: (1) their hulls contain fewer reverse curves (i.e., complex curves exhibiting

Plate 8: Speed boat built by Alex Burridge

both concavity and convexity), thus simplifying the planking process; and (2) the customary use of steam-bent timbers, rather than sawn, naturally-curved timbers, simplifies the timbering process. The speedboat has been especially popular with part-time fishermen, and with full-time fishermen based in poorly sheltered harbors who require craft light enough and flat enough to be hauled out of the water with relative ease on a regular basis.

Although the use of a speedboat provides certain advantages (e.g., hull speed, ease of construction, portability, low initial cost), the overall suitability of this hull form as an inshore fishing craft is widely questioned. Fishermen with experience in the more sea-kindly displacement hull craft are especially scornful of the speedboat. Austin King's remarks are typical:

> That's something that shouldn't [have] been created . . . . It's a menace. Like I said, I used one and I'd be out in it, but if you wants to go to the bottom right fast, get a speedboat . . . . If the motor gives out and if you haven't got a life jacket you've gone to the bottom.[5]

The longliner was also introduced in the 1950s. This displacement hull form became known by this name because it was initially used chiefly in the groundfish longline fishery. In recent years, however, the term has become somewhat of a misnomer since the longline fishing technique has declined in popularity and this vessel type has been adapted to serve in a variety of fisheries. While the term remains, this general type is viewed as a multi-purpose vessel.

Ranging in length from 35 to 65 feet, the longliner is considerably larger and much more costly than the older types of inshore craft. Current prices range from $50,000 for small vessels to several hundreds of thousands of dollars for larger ones. Longliners differ from the older types in other ways: they have greater carrying capacities; they have crew accommodations for extended fishing trips; they are often outfitted with an assortment of electronic navigational, communications, and fish-finding gear; they are usually the products of designs drawn by naval architects; and, they are generally constructed in shipyards by professional builders.[6] Among the builders contacted in connection with the present study, several have built longliners of various sizes and shapes. These builders include: Reuben Carpenter of Port Union, Henry and Wilson Vokey of Trinity, Russell Bishop of Hatchet Cove, Bill and Kevin King of St. Jones Within, Fred Jackson of Whiteway, and Harold Barrett of Old Perlican.[7]

It is significant that the longliner type has been heavily promoted by the provincial government. This has taken place in recent years in order to strengthen the inshore fishery through the development of a class of more efficient fishing craft capable of producing high annual landings. The advocacy of this vessel type by the provincial Department of Fisheries has been particularly strong since the establishment of Canada's 200 mile fisheries management zone (effective January 1, 1977), and the articulation of the province's

Plate 9: Launching of longliner built by Wilson Vokey

policy of balanced growth between the inshore and offshore fishing sectors.[8] Despite this promotion, the longliner type has been roundly criticized for such things as poor design, poor construction, and excessive construction costs.[9]

Centralization

In order to accurately determine pattern relative to boat design within the study area, it is necessary to examine the extent to which people with this sort of knowledge moved into the region, moved out of the region, and moved around within the region. Clearly, the analyst's task is not terribly complicated if a relatively stable population is being examined. Unfortunately, because of a centralization program initiated by the provincial government, this is not the case within the study area. Accordingly, with the rapid movement of people from one community to another within the region, or from a community outside the region to one within (or vice versa), it becomes much more difficult to ascertain well-defined regional patterns.

Officially known as the "centralization program," but more commonly known as "resettlement," this plan was inaugurated in 1954, five years after Newfoundland's confederation with Canada.[10] Because of the tremendous difficulties inherent in providing electricity, roads, medical facilities, schools, and other services to approximately 1500 small communities scattered along the island's 8000 mile coastline, the provincial government, led by Premier Joseph R. Smallwood, hatched a plan to consolidate the population and, thereby, bring services to the people more efficiently.

In order to encourage people living in small, isolated communities to move to larger "resettlement centers," in 1954 the provincial government began to give grants to those who would move. During the next eight years roughly 8000 people left their communities to move to larger ones and, as a result, 115 communities were abandoned. Deeming the first eight years of the program a success, the government decided to extend it. Between 1962 and 1970 another 16,000 people pulled up stakes and 119 more small communities disappeared.

Within the Trinity Bay region, a number of small communities on the western shore of the bay ceased to exist as a result of this program. These included: Little Harbour, Pope's Harbour, Delbys Cove, British Harbour, Loreburn, Birch Cove, Kerley's Harbour, and three communities on the island of Ireland's Eye, namely Deep Harbour, Traytown, and Ivanhoe. The larger communities in the area to which people from the smaller communities were encouraged to move were Catalina and Port Union on the western shore of the bay, and Old Perlican on the eastern shore. The community of Bonavista, located at the tip of the peninsula separating Trinity and Bonavista Bays, also received settlers from Trinity Bay communities.[11]

In retrospect, it is clear that advantages could be gained by moving from a small, isolated community to a larger "resettlement center," but it is also clear that a number of disadvantages could result as well. These disadvantages included the sense of loss experienced when people abandoned their home communities and the weakening or loss of kin and friendship networks. Also, people lost traditional fishing, farming, lumbering, and hunting territories, as well as inherited homesteads and garden plots. Finally, the acquisition of debts as a result of bank-financed purchases of new homes in the relocation centers was another jarring detriment.

When compared to other changes experienced when people left their home communities, change in boatbuilding practices does not rank among the most serious. In the analysis of Trinity Bay boat design, however, this large-scale movement of people cannot be ignored. Prior to the start of the resettlement program, regional differentiation in boat design was fairly strong due to the isolation of many coastal communities. Most inshore fishing boats used in any given community had been built in that community. Consequently, each community had, to a certain extent, its own distinctive design. As Austin King, formerly of Deep Harbour and now a resident of Hickman's Harbour, told me in 1982:

> Well, in that area, down that way, if we came up here, like I said, 15 or 20 years ago, they could tell us, when we came around the point, by our boat, you know. If they came down we knowed it, you know, 'cause there was quite a difference.[12]

It is interesting to note Austin's observation that "there was quite a difference" between the shapes of boats from Deep Harbour and the boats from Hickman's Harbour, especially in view of the fact that the communities are only ten miles apart.[13]

The government's centralization program resulted not only in the disappearance of many community-specific designs, but also in the dispersion of localized notions about design and construction methodologies. Therefore, the problem of assessing geographical patterns in traditional design practices within the study area is now rather difficult given the movement of people and ideas that has taken place.

Unemployment Insurance Regulations

In pre-Confederation Newfoundland, fishermen often used the months of winter and spring --historically, periods offering meager employment opportunities-- to build boats for themselves, or to build boats to sell to others. With the introduction of unemployment insurance (UI) benefits, however, eligible fishermen no longer had to scramble for off-season work as they once did. Consequently, a good deal of the incentive to build boats was lost. Compounding this situation were UI regulations, instituted on a nation-wide basis in 1957 by Employment Canada, which prohibited unemployment insurance recipients from using their time to build boats to sell to others or to build additional boats for themselves.

According to Rick Fifield, Employment Canada's Regional Manager of Public Affairs, this regulation applies to fishermen building boats because "...they're considered to be building a new boat for gain or profit, and any time a person is building a new boat for gain for profit they [sic] are not entitled to unemployment benefits."[14] It is permissible, however, for a UI recipient to repair his boat, even to the extent of building an entirely new hull around the keel of an old boat. A rebuilding project, even a major one, is allowed, says Fifield, because the fisherman is

> ...not building the boat for gain or profit. He's building the boat because he doesn't have a boat to fish out of and that's a different situation [from] building a new boat and having a second boat besides.... Now, see, if a person can fish only in one boat and ends up with two boats, they've clearly made a gain. Obviously, they're going to sell one, or employ another crew in the other one, or whatever. If the boat is completely not available, [if] the boat has been destroyed by a storm, or has just outlived its value and the person's not going to have a boat to fish out of anymore, then that's where they would want to make a case with us.[15]

The rationale behind the UI regulations, lucidly described above by Fifield, is poorly understood by fishermen. Moreover, it is not widely known that individuals can appeal rulings made against them by Employment Canada to an independent board of referees.[16] Many fishermen who have built boats in the past single out UI regulations as a major cause for the decline in boat construction by part-time builders. Obediah Meadus's remarks are typical:

Meadus: See, you're really not allowed to build a boat now.

Taylor: What do you mean?

Meadus: On account of your unemployment insurance. See, you'll fish all the summer now and when you're finished fishing you've got your stamps for unemployment insurance. And you're supposed to be available to go on a job anywhere at all and you're not supposed to be doing any work for yourself or anybody else . . . . But, if you starts building a boat you're self-employed and you shouldn't be drawing unemployment insurance. People have lost their unemployment insurance on account of it. So, there's not many of them being built now. I haven't seen a boat built here in Grates Cove for, I don't know, it must have been six or seven years.[17]

Federal and Provincial Loan, Bounty, and Subsidy Programs

Federal and provincial programs designed to assist fishermen with vessel acquisition have also exerted much influence on traditional practices. Under a federal subsidy program, one of several assistance plans administered by the Fisheries and Marine Service of Environment Canada, qualified fishermen may receive 25% of the total cost of boats 16 to 75 feet in length.[18] In order to receive these subsidies, fishermen must adhere to a number of explicit regulations. These regulations affect traditional practices in three principal ways. First, instead of building his boat by himself or having it built by another individual in his community, a fisherman must select a builder who has been certified by the Fisheries and Marine Service. While it is not especially difficult to receive certification, this rule encourages fishermen to have their boats built by full-time builders. Second, instead of having their boats built through the use of traditional construction techniques, new methods of construction, detailed in the federal specifications, must be adopted.[19] Third, federal specifications call for scantlings that are often greater than those traditionally used. An increase in scantlings results in increased strength and weight. Because traditional design and construction practices are often linked to specific use requirements and/or specific environmental conditions, extra weight is not always desirable. For example, hull lightness is an asset in areas where the lack of sheltered harbors requires that boats be hauled out of the water on a regular basis.

The provincial assistance programs are administered by the Fisheries Loan Board and fall into three basic categories: direct loans to fishermen from the Fisheries Loan Board in amounts from $1000 to $50,000; guaranteed loans to fishermen by chartered banks in amounts from $50,000 to $1,000,000; and bounties on new construction at the rate of $1050 per underdeck ton for vessels up to 75 underdeck tons, $1300 per underdeck ton for vessels up to 75 underdeck tons, $45 per foot for open fishing boats 25 feet and over (17 feet and over for residents of Labrador from Cape Charles to Cape Chidley), $80 per foot for partly-decked fishing boats less than ten tons underdeck, $100 per foot for fully-decked fishing boats less than ten tons underdeck, and, for rebuilding and repairs, at the rate of 35% of the approved cost.[20] These provincial programs appear to have had less direct impact on traditional practices than the federal programs described above. This is probably due to the fact that, until recently, no specific standards were laid down for boats built under these programs apart from the stipulation that they must be well constructed and generally suitable for Newfoundland's fisheries. Specific scantlings for small craft were established in 1981, but, according to a Loan Board official, since they were developed "in accordance with traditional methods" they did not generate much criticism from fishermen.[21] Newfoundland fishermen have been eager to take advantage of these generous programs and between 1978 and 1984 approximately 3800 boats were built with Loan Board financing.[22] For example, during 1983, eleven Trinity Bay builders constructed sixteen boats 35' and under which were financed by the Fisheries Loan Board.[23] These data are contained in Appendix A. In regard to larger vessels, Loan Board records show that between November, 1978, and March, 1984, permits were issued to Trinity Bay builders for the construction of forty-five fishing vessels between 35 and 65 feet in length.[24]

Thirty-eight of these vessels were built by ten professional builders, six of whom were still active in 1985. The designs of at least 33 of the 45 vessels were obtained from plans drawn by Loan Board naval architects or by other naval architects. These data are included in Appendix B.

Notes

1. I have elected to examine changes made in the twentieth century, as opposed to those of earlier periods, for two reasons: (1) the dearth of data pertaining specifically to boatbuilding prior to 1900 makes it extremely difficult to ascertain the evolution of the tradition in earlier times, and (2) because it is my considered opinion that more significant changes have occurred during the twentieth century than in all of the previous three centuries during which boats have been built in Newfoundland.

2. See the following for more information about these early marine engines: Stan Grayson, Old Marine Engines: The World of the One-Lunger (Camden, Me.: International Marine Publishing Co., 1982); Edward Butler, Evolution of the Internal Combustion Engine (London: C. Griffin & Co., 1912); Peter Spectre, "The Reliable One-Lunger," Woodenboat 30 (Sept.-Oct. 1979), 59-64.

3. Newfoundland, Colonial Secretary's Office, Census of Newfoundland and Labrador, 1921 (St. John's: n.p., 1923), II, 81, 84.

4. A planing hull is defined as a form that is intended to skim over the surface over the water. A displacement hull, on the other hand, is a form that is intended to occupy space below the surface, thereby displacing a certain volume of water.

5. Interview with Austin King by David Taylor, May 25, 1982. MUNFLA accession number C6700.

6. It is worth noting that many older fishermen think of the longliner as the modern equivalent of the fishing schooner. This conceptualization has nothing to do with hull forms, which fishermen recognize as being quite dissimilar, but, instead, relates to vessel size and function. Schooners and longliners are similar in that they both have crew accommodations and large carrying capacities, and are intended primarily for extended mid-shore and off-shore use.

7. All except Barrett are professional builders. Bill King retired in 1982 and turned his modest operation over to his son, Kevin.

8. For a brief discussion of an attempt by the government of France to introduce a new fishing boat type in Martinique, see: Douglas C. Pyle, Clean Sweet Wind: Sailing Craft of the Lesser Antilles (Preston, Md.: Easy Reach Press, 1981), 212. Perhaps the most prominent example of a large-scale effort to introduce standardized, "improved" boat forms is the work of the Food and Agriculture Organization of the United Nations (F.A.O.). See: Food and Agriculture Organization, International

Labour Organization, and International Government Consultative Organization, FAO/ILO/IMCO Voluntary Guidelines for the Design, Construction, and Equipment of Small Fishing Vessels (London: Inter-Governmental Consultative Organization for Food and Agriculture Organization of the United Nations, International Labour Organization, and the Inter-Governmental Marine Consultative Organization, 1980); and Jan-Olof Traung, ed. Fishing Boats of the World 3 vols. (London: Fishing News (Books), 1955-67). The latter work is derived from the proceedings of F.A.O.-sponsored international conferences on fishing boat design. F.A.O. boat designs have been used by development agencies to upgrade fishing fleets in Third World countries. Since these designs are not always consonant with traditional practices associated with the construction, repair, and use of the vessels they are intended to replace, they frequently fail to gain acceptance. Efforts have also been made to introduce F.A.O. designs to Newfoundland's inshore fishery. For a discussion of this unsuccessful attempt, see my article, "St. John's Has Taken on Shipbuilding and Naval Architecture," National Fisherman 59, no. 23 (April 30, 1979), 188-189.

9. Various criticisms are contained in the following: Fishing Industry Advisory Board, Changes in Fishing Vessel Construction Costs in Newfoundland 1973-1979 (St. John's: Fishing Industry Advisory Board, Government of Newfoundland and Labrador, 1980); "The Question of Longliners," Decks Awash 2, no. 2 (May 1973), 8-10; "Fishing Boat Costs Soar," Decks Awash 5, no. 2 (1976), 10; J. C. Hull, "The Government-Designed Longliner is not a Seaworthy Boat," Decks Awash 7, no. 2 (1978), 49-50; "The Great Longliner Debate," Decks Awash 7, no. 3 (1978), 49-50.

10. For more information on resettlement, see: Parzival Copes, The Resettlement of Fishing Communities in Newfoundland ([Ottawa]: Canadian Council on Rural Development, 1972); Noel Iverson and D. Ralph Matthews, Communities in Decline: An Examination of Household Resettlement in Newfoundland (St. John's: I.S.E.R., 1968; D. Ralph Matthews, "Communities in Transition: An Examination of Government Initiated Community Migration in Rural Newfoundland," Ph.D. diss. University of Minnesota, 1970; and, D. Ralph Matthews, The Creation of Regional Dependency (Toronto: University of Toronto Press, 1983), pp. 118-136.

11. Statistics pertaining to the movement of people within the study are contained in Statistics[:] Federal-Provincial Resettlement Program Community Consolidation Program First Resettlement Agreement (1970-1975), ([St. John's]: [Government of Newfoundland and Labrador], [1975]).

12. Interview with Austin King by David Taylor, May 25, 1982. MUNFLA accession number C6700.

13. In addition to Austin King, other builders interviewed had "resettled" to communities within the Trinity Bay region. George Penney moved from Keels, Bonavista Bay, to Catalina; Edward Toope moved from Ireland's Eye, Trinity Bay, to Trinity; and the Vokey family moved from Little Harbour, Trinity Bay, to Trinity.

14. Rick Fifield, Employment Canada Public Affairs Regional Manager (St. John's), speaking on the CBC Radio program "Fishermen's Broadcast," January 15, 1982. Interview by Wilf Dyke.

15. Rick Fifield speaking on "Fishermen's Broadcast," January 15, 1982.

16. Occasionally, cases are taken before federal court. See, for example, "Baker Wins UIC Boat-Building Case," The Georgian (Stephenville, Nfld.), April 14, 1982, p. 1.

17. Interview with Obediah Meadus by David Taylor, June 16, 1982. MUNFLA accession number C6705.

18. See: Fishing Vessel Assistance Program, Eligibility Criteria, Program Year- 1983-84, ([St. John's]: [Fisheries and Oceans, Government of Canada], [1983].

19. G.M. Sylvester and H.A. Shenker, Minimum Specifications for Building 35' to 50' Wooden Fishing Vessels, No. 82 in the Technical Report Series of the Industrial Development Branch (Ottawa: Fisheries and Environment Canada, 1974).

20. The general provisions of these programs are detailed in the pamphlet Fisheries Loan Board Fishing Vessel (1981) Assistance Plan (St. John's: Fisheries Loan Board, Government of Newfoundland and Labrador, n.d.). The Fisheries Loan Board has been in operation since 1951 and has modified its regulations from time to time. For example, the programs contained in the Fishing Vessel (1981) Assistance Plan were preceded by the Small Fishing Boat Bounty Program, which provided qualified fishermen with bounties in the amount of 35% of the approved costs of fishing boat hulls from 25 to 35 feet in length, and The Fishing Ships (Bounties) Act, 1970, which pertained to larger vessels in the 10 to 150 gross ton range.

21. Telephone interview with Len Edwards, Fisheries Loan Board, Sept. 29, 1981.

22. Personal communication to the author from F. G. Pike, Chairman, Fisheries Loan Board, May 15, 1984.

23. Personal communication to the author from F. G. Pike, Chairman, Fisheries Loan Board of Newfoundland, June 27, 1984.

24. Personal communication to the author from F. G. Pike, May 15, 1984.

CHAPTER 1, SECTION 4: Trinity Bay Design Systems

This chapter examines the principal design methods used by boatbuilders of the Trinity Bay region. Specifically, it investigates the technical processes employed with these methods and the relationships between design methods. In addition, views are posited on provenance, distribution, and modification of methods. However, before entering into this discussion, there are a few important points to consider about the communicative networks that channel information about design and other facets of vessel construction and use among boatbuilders.

The majority of builders surveyed learned design procedures in the same way they learned construction methods. That is, they learned informally, largely by word-of-mouth and by observation and imitation. However, this is not to say that they live in an informational vacuum. Although regional conventions for boat design and construction are predominant, builders are influenced by other sources of information. These include books and articles about boatbuilding,[1] naval architectural plans circulated by the Newfoundland Department of Fisheries and the Fisheries Loan Board of Newfoundland, television programs about commercial fishing, and, if they elect to take them, boatbuilding courses sponsored by the College of Fisheries[2] or courses offered by regional vocational schools.[3] They are also influenced by unique vessels that might visit their harbors or vessels they see during travels around the province or elsewhere. Part-time builders, in particular, look to the boats produced by professional builders for new ideas about vessel form and construction. For their part, professional builders are more likely to be influenced by the work of their peers as well as the designs of naval architects.

Moulds

For many of the boatbuilders in the study area, important elements of design heritage are embodied in wooden moulds that are used in several ways to derive the basic shapes of boat hulls. It is very common for these devices to be passed on from father t son, and it is also common for builders to lend their moulds to others and to make copies for friends and acquaintances who may request them. In a very literal sense, the handing about of moulds (and other physical devices we will consider later) represents the transmission of traditional knowledge.

When conducting any study of vernacular watercraft, researchers must be aware of the likelihood of variation in terminology, even within a relatively small geographic area. The use of the term "mould" within the Trinity Bay region is a case in point. In most contemporary boatbuilding manuals, the term is generally defined as one of several full-scale wooden patterns set up on a keel as a means of establishing

Plate 10: Speed boat moulded out

Plate 11: Speed boat "moulded out," aft view

the desired hull form prior to the installation of planks.[4] However, along the shores of Trinity Bay, the matter of definition is vastly more complex: there are at least four meanings in common usage. As a verb, "mould" generally means the act of shaping a craft's timbers.[5] Frequently, the phrase "mould out" is employed, as in "I moulded out all my timbers." As a noun, "mould" has at least three definitions. It can mean a wooden, three-piece adjustable template used to draw the shapes of some or all of a boat's timbers. It can refer to wooden, full-scale patterns for key timbers and the counter. And it can refer to wooden, full-scale transverse sections that are erected on the keel temporarily and used in conjunction with ribbands to establish the basic form of a boat prior to the installation of steam-bent timbers. Let us examine these three definitions in more detail.

Commonly referred to collectively as "moulds," or "set of moulds," the three-piece adjustable template[6] consists of: (1) a small, rectangular piece of wood usually called the "rising square" or "rising board;"[7] (2) a narrow (approximately 1-1/2" x 1/2") piece of wood in the shape of a sharp, nearly right angle, curve, often called the "half bend," "the mould," or the "sweep;" and (3) a piece of wood in the shape of a more gradual curve, sometimes called the "hollowing board" or the "hollying board," but is usually unnamed. All three pieces are about 1/2" thick. Each piece corresponds to a specific area of the hull. The rising square corresponds to the keel of the boat to be built and has the same height and width as the cross-section of the keel. The half bend corresponds to the "side" of the boat, the area

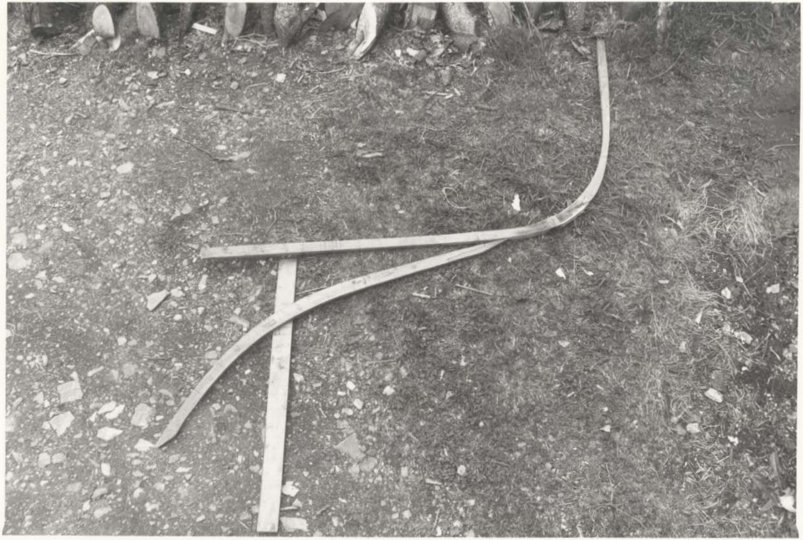


Plate 12: Three-piece adjustable template for 16' rodney

Plate 13: "Sir marks" on adjustable template

between the turn of the bilge (waterline) and the sheer. The hollowing board corresponds to the "bottom" of the hull, the area between the turn of the bilge and the keel. The hollowing board determines the degree of concavity or "hollowing" present in the bottom of a boat, one of the primary elements of Trinity Bay boat design.

Inscribed on each of the three pieces are lines called "sir marks" that refer either to all of a boat's timbers or to a select few. In both cases, the three primary timbers--the fore hook, midship bend, and after hook--are always included.[8] When the three template pieces are brought together with sir marks properly aligned, the shapes of the various timbers can be formed individually. Often, the half bend is inscribed with marks indicting the height of the sheer for each of the principal timbers.[9] Once the shape of a particular timber has been formed with the three-piece template this shape is traced onto the timber stock and then cut to form the timber.[10]

Although fieldwork for the present study failed to uncover any boatbuilders who use the three-piece system to derive the shapes of all a craft's timbers, many of those interviewed recalled observing this usage in the past. For example, Harold Barrett of Old Perlican remarked:

> Those, those old, old builders that was familiar with the mould . . . they would take this mould and they would . . . make up all the timbers and throw them over there in the corner and, ah, put them in the boat just the same as they do now with the

plan. Well, it was really a plan, but it was an old-fashioned way of doing things.[11]

Instead of using the three-piece adjustable template to "mould out" all of a boat's timbers, contemporary builders use them to obtain only the shapes of the three principal transverse sections: fore hook, midship bend, and after hook. After the timbers corresponding to these sections have been cut out and installed on the keel, ribbands (sometimes called "battens"), running from stem to stern, are tacked to them in horizontal rows in order to approximate the shape of the hull. Then, the shapes of the remaining timbers are obtained by measuring outboard, from the center of the keel, at various heights, or by pressing a flexible lead rod or a length of copper tubing against the inboard side of the ribbands.[12]

The contemporary use of three-piece adjustable templates is confined almost exclusively to the design of the region's oldest vernacular boat types: carvel-planked, open fishing boats between sixteen and thirty-two feet in length (e.g., rodneys (punts), motor boats, and trap skiffs). It is common for builders to possess two or three sets of moulds, each representing a specific boat type. For example, a builder might have a set of rodney moulds as well as a set of moulds for a motor boat. It is noteworthy that a set of moulds is generally used to derive the transverse sections of boats within a range of lengths--rodneys fourteen to seventeen feet in length, for example--rather than one hull form of a specific length. Builders are able to derive boats of various sizes from the same set of moulds in several ways: by changing the size of the rising square in accordance with the keel of the proposed craft, by increasing or decreasing the width and height of the half bend and the hollowing board, and by increasing or decreasing the distance between timber locations.

While Trinity Bay boatbuilders generally acknowledge that the use of the three-piece adjustable mould is the oldest design system in use around the Bay, they are not aware of its significance in terms of the history of naval architecture.[13]

Known to English ship designers as "whole moulding," this system of design is defined as "a system of forming the hull by using tangent arcs for the transverse sections"[14] in use in England, and probably other parts of Europe, at least as early as the mid-seventeenth century. With this system, transverse sections of vessels "were drawn with a pair of compasses while long radius fore-and-aft arcs were calculated mathematically or worked out approximately by a simple mechanical method."[15] Several key factors were integral to the use of whole moulding. One was the importance of the largest transverse section, usually called the midship bend, and the spot where it was located on the keel. It was recognized that the location of a hull's maximum breadth was directly related to the seaworthiness of the vessel. According to Baker, it was generally located aft of the forward part of the vessel a distance equal to one-third of the overall length.[16] This arrangement resulted in hulls that were full forward and fine aft and upheld the prevailing theory that a well-designed ship should possess a "cod's head and a mackerel's tail."[17] Other design elements were of even greater significance:

> While the shape and location of the midship bend were important, the shapes of the maximum breadth and floor lines actually determined the form of a vessel. These were generally called the narrowing and rising lines, which two terms are the simplest and best description of their function. Starting from the midship bend and working towards the bow and stern, it is obvious the area of each succeeding section must get progressively smaller if the vessel is to have a reasonable shape. The narrowing and rising lines for the floor arc show how far its center must move inboard and rise in order to produce the proper form. At the extreme ends, the narrowing line could actually cross the centerline in which case the floor arc did not form part of the frame outline but served only as a guide for the body sweep. The location and shape of the maximum breadth narrowing and rising lines determined whether a ship was chunky or fine. An easily curved narrowing line at the bow and a rising line that was much higher at the ends than at the midship bend produced a fine relatively speedy hull. Blunting the end of the narrowing line and dropping the ends of the rising line would make for a tubbier ship---slower than the previous one but capable of carrying a heavier armament if a warship or more goods if a

merchantman. This was the general trend of large ship design during the seventeenth century.[18]

It is clear that this system was developed for the design of ships. The use of whole moulding, or at least substantial elements of it, for the design of small boats appears to have occurred somewhat later, when knowledge of whole moulding trickled down to builders of small craft. Drawings contained in naval architectural works of the eighteenth and nineteenth centuries suggest that the adjustable moulds discussed above were used for small craft. For example, Mungo Murray, writing in 1765, explains the application of whole moulding for the design of a 29 ft. 1 inch longboat; Marmaduke Stalkartt (1781) and Abraham Rees (1819-20) do the same for 31 ft. and 32 ft. longboats, respectively.[19] All three writers provide detailed lines plans as well as drawings of adjustable moulds. However, this is not to say that adjustable moulds were not employed for the design of large vessels as well. According to John Sarsfield, Portuguese and Italian manuscripts that discuss whole moulding "are replete with [examples of] very large ships being built with this system. Moulds were extremely light and eminently practical to use, even for the largest vessels."[20]

The whole moulding apparatus currently employed by Trinity Bay boatbuilders is virtually identical to that described by such eighteenth century chroniclers of British boat and ship design as Murray and Stalkartt.[21] For example, Murray's <u>Treatise on Ship-Building and Naval Architecture . . .</u>, published in 1765, contains a drawing of the whole moulding apparatus that bears a remarkable resemblance to those used by contemporary Trinity Bay builders.[22] (See Plate 9 and Figure 3) In addition, the terms used by Murray to identify the individual parts of the apparatus and the marks which are inscribed upon them are nearly the same as those used by Trinity Bay boatbuilders.

It is impossible to determine when, and by what means, whole moulding came to Trinity Bay, but, based on the fact that the region's first settlers came from the West Country of England in the mid-seventeenth century, it is probably safe to assume that knowledge of whole moulding (and, perhaps, actual moulds) was brought from England by these settlers or by those who followed.[23] The earliest documented evidence of mould use in Trinity Bay appears to be "An inventory of the Effects of John Brine, Boatkeeper, deceased of Trinity 1805."[24] In addition to various woodworking tools (including some appropriate for boatbuilding) and fisheries-related items, Brine's effects include one set of skiff moulds, valued at two shillings and six pence, and three sets of punt moulds, valued at three shillings. Although this terse listing of the moulds and their values does not reveal their form and composition, it is highly possible that they were the three-piece type associated with the system of design known as whole moulding. As spare as the description of Brine's moulds may be, it clearly affirms that they were valued objects and confirms the early use of individual sets of moulds for specific boat types.

Whole moulding, a system of design that remains in use by a number

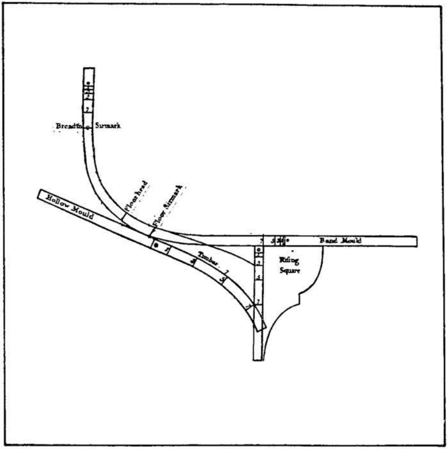


Figure 3: Illustration of whole-moulding apparatus from Murray (1765)

of Trinity Bay builders and, very likely, builders in other parts of Newfoundland, represents a significant chapter in the history of naval architecture.[25] At the time of its inception in Britain and on the continent, this formal and elaborate system for the design of ships marked the apex of the naval architectural theory of the day. Until fairly recently, historians of naval architecture generally believed that the practice of whole moulding died out long ago.[26] Chapelle, Lavery, and McKee have been fairly explicit on this point. Chapelle states that "the Elizabethan system of designing lines remained in limited use in England until as late as 1717 and was employed in small-boat design even later."[27] Lavery, in discussing the original meaning of "whole moulding," notes that "certainly this was how the term was understood in the nineteenth century, when it still survived in small boat design."[28] McKee observed that "today, no instances of whole moulding having been used recently can be given . . .[29] These assumptions were probably based on early eighteenth-century treatises on naval architecture that noted the whole moulding had been supplanted by more advanced systems of design. For example, in a lengthy article on ship building in Abraham Rees's Cyclopaedia: or, a New Universal Dictionary of Arts and Sciences, published in 1819-20, the author observes:

> Whole-moulding was formerly a method of constructing the immersed part of ships' bodies, by the mould being made to the form of the midship-bend, which, with the addition of the floor-hollow, would mould all the timbers below the main-

> breadth in the square body. But since the art of ship-building has arrived to its present perfection, the method of whole-moulding, for the following reasons, has been justly laid aside. For by whole-moulding, no more is narrowed at the floor than at the main-breadth, that is to say, the curves of each are kept parallel; nor must the rising-line in the sheer-plan lift any more than the lower height of breadth; which, according to the form of some midship-bends, would make a very ill-constructed body; for by continuing that nearly forward and aft, the ship would not only be incapable of rising in a heavy sea, but would be deprived in a great measure of the more advantageous use of her rudder.[30]

In other words, whole-moulding was replaced when a system was developed that permitted the execution of designs that did not possess the limitations, and resultant lack of seaworthiness, imposed by whole moulding. Chapelle explains ship builders' abandonment of whole moulding somewhat more cogently, stating:

> The system did not survive because it could not produce a fair form near the bow and stern. It also did not permit the change in curves of the transverse sections necessary to create wholly fair longitudinal or planking lines, nor did it allow for the numerous reverse curves required in the lower longitudinals to meet the bow and stern forms. The net

effect was to require interpretations, and the results of this would prevent two builders from working to the same design from producing identical vessels in form.[31]

However, according to Rees, despite these shortcomings, "Nevertheless this method is still continued in the formation of boats."[32] Research done in connection with the present study has proven that this is clearly the case. In addition, researchers working in Portugal and Brazil have uncovered other cases of the contemporary use of whole moulding or related systems of design by builders engaged in the production of vernacular craft.[33] Unquestionably, current research has the potential to shed light on the intricacies of whole moulding, a seminal, but poorly understood chapter in the development of naval architecture.

Although research for the present study revealed that most Trinity Bay boatbuilders are familiar with the variant of whole moulding they refer to as "building by the mould," only two of my informants--Marcus French of Winterton, and Llewellyn Meadus of Grates Cove—actually employ the system for the design of the boats they build. Interviews also suggest that the use of three-piece adjustable moulds appears to have been more common along the eastern shore of the bay than on the western shore, at least throughout the present century.[34]

Pattern Moulds

Moulds of another type, what I will refer to as "pattern moulds," are commonly used around the bay. These moulds are not adjustable templates in the style of the three-piece adjustable moulds derived from the whole moulding system, but are individual patterns for the shapes of timbers and, occasionally, the counter. These patterns sometimes take the form of full transverse sections (timber pairs), but more frequently represent only one half of the transverse section. Usually, they are made of wood and represent the shapes of the fore hook, midship bend, after hook, and sometimes the counter. Counter moulds are generally made of wood or cardboard and represent one half of the counter.

As with three-piece adjustable moulds, pattern moulds are used to trace out the shapes of the chosen timbers onto the timber stock. One starboard timber and one port timber are then cut out of the stock. Next, the two halves are joined together with "floors" (floor timbers), braced across the top, then erected on the keel.[35] After the principal timbers and the counter are fastened in place, ribbands are attached so that they run from stem to stern in horizontal rows, touching the outboard edges of the timbers. The shapes of the remaining timbers are obtained in three ways: (1) by taking measurements from the hull centerline out to the ribbands, (2) by eye, or (3) through the use of a flexible piece of copper tubing or a thin lead rod which, when pressed up against the inboard faces of the ribbands, yield the shape of the desired timber. Austin King of Hickman's Harbour describes the use of this type of mould:

> Well, I have them [moulds] out there, you know, [in my shop]. There are certain frames done out and they're put together, you know. You usually have three frames and then the stern, you know. And you usually put them across your boat and then you, ah, what they calls "batten her out," or "lath her out." And then you go to work and then do whatever frames, then, to suit, you know.[36]

Generally, builders who employ this type of mould do not make new moulds for new craft of different dimensions, provided these boats possess the same basic hull shape. Instead, they prefer to use the moulds they already own to derive the shapes of larger of smaller craft. According to most who do so, this is done in order to more successfully retain the basic design characteristics (characteristics already tested through use) that they favor. How does one use moulds originally intended for a twenty-one foot boat in the construction of a thirty-two footer? This is done by transverse and longitudinal expansion of the shapes described by the moulds. In order to preserve the essential shapes of the moulds, expansion takes place in two areas: half-way between the turn of the bilge (waterline)[37] and the lower end of the timber, and at the topmost end of the timber at the sheer. These two adjustments create greater depth and, in most cases, greater width. Longitudinal expansion is achieved by expanding the distance between mould stations, but this is keyed to standard measurement formulas for the placement of principal timbers that we shall examine

Plate 14: Russell Bishop holds pattern mould for stem

later. To build smaller boats, the procedure is reserved. Instead of expanding critical dimensions (e.g., length overall, width, depth, height of sheer, distance between timbers) they are contracted.

This use of a basic design or "model" for boats within a specific size range is very common around the bay. It is not unusual to observe boats from twenty-one to thirty-five feet in length being built from the same set of moulds, provided no drastic departures from the base form are to be attempted. Indeed, some builders are so committed to the efficacy of this approach--design plasticity, we might call it--that they claim the moulds of small boats can be used to derive successful craft up to one hundred feet in length or longer.[38] This practice underscores the characteristic conservatism of design practice within the study area. In general, the builder's range of hull shapes is very limited, and it is the rare builder who departs from the way things have been done in the past and introduces large-scale design changes from one boat to the next. For example, when asked if his father used different moulds for the boats he built, Austin King replied that he did not because he was "just afraid that it would be a bad boat" if the basic form was altered.[39]

At first glance, three-piece adjustable moulds and pattern moulds appear to characterize two separate approaches to boat design. However, fieldwork has uncovered sufficient evidence to indicate a strong relationship between the two techniques. A number of builders have indicated that the pattern moulds they possess were originally derived through the use of a three-piece mould. In many cases, the fathers of these builders used three-piece moulds, but their knowledge of the utilization of this system was not passed on to their sons. Instead, sons resorted to the use of pattern moulds based on their fathers' designs. Indeed, some builders have said that their fathers used a new three-piece mould to derive a boat's timbers and also used them to make up pattern moulds. The principal timbers of subsequent boats were derived from the pattern moulds. Since it is much simpler to make up timbers using exact patterns than it is to go through the precise manipulations required to derive the same shapes with a three-piece mould, it is easy to see why this route was usually taken. Consequently, as skills required to manipulate the three-piece mould became less widespread, the use of this technique rapidly declined. Currently, while many older builders understand the basic theory underlying the employment of three-piece moulds, few possess the practical knowledge required to put it to use with their own boatbuilding projects. Among those builders who do possess the practical knowledge, this knowledge is often put into practice only on the rare occasions when a new set of pattern moulds is needed.[40]

Moulds for Steamed Timbers

The two types of moulds discussed above --three-piece adjustable moulds and pattern moulds-- are used in the determination of sawn, naturally curved timbers. The third type of mould in use around the Bay differs in that it is used in conjunction with steam-bent timbers. The steaming of timbers, though widely employed in other parts of the world (especially with clinker or lapstrake hulls[41]), has only been practiced in the Trinity Bay region since the 1960s. Although the number of builders who have used this technique has steadily increased over the years, the total remains relatively small compared to the builders who employ sawn timbers. The steaming of timbers has not been enthusiastically embraced because many boatbuilders and users are skeptical about the strength and longevity of steamed timbers, and are convinced that sawn, naturally curved timbers are absolutely and unquestionably superior. Indeed, builders who have embraced the steamed timber technique for boats larger than eighteen to twenty-four foot speedboats will, in many instances, have difficulty in convincing customers of the merits of steamed timbers. Consequently, they have a hard time selling boats with steamed timbers.[42] When Kevin King of St. Jones Within was asked if he had ever installed steamed frames in boats he sold to fishermen, his response was typical:

> King: We used to on speedboats, but [we've] never done it on trap skiffs. Fishermen don't prefer that.
>
> Taylor: Why is that?
>
> King: They like the solid frame . . . . You know, if you got a boat here in the yard and she's steam-bent and you got one, same boat, same shape with solid frame[s] on it, they'd take the other one [with solid

frames] . . . .

Taylor: What do you think? Do you think it's as strong?

King: Well, steam-bent frames, they've been used for years. Yeah, I think they're just as strong as the solid frame, but the solid frame looks stronger, put it that way.[43]

In any event, those who do employ steamed timbers in their boats use moulds that are full-size wooden patterns representing the full breadth of the hull at key timber stations such as the fore hook, the midship bend, and the after hook. These moulds are erected on the keel and used, along with ribbands to form a temporary hull shape around which the steamed timbers can be bent. Once the timbers have dried and been fastened securely in place, the moulds are removed from the hull and set aside for use with future craft. This type of mould differs from the two types discussed earlier in two ways: it is not used as a direct pattern for principal timbers, and it plays a more integral role in the construction process. However, it is similar to the other mould types in that proportional expansion is used to derive craft of varying dimensions.

Models

In addition to moulds (in all of their forms), there is another prominent device used around Trinity Bay for the design of boats: the half-hull model. As in the case of the "mould" it is important to point out that "model" has more than one operative definition in the study area. In one sense, as has been mentioned above, a model is an overall design. A fisherman might say, for example, that his boat "fits the old-fashioned model." When used as a verb, however, it is used to mean the act or process of shaping or designing. For example, a builder might say he "modeled the skiff to be a good sea boat." In the third sense of the term, "model" is defined as a hand-carved, wooden, scale miniature of one half of the hull (divided longitudinally along the center-line) of the craft to be built. Usually referred to as the "half model" or "side model" by Trinity Bay builders, this device is used for two basic purposes: as a three-dimensional representation of the planned vessel that will permit the builder and, in some cases, the prospective buyer, to assay the design and make modifications if necessary; and as a template from which the measurements for timber shapes, stem shapes, stern post shapes, and other critical aspects of the hull form can be "taken off" and expanded to full size for use as patterns. In the Trinity Bay region, such models are commonly carved to scales of 1/2" = 1,' 3/4" = 1,' 1" = 1,' and 1-1/2" = 1.'

There seems to be general agreement among chroniclers of naval architecture that the half model technique was probably practiced in England sometime prior to the eighteenth century and, as has been noted earlier, replaced whole-moulding as the most popular system for the determination of vessel shape. Chapelle, for example, states that the

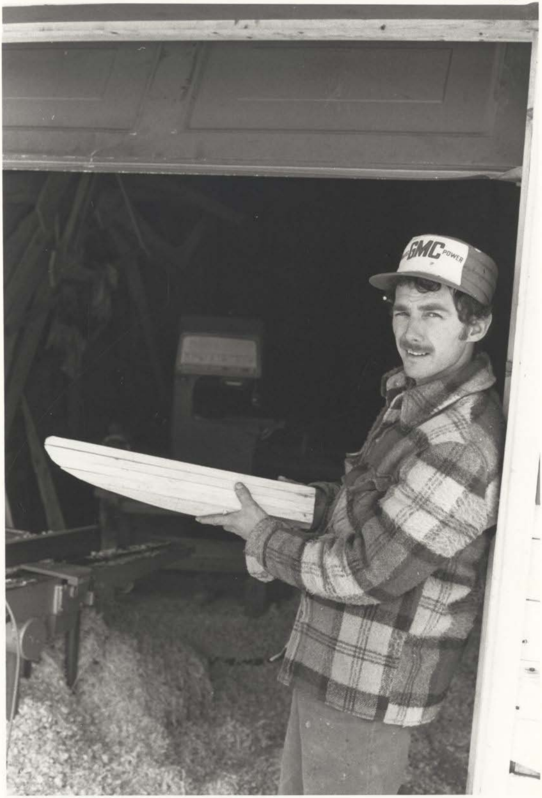


Plate 15: Kevin King with unfinished half-model

half model was probably introduced in England before 1700[44] and notes, in a later publication, that the earliest form of the half model, known as the block model, "was in use in England and in the colonies at least as early as 1715."[45] Two principal factors accounted for the eclipse of whole-molding by half-modeling: first, because all facets of a hull form are represented in a model, the problem of how to create fairness at the ends of a hull (the primary shortcoming of whole-moulding) could be resolved in advance; and, second, the model served as a tangible, three-dimensional representation of a design. Although he does not discuss whole-moulding, nineteenth-century American ship-builder John W. Griffiths emphasizes the second point in his work of 1855, Treatise on Marine and Naval Architecture. Noting the limitations inherent in determining vessel form from two-dimensional draughts of vessels, he writes:

> . . . thus it will be perceived that the draught alone does not furnish an index to rotundity in ships, and although useful, and in many respects far more convenient, yet for the single purpose of delineating the form of a vessel by the eye, the model is incomparably its superior . . . . That the model is completely adapted to our wants must be admitted even by the casual observer, when he discovers that every part of the vessel may be exhibited, all the proportionate lengths, breadths and depths, every line may be seen in its appropriate place, it exhibits not only the form but a ready

> model of obtaining tables for the loft, and is for the purposes delineated, to the draught, what statuary is to written description of the physical man, the latter the shadow, the former the substance.[46]

Within this discussion of half modeling, it is important to point out variations in model type and their relationship to the development of this technique over time and space. As mentioned in the previous paragraph, the solid or "block" model is usually considered the earliest type of half model. Carved of a single piece of wood, it is undeniably the simplest of all types. The lines of a block model are taken off in a number of ways, but the most common sequence is as follows: (1) trace the profile of the model onto a board or a piece of paper; (2) mark perpendicular lines along the profile tracing that correspond to the locations of the timbers; (3) take off shapes of individual timbers by pressing a piece of flexible lead rod against the model at appropriate locations; (4) trace timber shapes onto a piece of wood or paper. One variation of this sequence is to use a fine-toothed saw to cut completely through the model at the perpendicular lines representing the timbers. Timber shapes are then easily obtained by tracing the outlines of the various slices. Another variation is to make shallow cuts into the model at the timber locations and then insert pieces of cardboard which are then marked or trimmed so that they can be used as templates.

The second main type of half model is known as the "crow's nest," "hawk's nest," or "skeleton" model. This type of model consists of mould frames representing timber shapes that are nailed to a backboard and held vertical by battens, at least one of which represents the sheer line. The lines of these models are taken off by tracing the mould shapes onto paper or cardboard. According to Chapelle, the earliest documented use of this technique occurred in England in 1752.[47] This type of model was especially popular along the Atlantic coast of the United States between 1780 and 1820 and was employed in isolated regions of the country as late as 1880.[48]

The third principal type of half model is called the "lift" model. This type of model is carved from a block created by fastening together several thin boards with screws or dowels. In order to take the lines, the spacings of the frames are marked on the model. Next, the profile is traced onto paper or a piece of wood. Finally, the model is taken apart and the profile of each lift is traced in order to determine the shape of each frame.[49]

Chapelle states that the lift model came into use during the years 1790-95, but also allows that it was possibly introduced earlier and was a product "of a gradual evolution from a solid block model sawn into vertical sections."[50] Although there appears to be a dearth of solid evidence, the provenance of the lift model is often attributed to the Massachusetts seaport towns of Salem and Newburyport.[51] John W. Griffiths, writing in the middle of the nineteenth-century, asserts that the lift model (which he calls the "water-line" model) is an American invention, the origin of which can be traced to an accidental discovery. As he puts it:

> The invention of the waterline models, like many others, was the result of mere accident. In the Eastern states, and in the British provinces, men who were acquainted with the art of construction upon paper, made from a block the form of the vessel they intended to build, which was cut into several transverse sections; those sections representing frames, were then expanded from the scale upon which the model was made, to the size of the vessel; and the frames were worked out to which harpens[52] were attached, and the remaining parts, or intermediate spaces, filled in by making moulds to those harpens. In making one of those block models, the block was found to be too small to give the required depth, to which a piece was added, and when finished it was discovered that the longitudinal form of the vessel was shown by the line uniting the two pieces together. The question at once arose, if one seam was an advantage two would be still greater; and as early as 1790 water-line models were made for building purposes.[53]

Although Griffiths' claim that "the history of commerce has witnessed no greater achievement than is furnished by this ensign of mechanical genius"[54] is an exaggeration, the introduction of the half-model was indeed a major contribution to naval architecture at the time. Lift models were widely used by shipyards as recently as the early decades of the twentieth century and their continued use by small yards and boatshops in North America and Northern Europe is well documented.[55]

As with whole-moulding, the matter of determining when half-model use commenced in Newfoundland is open to conjecture. Owing to the relatively esoteric nature of the device, the paucity of documents noting its use is not surprising. The earliest printed reference to the use of the half-model in Trinity Bay found to date is in the March 2, 1853, issue of the Weekly Herald, published in Harbour Grace, Conception Bay. In noting the launching of the vessel Thomas Arthur at Heart's Content, the writer observes: "She is built upon the half-model system, and is considered by ship-builders to be a first class production."[56] A thorough study of merchants' records on deposit at the Provincial Archive of Newfoundland may yield additional references to the use of half-models in the Trinity Bay region, as well as other parts of the province.

In any event, we may safely conclude that half-models were introduced to Newfoundland between 1800 and 1850. A more precise determination cannot be made without additional data. However, if Griffiths is correct in assigning the discovery of the half-model to builders in the "Eastern states" and the "British provinces," and if one of the British provinces to which he refers is Newfoundland, then the use of half-models probably began in the province near the beginning of the nineteenth century. Setting aside documentary evidence of half-model use, the large number of nineteenth and twentieth century half-models (used to design fishing schooners, coasting vessels, and trans-Atlantic merchantmen) in the collection of the Newfoundland Museum (St. John's), and in the collections of smaller museums throughout the province, offers ample proof of the use of half-models in Newfoundland shipyards. Much in the same way that knowledge of whole-moulding gradually trickled down from shipbuilders to the builders of vernacular craft, it is highly likely that the first builders of inshore fishing craft to use half-models acquired knowledge of this design technique through employment in shipyards or from other men who worked in shipyards.

Field research undertaken in connection with the present study has documented all three of the basic half model types noted above, as well as several sub-types, within the Trinity Bay region. Some builders carve or "cut" the model from a single block of wood and then saw it up into as many vertical slices as are desired to obtain key transverse sections. For example, in 1962, George Penney of Catalina carved a model (scale 1/2" = 1') for a 20-foot outboard powered boat from a solid piece of wood, marked the locations of seven timbers, and then sawed through the model at these places. Having determined the transverse sections in this very direct way, he took measurements at regular heights (waterlines) from the centerline outward to the hull surface. Next, by expanding these measurements to full-size, Penney derived the shapes of the full-size timbers. While some would find this method unattractive because it involves cutting up the fruits of one's carving labors, models of this type can yield fairly accurate measurements for transverse sections. Penney also fashioned another variant of the solid block model. This unusual model—the only one of its kind observed during the course of fieldwork—is a solid model which has received shallow saw cuts at key timber stations. Strips of stiff paper trimmed to match the outboard shape of each station have been inserted in the cuts. This model, carved in 1980, is for an 18' by 6-1/2' speedboat. The scale is 1" = 1.'[57]

Instead of sawing up solid models by making vertical saw cuts, other builders take off timber shapes with calipers or with a thin lead rod that is pressed against the model at various timber stations. Joseph Dalton of Little Catalina is one who employs this approach. After using calipers to take off measurements at the timber stations of his 1" = 1' model, he then transfers the expanded measurements (half-breadths) to a grid marked on a piece of plywood which he calls the "door." This grid consists of one vertical line representing the centerline of the hull, and several lines perpendicular to the centerline at regular intervals.[58] When all the half-breadths have been marked down for each waterline and identified according to specific timber, Dalton begins the task of individually deriving the shapes of the timbers. First, he drives a thin nail into the door at the outermost point of each half-breadth. Then, he bends a flexible batten around the nails. Finally, he traces the curve thus described that represents the shape of the timber. This procedure is repeated for each timber in turn.[59]

Another informant, Clement Stone of Lower Lance Cove, also follows

Plate 16: Joseph Dalton takes half-model measurements

this basic procedure of taking the lines of solid block models.[60] Builders were also interviewed who utilized lift models. As noted earlier, these models are carved from a block made by pinning together (usually with dowels) horizontal layers of wood of uniform thickness that correspond to the waterlines of the planned vessel. Timber shapes are obtained by disassembling the model and measuring outboard from the centerline along the top and bottom of each lift at the timber stations. There measurements are generally recorded on paper in tabular format and then expanded to full-scale on a grid drawn on a piece of cardboard, a sheet of plywood, or on a wooden floor.[61] Lastly, using the same procedure described in the previous paragraph, the shapes of the timbers are faired with a flexible batten. Builders interviewed who employ this type of half-model are Kevin King of St. Jones Within, and Edward Toope of Trinity.[62]

Analogues of Trinity Bay builders' practice of expanding timber shapes--but not the full-scale lines of other boat parts--on sheets of cardboard or wood are found outside Newfoundland. In England and the United States, the piece of material upon which the lines are drawn is often known as a "scrieve board" or "scrive board."[63] A related device, called a "gate," has been documented in the Placentia Bay region of Newfoundland, but fieldwork for the present study uncovered no similar devices around Trinity Bay.[64]

All the builders contacted who make use of half-models carve them out of soft wood, usually pine. Hand tools are used for primary shaping, and these generally include planes, chisels, hatchets,

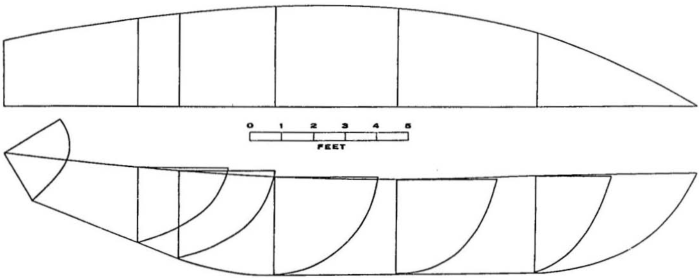


Figure 4: Tracing of Bill King's half-model for 22 ft. motor boat

Plate 17: 29' trap skiff under construction by Kevin King

jackknives, and handsaws. Final shaping is usually accomplished with sandpaper and a small piece of glass, the latter being especially useful for removing "high spots." Invariably, the completed models are not given any protective coatings such as paint, varnish, or shellac. Occasionally, models are mounted on rough backboards. When backboards are used, builders often use a pencil to write key measurements on them, or to trace the vessel's profile or deck outline. When inscribed in these ways, the backboard becomes a handy reference to which the builder can refer instead of remeasuring aspects of the model. Sometimes data of this kind are recorded on boards which are not used as back boards for models; they are used exclusively as reference devices.

Edward Toope of Trinity showed me several reference boards[65] of this kind. For example, one was a reference board for a 25'-8" motor boat he built in 1975. Drawn in pencil on one side of the board was the profile of the craft bracketed by forward and after perpendicular lines and a base line. The locations of six evenly-spaced timbers were also indicated.[66] Measurements were inscribed for the height of the sheer at the stem, stern, and each of the six timber locations. Measurements are also given for the distances between each timber station. In this case, each timber is spaced 3'-8" from the next. Similarly, the forwardmost timber was 3'-8" aft of the forward perpendicular, and the aftermost timber was 3'-8" forward of the after perpendicular. On the reverse side of the board, Toope had drawn the boat's deck profile. The six timber stations were also marked, and the half-breadth measurements were inscribed for each timber as well as for the counter. Apart from the transverse sections for each timber, the drawings and measurements marked on both sides of the reference board represented all the key data required to derive the full-scale design of the boat.[67]

It is important to note that not all builders who have employed half-models actually carved the models they used. In many cases, this is explained by the fact that models have been handed down in families from father to son. In other cases, builders have preferred to borrow successful half-models rather than carve new, untested models. For example, Joseph Dalton, who learned how to carve half-models by watching his father, explains how he had come to loan one of his trap skiff models to other builders:

> And she ended up someplace up Trinity Bay, that model did. Well, there's five [boats] built off her down there. You know, they liked the boat alright, seen that she was alright, and they got the model. Because model cutting, there's boatbuilders, there's boatbuilders that builds lots of boats, far more boats than I've built, . . . [who] don't cut models. They'd sooner get a model already done.[68]

Aside from illuminating two levels of builder interaction with half-models (i.e., creation and use, and use alone), Dalton's comments about the dissemination of knowledge resulting from the lending of his model underscore the complexity of tracing the diffusion of boat designs and design-related devices within the study area.

Once a half-model has been carved and used to build one or more boats, its form is not always viewed as sacrosanct. In other words, many builders feel no compunction about altering a model in order to introduce small-scale design improvements. For example, Joseph Dalton decided he could improve the design of a rodney half-model carved by his father by cutting off a portion of the stern. Similarly, a trap skiff model shown to me by Reuben Carpenter reveals that its maker introduced added breadth by fastening a 1/2" board along the center line of the original model and then carved it down to blend in with the contours of the model. Altered models such as these indicate that their makers sought to make minor changes in designs that, by and large, were judged to be successful. If major design changes are to be made, however, builders generally carve new models.

Before leaving this discussion of half-models, let us briefly examine how these devices are viewed by builders and by the members of their communities who do not build boats. To the builder, completed half-models are considered tools, not works of art, and are seldom accorded any more respect than a hammer, a saw, or any other tool found in the builder's shop. When a builder is not using a model, it is likely to be set aside on a shelf, in a drawer, of merely shoved to the back of a work bench.[69] When models have cut-lived their usefulness, builders will often throw them away or toss them into the stove. Frequently, however, they are saved and sometimes passed down in a family from father to son. In some cases, these models continue to be used to derive the designs of boats. In other cases, old models made by a man's father, grandfather, or another relative are not used, but are preserved as heirlooms. All models serve as tangible links to prior experience and, as such, often function as catalysts for narratives about particular boats and their builders and users. Since they represent the design of a particular boat as it existed at a specific time in a specific place, they often evoke insightful commentary from builders about design evolution. Beyond the circle of boatbuilders in any Trinity Bay community, and the fishermen who have a good understanding of boatbuilding, community residents (including wives of builders) rarely understand either how models are used or their relative importance in the boatbuilding process.

It is interesting to compare perceptions of half-models to those of another type of model commonly found around the Bay. While half-models are not considered art, within the communities of the Bay, fully-rigged scale models of fishing boats made by many adult males (often retired fishermen) are considered to fall within this aesthetic domain. A principal reason for this categorization lies with the fact that builders' half-models are unadorned, extremely esoteric devices -- minimal boats, in effect-- and their beauty, when it is present, is more difficult for the non-builder to apprehend than the beauty of the full-rigged model that, ideally, looks just like the real thing in all of its complexity, albeit in miniature form. Another central reason is that builders and non-builders consider half-models to be tools used in a process, while they view full-rigged models not only as the products of a process but also artifacts for contemplation rather than use.[70] Both types of models share the characteristic of stimulating thoughts and narratives about people, places, and experiences. Both also testify to the skill, or lack of skill, possessed by their creators.[71]

Mould and Model Relationships

Historians of naval architecture have often claimed that the use of half-models eventually led to the demise of the whole-moulding system. As previously noted, two central factors have been cited to account for the ascendancy of half-modeling. First, since all facets of a hull form are represented in a model, the problem of how to create fairness at the ends of a hull can be resolved at the design stage. And, second, the model served as a tangible representation of a design which the builder and his prospective clients can view in three dimensions. Given the improvements inherent in model use, the argument that half-modeling replaced whole-moulding seemed altogether convincing. However, as I began to travel around Trinity Bay and question builders about their design techniques, this view of design evolution started to appear somewhat less convincing. In some communities, builders used half-models, in others they used whole-moulding, and, in some, pattern moulds predominated. To say the least, I was surprised to discover such a variety of design techniques within a relatively small area, and confused about how to make sense of it.

Having uncovered little useful data on Newfoundland design practices in documents, efforts were focused on conducting interviews with boatbuilders. Gradually, the ways in which boat design techniques have changed in the Trinity Bay region became clear. According to oral tradition, whole-moulding came first and, at some unspecified date, half-modeling followed. For example, part-time boatbuilder George Penney (born 1915) offered the following recollection from his youth:

> Well, we used the mould mostly at that time, you know. We used the mould. You['d] never hear talk about models, very seldom hear talk about models, you know. But they was starting to come in, just starting to come in then.[72]

When asked about the origin of whole-moulding in his community, Harold Barrett (born 1916) of Old Perlican responded:

> I suppose they brought it back from England and Ireland when they came out. What they used to call a mould. They'd have a mould, you know. They built their boats by mould.[73]

However, when Barrett was a young man, ". . . they were building by model, too, at that time. But, most people at that time, the smaller boats they'd build by mould."[74] Other informants also confirmed this chronology. For example, Clement Stone of Lower Lance Cove explained to me that although he uses half-models his father had used three-piece moulds. He verified this by showing me the actual moulds passed down to him from his father.[75]

Based on the wealth of documentation cited earlier, I believe it is safe to assume that whole-moulding is of European origin and that it arrived on Newfoundland shores with early settlers. Oral tradition solidly supports this assumption, at least within the context of Trinity Bay. At some point --the date is unclear--the use of half-models was introduced from England or, perhaps, New England. In some Trinity Bay communities the new technique replaced whole-moulding, but in others--either because half-modeling did not catch on or was not introduced--it did not. In analyzing why half-modeling was not accepted in some places, the case of the community of Winterton, located on the eastern shore of the Bay, may be instructive.

When questioned about the use of half-models, several Winterton informants recalled that models had been used during the first quarter of the twentieth century by Amos Piercey, a local builder of schooners. However, they said that the use of models did not catch on with the majority of builders of small, inshore craft. One informant, Lionel Piercey, revealed that his father, William Piercey, had used half-models for the design of small boats. When asked why he hadn't learned how to use half-models himself, Lionel replied that it was simply a technique he hadn't mastered. Over the course of two years of fieldwork in Winterton, I was unable to uncover any evidence of ongoing half-model use in the community. All three types of moulds (three-piece moulds, pattern moulds, and moulds for stemmed timbers) were found to be in use, however. Why is it, then, that half-modeling, a technique of supposed superiority, never caught on here? Perhaps, its rejection was due to builders' reluctance to abandon the older, proven system for an untried system which was, possibly, initially incomprehensible. Or it may have been that builders, most of whom were fishermen who built boats only for their own use, saw no particular merit in the improvements inherent in model use. All of these factors may have come into play, but one can do little more than speculate on reasons for the non-adoption of the new technique.

My fieldwork has shown that half-model use definitely supplanted whole-moulding in some communities. This is supported by fieldwork conducted by Hilda Murray in her home community of Elliston. In an unpublished paper, Murray notes, "All early boats in the Elliston area were built 'by mould.' Building by 'model' does not seem to have been done there till perhaps the first or second decade of the twentieth century."[76] Today, in many parts of the Bay--especially along the western shore--model use is more common than the use of the three-piece adjustable mould. More specifically, while I contacted seven boatbuilders from the western shore who use half-models, I was unable to locate any builders from the eastern shore who employ the device, despite the fact that ample oral testimony indicates that models were used there in the past, especially for the design of schooners.[77] Conversely, while I have identified five builders from the eastern shore of the Bay who use three-piece adjustable moulds, I did not locate any from the western shore.[78] The chart on page 136 shows which builders use which combinations of these design methods.

Table 1: Methods Used for Derivation of Timber Shapes

Informant	adjustable moulds	full & half-breadth moulds	half-models	plans
Barrett		X		X
Bishop		X		X
Burridge		X		
Carpenter				X
Dalton			X	
French	X			
Jackson		X		X
King, A.		X		
King, K.			X	X
King, W.			X	
Lambert			X	X
Meadus, L.	X	X		
Penney			X	
Stone			X	
Toope			X	
Vokey, W.		X		X

As fascinating as it is to examine the current distribution of the use of half-models and three-piece moulds, current trends seem to indicate that in the future, <u>neither</u> will be the device of choice for the majority of Trinity Bay builders. Increasingly, contemporary builders on both sides of the Bay are relying on the exclusive use of pattern moulds for the derivation of the shapes of key timbers. In other words, what were once the secondary products of the design process (i.e., offspring of half-models or three-piece moulds) have become primary devices. Moulds of this kind are not unique to Trinity Bay, and may be found in boatbuilding cultures throughout the world. As McKee was pointed out, such moulds function not only "as a way of storing previous designs, but as a convenient starting point from which improvement on an old design can be made."[79] Around Trinity Bay, the shapes of pattern moulds are derived by taking measurements directly from boats that have proven to be successful through use in the fishery, or, more commonly, by copying the moulds of successful designs developed by other builders. Yet, in many instances, the hulls that are measured and the moulds that are copied have originally been derived through the use of three-piece moulds or half-models. In terms of builders' design competence, the exclusive use of pattern moulds with no practical knowledge of the systems that gave birth to them appears to be somewhat of a retrogressive development. In order to understand why this is the preferred technique for the majority of builders, we must look at the basic similarities between model use and three-piece mould use.

In many cases today, builders who use half-models and builders who use three-piece moulds frequently employ these devices only for the production of a new design. Each time a new design is executed, shapes for timbers are derived with these devices, pattern moulds are then made, and these moulds are used exclusively for all succeeding boats of the same design. As one veteran builder described the process:

> Now, we had our own, our own [pattern] mould. It come off a model. We took it off a model. But that's what you do . . . take your mould off of the model . . . and take [the model] and burn it . . . you know, throw it away.[80]

This abandonment of the initial design device, whether mould or model, is, from the builder's viewpoint, simply a way of lessening the time and effort needed to produce the second and all subsequent craft based on the same design. Unless significant changes in the design are to be made, why go through the exacting and laborious task of measuring a model and expanding (lofting) transverse sections, or manipulating the parts of the three-piece mould apparatus? In fact, as the builder quoted above suggests, why save the primary device at all? The widespread use of pattern moulds today stems from this streamlining of both mould and model technique. While some builders contacted carve models and then make up pattern moulds, and some use three-piece moulds and then make up pattern moulds, a large number do not use either procedure. Instead, they rely solely on pattern moulds that have been handed down in their families or that they have copied from those of other builders.

Minor changes in design generally are accomplished by changing the spacing of the key transverse sections that pattern moulds represent, or by slightly altering the shapes of the pattern moulds. In other words, pattern moulds originally produced for a craft of specific length, breadth, and depth are used for the production of larger or smaller craft of the same basic shape through proportional expansion or contraction. For example, if a smaller boat is desired, spacings between transverse sections, breadths of the sections, and the sheer heights at each section are all reduced. If a larger boat is required the procedure is reversed and expansion takes place in these areas. In this way, builders are able to use one set of pattern moulds to build the same basic design in a range of sizes. In the words of fisherman and part-time boatbuilder Edward Toope, after the first boat is constructed to a new design derived from a half-model,

> . . . if you wanted a smaller one, you'd just make it on a smaller scale. You made the moulds after you got the model made, you know. You made your moulds if you wanted a smaller scale. You just took it in narrower, or shorter, or whatever the case may be.[81]

This approach to design is also integral to the work of professional boatbuilder Wilson Vokey of Trinity. Vokey, who employs neither models nor three-piece moulds, uses a single set of pattern moulds to build trap skiffs from 25' to 35' in length. The set of moulds he uses are based on the design of a 30' x 9' trap skiff that has been passed down in his family. Boats larger or smaller than 30' are fashioned by increasing or decreasing the bottoms and sides of the original design, and by increasing or decreasing the distances between timbers.[82] Unlike Wilson Vokey, who uses a single design (handed down in his family) that is expanded on contracted according to the size of craft desired, many of the Bay's professional builders tend to favor discrete designs represented by individual sets of pattern moulds. For example, Fred Jackson of Whiteway has individual sets of moulds for the five basic designs he builds, and Reuben Carpenter of Port Union has individual sets of moulds for his four stock designs.[83] The creation of individual sets of moulds for discrete designs is a fundamental departure from the one-design-fits-all approach favored by Vokey and most of the Bay's part-time builders. Basically, the former approach exemplifies major design change, while the latter represents minor change within a narrow range of possibilities.

Part-time builders find the use of pattern moulds efficacious because it is a fairly straightforward system that generally results in craft that are adequate for their intended purposes. Full-time builders also value the simplicity of pattern mould use, but justify their use on the grounds that they are instrumental in cutting production time, labor costs, and materials costs for multiple boats built from stock designs. In general, the Bay's full-time builders desire to replicate several discrete designs with a high degree of precision in order to maintain a healthy profit margin while responding to a wide market. Part-time builders, on the other hand, prefer to remain faithful to a single, localized hull form (albeit one that can be expanded or contracted) that serves a narrow market. Consequently, full-time builders are more likely than part-time builders to have individual sets of pattern moulds for their stock designs. Similarly, because exact replication of designs is highly valued by full-timers, they generally have a larger number of moulds in each set than part-time builders. For example, while a part-time builder might have as few as three or four pattern moulds for a trap skiff, a professional builder might have one mould for each timber--thirty or more in all.[84]

While the casual observer may conclude that the gradual abandonment of the whole-moulding and half-modeling techniques in favor of exclusive reliance upon pattern moulds is a retrogressive development, this is not a fair assessment of the situation. Firstly, in a context where improvement in design and construction procedures has always been sought (even though acceptance of improvements has been characteristically slow) this development should be viewed not as a step backward, but as a step forward along an evolutionary staircase of refinement. Secondly, while certain ways of looking at design in a holistic way will probably be lost with the dismissal of half-models and three-piece moulds, it is highly likely that new modes of design conceptualization will be fostered by the exclusive use of pattern moulds. For some time to come, however, the influences of the older systems will be apparent.

Mental Templates

In addition to the various forms of physical devices used in the design process discussed above, another important aspect of the process of boat design is the utilization of non-physical patterns that exist only in the minds of the builders. I will refer to these patterns as "mental templates."

After most Trinity Bay builders have decided upon the type and size of boat they will construct, one of their first activities is the selection of the pieces of wood to be used for the major structural components of the craft. Since most employ sawn, naturally-curved pieces of wood for boat parts that require curved shapes, they must become adept at seeing the shapes of these parts in standing trees or in piles of lumber at the sawmill. Builders who use half-models will be guided, to some extent, by the shapes contained in their models. Builders who use moulds, however, will be guided by them for the selection of timbers, but generally will not have other patterns to guide them in the choosing of other boat parts, especially stems and sternposts.[85] Consequently, because they are not bounded by rigidly prescribed shapes, it is not surprising to observe that the stems and, to a lesser extent, sterns exhibit more variability from boat to boat than other component parts. However, while most builders who use moulds are not guided by physical patterns in the selection of stems and sternpost, and most builders who use half-models seldom take off

Plate 18: Alex Burridge with tree section for boat knee

stem measurements, it should be noted that they are guided by a general notion of what is correct, what looks right, what will "answer," as they often say, to the shape of the planned vessel.

When I questioned builders about how they go about choosing pieces of wood for boat parts, their answers were quite uniform. For example, when I asked Joseph Dalton, a builder who uses half-models, how he knew what shapes to look for, he replied:

> Well, you had a very good idea, you had a very good idea. Your bow pieces, your bow pieces was more like that, [sketches bow timber] and then you come along midships. When you come out like that they have more of a crook, according[ly], as you come along. You, ah, [make a] shorter crook, a shorter crook. See? Well, you can see that, you look at the model and see that.[86]

When I asked George Penney the same question, he said:

> Well, now, that's, a man that's used to building a boat [has] got no problem there at all. He's got no problem . . . . I can go in the woods and cut everything for a boat, everything that's needed for a boat. And you can cut any shape you wants in the woods. That's if you got the patience enough to look, you know, to look around. You can get any shape you want.[87]

Plate 19: Curved pieces of wood to be used for boat parts

Eleazor Reid provided a somewhat more graphic description of the process when I asked if he ever used a pattern for stems:

> No, whatever you thinks of making, that's all. You'll see a stick in the woods, go until you see, look around until you say, "Well, I know he'll make a stem . . . ." Same way with all your timbers. You'll go into the woods and you looks around until you see the piece of timber . . .[and you'll say], "Well," you know, "he'll make a piece for forward, he'll make a piece for aft, or a piece midships," and you'll cut it, that's all.[88]

When I attempted to elicit more precise information about the process of fitting a mental template to a standing tree, I was not successful. Apart from my own inability to frame the right questions, I believe the central reason for this is that builders are simply not accustomed to providing verbal descriptions of this process. Verbal rationalizations behind individual decisions about the acceptance or rejection of shapes for boat parts are uncommon just as verbal rationalizations for decisions relating to any number of processes that are part of daily life are uncommon.[89] In any event, while builders appear to lack an extensive vocabulary with which to describe complex shapes, this absolutely does not prevent them from making an enormous number of astute judgments about the fit or lack of fit between a mental image of a boat part and the tangible shape of a root, a trunk, or a limb. As

Plate 20: Curved wood for timbers in Alex Burridge's shop

Henry Glassie has similarly noted in the case of lower Potomac watermen who build boats, "The lack of an aesthetic vocabulary does not prevent aesthetic operation."[90]

In the Trinity Bay region, "mental templates" are part of the collective memory of a community's builders and users of boats. They are a non-physical distillate of generations-worth of judgments about that which is proper and right about the shapes of boats. Templates are products of knowledge males begin to pick up informally at an early age by closely observing boats and, concomitantly, by listening to the pronouncements of their elders concerning the relative correctness of their shapes. Over the years, the understanding of mental templates gradually deepens for those who stay close to the water. Just as diligent bird-watchers become adept at identifying a large number of species on the basis of shape, color, movement, and sound, watermen become proficient at identifying boats on the basis of exactly the same kinds of information.[91] Most veteran watermen can identify every boat in their communities, even from considerable distances.[92] In the case of boats from outside their communities, in many instances they are able to match these craft with the communities in which they were built and, sometimes, even with their builders. As boatbuilder Reuben Carpenter, a native of Little Catalina, observed:

> Well, as I said before, everybody, every bay around the coast had different ideas of the shapes of boats, and they were all different. I mean, you could tell a Trinity Bay boat. You

could tell a Little Catalina [boat], at least I could. You know, I could tell a Little Catalina boat anywhere that I saw it, you know. And the same thing about Glovertown [boats].[93] They had a beautiful model of a boat in Glovertown.[94]

There is a limited lexicon for the description of form, and it is customary for a word or a phrase to carry considerable freight. For example, for most Trinity Bay fishermen and boatbuilders, the term "Bonavista boat" conjures up a complex image of a vessel possessing all the characteristic features of craft from Bonavista Bay. Reuben Carpenter employed many of the terms commonly used to describe boat forms when I asked him if he could describe how the regional boat types he discussed above were different.

Ah, not particularly. I mean in the shape of the boat, you know. Some of them had a nice flared bow. More of them was rounded on the bows. Some of them had an upright stern. More of them had a bit of a flat stern, you know. This kind of way, you know. And you could tell some of the boats because the sheer of the boat was different, you know. Some of the boats that you see would come along with the sheer and then kind of turn down on the bow again, you know. More of them had a nice, suent shape. It was different, different ideas. Different opinions of the people that was building the boats.[95]

While Carpenter's response is rich in terms descriptive of form, it clearly reveals the difficulty inherent in verbalizing differences between complex forms. Such statements, to use a term employed by anthropologists Ladislav Holy and Milan Stuchlik, are "highly indexical," or dependent on a wide background knowledge that is unstated.[96]

For the cultural investigator, the task of quantifying a builder's or a community's mental templates is not easy. To a certain extent, mental templates are revealed in the craft that builders produce. That is, if one examines the forms of a number of boats of the same type and size certain commonalities should emerge. Simple observation might reveal, for example, that trap skiffs built in a certain community possess a rake of stem that is distinctively more pronounced than that found in boats built elsewhere. If the investigator has the time and expertise required to carefully measure existing boats and produce accurate lines plans, it is possible to ascertain form characteristics with a high degree of arithmetic precision. As useful as these data may be, they do not, necessarily, reflect the conceptions of the builder or reveal the cognitive sequence involved. In short, the observations and measurements a researcher records of a completed boat in isolation speak loudly of the <u>product</u>, but not the <u>process</u>. Moreover, if the researcher looks to the boat alone as a source of data, he can never be certain to what extent the artifact is a successful realization of the builder's intentions. A full understanding of builders' mental templates can only be obtained by ascertaining the rules that guide them, as well as the definitions of the terms they use to identify aspects of form, and by observing and documenting their design and construction practices.

In my experience, critical data concerning builders' mental templates can be obtained by eliciting verbal statements from builders. Such statements can be garnered by asking builders to compare the shapes of the boats they have built to the shapes those built by others in the community. Moving to a larger sphere, additional statements of value can result by asking builders to compare the shapes of the boats from their communities to the shapes of those built in other communities in the region. In order to decipher builders' responses to these queries, it is essential that the terms they use to describe elements of form are accurately defined, terms such as "flare," "suent," and "upright stern." In most cases, since elements of form are more readily conveyed visually than verbally, this can be accomplished by asking the informant to sketch the aspect of form under discussion, or by pointing out a boat in the harbor that possesses that characteristic. Walking tours of harbors with local builders invariably yield a wealth of information about the similarities and differences between boats built in a given community and boats built outside the community. As I have noted elsewhere, builders' vehement statements about aspects of form that do not fit the local aesthetic are immensely helpful in determining what aspects do fit.[97] For example, while a builder might not be able to succinctly describe the range of stem shapes that abide by local rules, he will instantly recognize and point out (often will considerable sarcasm) stem shapes that break the rules.

Timber Placement Formulas and Other Measurement Formulas

To understand how builders translate a design concept into the physical artifact, one must also analyze the various formulas they use to establish the principal relationships between aspects of hull form. Commonly used within the study area, these formulas reveal both the basic parameters of hull proportion and the rules by which designs are expanded or contracted. Although such formulas are in widespread use by the world's boatbuilding cultures, they are frequently ignored by the authors of studies of regional boatbuilding traditions.

In the Trinity Bay region, builders who make use of the half-model technique generally do not require measurement formulas since timber stations, stern shape, sheer heights, and other aspects of hull form can be taken directly from the model. In addition, the relationships between all areas of the hull are fixed and readily apparent. Those builders who use moulds of all types for the determination of timber shapes (except those who make pattern moulds from model measurements) rely upon formulas to determine where to position timbers on the keel as well as the relationship of each timber to the stem, the stern, and every other timber. One commonly employed measurement formula concerns the placement of the three primary timber pairs: fore hook, midship bend, and after hook. The following are the measurement formulas employed by four Trinity Bay builders:

(1) <u>Formula used by Alex Burridge of New Perlican</u>.

Fore Hook: aft of the inner stem by a distance equal to the full breadth of the fore hook timber pair.

Midship Bend: 5" forward of the overall hull midpoint.

After Hook: located by eye.

(2) <u>Formula used by Austin King of Hickman's Harbour</u>.

Fore Hook: half-way between the outer stem and the midpoint of overall hull length.

Midship Bend: midpoint of overall hull length.

After Hook: half-way between outer sternpost and midpoint of overall hull length.

(3) <u>Formula used by Harold Barrett of Old Perlican</u>.

Fore Hook: half-way between stem and overall hull midpoint.

Midship Bend: midpoint of overall hull length.

After Hook: half-way between sternpost and overall hull midpoint.

(4) <u>Formula used by Arthur Lambert of Clifton</u>.

Fore Hook: aft of the inner stem at a distance equal to the full breadth of the fore hook timber pair.

Midship Bend: half-way between the fore hook and the after hook.

After Hook: forward of the inner stern at a distance equal to the full breadth of the after hook timber pair.

(5) Formula used by Marcus French of Winterton.[98]

Fore Hook: aft of the stem at a distance equal to the full breadth of the fore hook timber pair.

Midship Bend: approximately 2" (the width of a timber) forward of the midpoint of the overall length of the hull.

After Hook: forward of the sternpost at a distance equal to the full breadth of the after hook timber pair.

Measurement formulas such as these are remarkably consistent within the study area. Fore hook and after hook timbers are usually placed either half-way between the midship bend and the stem, and half-way between the midship bend and the stern, respectively. Alternatively, they are positioned in relation to their full breadth at the sheer. That is, the fore hook is placed aft of the stem at a distance equal to its full breadth, and the after hook is placed forward of the stern at a distance equal to its full breadth. The midship bend is usually placed at the midpoint of the overall hull length, or a few inches forward of this point. As precise as these formulas may sound, they are simply guides for timber placement, not hard-and-fast rules. In actual practice, builders often shift around the fore hook, midship bend, and after hook (especially after ribbands have been attached) until they are satisfied that a pleasing hull form has been realized.

After the three principal timber pairs have been fastened to the

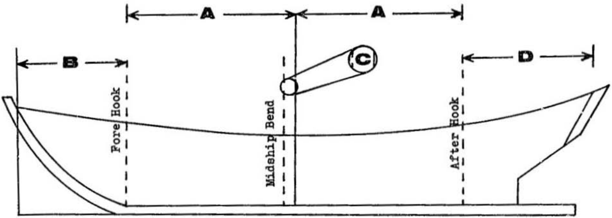


Figure 5: Timber placement formula used by Marcus French. A=breadth of midship bend, B=breadth of fore hook, c=2 in., D=breadth of after hook.

keel, the remaining timbers are formed and installed. Although the basic form of the hull will have been established before these later timbers are installed, their placement may occasion minor alterations. In any event, they are placed so as to achieve equal spacing within the hull section where they reside. For example, if there are to be three timbers forward of the fore hook ("forward pitchers," so called) they will be evenly spaced in the area between the stem and the fore hook. The same principle of even spacing is employed in the other hull sections, or "rooms," that lay between the fore hook and the midship bend, the midship bend and the after hook, and the after hook and the stern.

As has been noted earlier, it is characteristic of the Trinity Bay boatbuilding tradition that builders tend to adhere to a small number of designs that they expand or contract proportionally in order to obtain designs of larger or smaller craft. Measurement formulas are critical to this sort of design elasticity since it is their constancy that, in large measure, permits proportionality to be maintained.

For builders who employ half-models, the proper positioning of timbers is an easy task. Since all timbers, or at least the most significant, are marked on the model, builders need only take measurements from the model in order to arrive at the precise location of any transverse section. Although all timber measurements could be taken from the model, it is more common for builders to take off only a few key timbers, generally, the fore hook, midship bend, and after hook. Then, as with the builders discussed above, ribbands are attached and the shapes of the remaining timbers are determined. For example, Edward Toope of Trinity takes the shapes of five transverse sections from his model: the fore hook, the first of fore, the midship bend, the first abaft, the after hook, and the extra timber. Following the markings on the model, these timbers are all spaced at equal distances within the overall length of the hull and, accordingly, divide the hull into seven sections. George Penney's approach is similar. On his half-model for a 16' motor boat, the fore hook, midship bend, and the after hook are spaced four feet apart and, therefore, divide the hull into equal quarters.

Clement Stone of Lower Lance Cove uses a slightly different approach. Like Toope, he takes off the shapes of the first of fore, the fore hook, the midship bend, the first abaft, and the after hook. However, his model of a 20' motor boat indicates positions for these timbers that are different from Toope's arrangement that divides the hull into equal sections. Stone's midship bend is placed at the midpoint of the overall hull length. The fore hook is located aft of the inner stem at a distance equal to the full breadth of the fore hook timber pair. Likewise, the after hook is located forward of the inner stern at a distance equal to the full breadth of the after hook timber pair. The timber pair called the first of fore is placed half-way between the fore hook and the midship bend, and the first abaft is placed half-way between the after hook and the midship bend. Additional timbers, formed later with the use of ribbands, are placed between the fore hook and the first of fore, the first of fore and the midship bend, the midship bend and the first abaft, and the first abaft and the after hook. Remaining timbers in the forward and after sections of the hull (the forward and after pitchers) are spaced at equal distances within their respective areas.

Occasionally, builders record key measurements on paper or a piece of wood in order to eliminate the need to calculate measurements when the next craft of the same design is to be built. Sometimes, builders inscribe measurements on their half-models and, as we noted earlier, on pieces of wood with tracings of model profiles and decks. Frequently, builders will scribble key measurements on scraps of wood that they nail to the walls of their shops for easy reference.

In addition to the measurement formulas used to derive the placement of the principal transverse sections, most builders also use formulas to determine the height of the sheer and the placement of the counter. Of course, builders who use half-models do not have to rely on formulas since they can take these measurements directly from their models.

The first step in establishing the sheer—the top edge of the hull—is to mark a sheer height on the stem, the counter, and the three main timbers. The sheer heights for the timbers have usually been marked on the moulds and are directly transferred to the timbers when they are "gotten out." The heights for the stem and the counter, on the other hand, are sometimes written down on a piece of paper or wood, or are simply stored in the builder's memory. When putting stem and counter measurements to use, builders frequently use a base line known as a "timber line." A typical timber line is marked on the outboard face of the keel, 1/2-3/4" below the top of the keel. Once these salient sheer heights have been marked, a flexible batten is used to fair them in. Next, the corrected sheer height is inscribed on all the timbers. For example, Arthur Lambert's design for a thirty-foot trap skiff calls for a stem sheer height of fifty inches above the timber line (3/4" below the top of the keel), and stern sheer height of fifty-two inches above the timber line. Lambert's sheer height formula is particularly interesting in that the measurements of the stem and stern sheer heights are tied to the sheer height at the midship bend. In this case, the midship bend sheer height was forty inches above the timberline, and stem sheer height was forty plus ten inches, and the stern sheer height was forty plus twelve inches. By making the midship bend a constant factor when determining the sheer and the forward and after ends of craft within a range of sizes, he could maintain a rough correspondence between these three points on the hull. In simple algebraic terms, this relationship is rendered: midship bend sheer height = X, stem sheer height = X + 10, and stern sheer height = X + 12.

Measurement formulas for the counter are used to determine the angle of the counter as seen in the profile view. These formulas are either written down or memorized. The top edge of the counter intersects with the sheer line at the counter and, therefore, this point is determined when the boat is "sheered." In order to establish the angle of the counter it remains for the builder to locate where the bottom of the counter, commonly known as the "tuck," should be positioned. A timber line on the keel is often used as a reference point in this calculation. A typical measurement formula for the counter is very simple and is rendered as : "the tuck is X inches above the timber line."

Performance Correlatives

How do builders structure knowledge concerning the relationship between boat form and boat performance? If one is to attempt to answer this difficult question, it is beneficial to look into the area of emic "performance correlatives," dyads consisting of design elements and performance outcomes. By examining these relationships, one can more successfully reduce the process of traditional design to the basic options which builders believe are available to them. In other words, this line of inquiry can contribute to the illumination of the folk model for design utilized by builders working within a specific cultural context.

Posing abstract questions about the relationship between form and function was not the best way to draw critical data from boatbuilders. As the best studies of material culture have demonstrated, comprehensive analysis of the relationship of form and function involves careful measuring and documentation of the physical properties of artifacts and the recording of detailed accounts of their design, construction, and use given by their makers and users. To satisfactorily fulfill these requirements in Trinity Bay, with a fishing fleet of over one thousand boats (most of them locally constructed), it would have been desirable to have carefully measured a meaningful sample of local craft. Considering the fact that about one-half day is required to adequately measure a small boat (assuming that it is out of the water), it was impossible to undertake such an enormous task within the confines of the study period. However, much attention was focused on compiling a catalog of emic verbal descriptions of the relationship between form and function. Discovering how to elicit these data was an education in itself. For example, it was discovered that while all the builders interviewed are keen and experienced analysts of the form and function of boats, their verbal lexicon used for describing these relationships is limited. However, within the local tradition there is sophisticated use of visual models and images, and these play a primary role in communicating form-performance correlatives. Verbal descriptions are secondary to these models.

There are three basic ways that visual models are employed by Trinity Bay builders and their clients. The first is direct observation of a boat leading to the translation of the visual image to technical data. In such cases an individual looks at a boat, evaluates its critical features, and, if necessary, converts these data into other data that can be used to create a physical form. For example, a fisherman might point to a boat while saying to a builder, "I want a boat just like that," or "I want a boat just like that, except it should be 6 inches wider amidships and 4 inches deeper." The second way visual models are used is by invoking a visual model familiar to the individuals involved in a conversation. For example, a builder might say, "The next boat I'm going to build will be just like the trap skiff Wilson Vokey built last month." The third way visual models are used is in the form of simple sketches. For example, in explaining the amount of concavity ("hollowing") that should be present in the bottom of a hull a builder might sketch the cross-section of the hull at the midship station. It was frequently the case during the course of interviews with boatbuilders that, when asked about the relationship between form and function, they would say, "It's hard to explain," and then proceed to make a quick drawing of the feature of the hull form being discussed. The use of these visual models, which are highly complex, provides builders with a precise and immediate means of expressing ideas about form and function. Verbal de[illegible]tion is mainly used to frame the analysis presented through visua[illegible]

It was difficult to elicit explicit verbal desc[illegible]ns because of the secondary nature of verbal communication in these matters. By dint of trial and error, it was discovered that one satisfactory way of eliciting this information is through the use of the simple query: What makes a good boat?

While this simple question generated a wealth of data, there appeared to considerable variation in the quantity and quality of responses. Some were lengthy and extremely detailed and included (as I had hoped) performance correlatives—pairings of design elements and performance characteristics. Others were quite brief and consisted of references to only one or two desired characteristics. Some informants mentioned positive characteristics that resulted from the type or quality of construction materials and did not explicitly refer to boat performance. Consequently, I was left with the perplexing question: In what way did these data indicate the existence of a regional model of design?

Upon reflection, it seemed that the circumstances of the interviews themselves was also a factor that determined the sorts of responses this question generated. As other researchers have noted, some variation is often the result of informants' tendency to express only discrete portions of their knowledge. "People formulate partial statements, situationally relevant statements or direct answers to the researcher's questions. There may be parts of models which can be verbally described only with great difficulty; also, different informants may refer to different parts of the same model."[99] Nonetheless, from the conglomeration of individual responses to "What makes a good boat?" I have extracted seven performance characteristics that the majority of informants delineated as features of a "good boat:" the ability to handle well in high winds, the ability to keep passengers reasonably dry, an easy motion in a seaway (especially when winds hit broadside), the ability to carry substantial cargo without appreciable loss of stability, the ability to travel before the wind without burying the bows into waves, the ability to handle well in rough water, and the ability to serve as a stable platform for fishing operations.

Having identified these positive handling characteristics, the next task was to determine aspects of hull form that correlated to each. This was accomplished by posing questions that required informants to specify the aspects of form they would manipulate if they wished to correct in a future craft if they noted an undesirable performance characteristic in their present craft. For example, if a builder had previously identified the ability to serve as a stable platform for fishing operations as an ideal performance characteristic, later in the interview, or in a subsequent interview, I would ask: If you discovered that your boat was very unstable when you were fishing, what would you do to fix this in the next boat you build? Invariably, builders would respond to questions such as this with clear statements about aspects of form they would alter in an effort to remedy design shortcomings. Consequently, I was able to match each desired performance characteristic to aspects of form to which it correlated. The final step in this exercise was to look at all of the data collected in this manner and arrange them in a set of performance correlatives. For Winterton, this set, which can also be described as a representational model[100]—a model corresponding to the ways in which individuals perceive things to be—can be rendered as follows:

Desired Performance — Form Correlate(s)

performs well in high winds.............long, suent bow; flaring bow keeps passengers dry....................flaring bows

easy motion in a seaway.................proper amount of hollowing; proper amount of rising; proper length-width ratio

carries a large cargo..................proper length-width ratio; proper amount of hollowing; proper amount of hollowing

goes before the wind without burying bows............................proper stem-stern balance; flaring bows; proper bearing

handles well in rough water.............flaring bow; proper amount of hollowing; proper amount of rising; proper stem-stern balance

stable platform for fishing............proper amount of hollowing

Of course, if one is to grasp the full meaning of these pairings, the definitions of each of the terms that describe form must be obtained. In the case at hand, careful questioning of each informant revealed a fairly uniform lexicon. "Flare" means outward curvature, especially in the bows and sides. "Hollowing" means concavity, especially in the bottom. "Rising" means the vertical distance between the bottom of the keel and the waterline. "Suent" means a smooth, fair curve. "Bearing" means the degree to which the portion of a hull, particularly the bottom, resists being pushed deeper into the water. "Length-width ratio," a term of my own invention, but a concept well-known to builders, means the relationship between length and width. "Stem-stern balance," another of my terms, identifies the concept builders have of how the shape of the stem (bow) affects the stern, and how the shape of the stern affects the stem.

The set of performance correlatives given above represents my interpretation of what Winterton builders perceive to be the set of design variables they attempt to manipulate in their quest for hulls that perform well under conditions typical of Trinity Bay's environment and fisheries. That many of the form correlates overlap underscores the fact that builders recognize the interrelatedness of design variables. Like twisting a Rubik's Cube, each time a builder alters one variable --flare, hollowing, rising, stem-stern balance, length-width ratio, or bearing-- all other variables are affected in major or minor ways. The central problem that confronts the builder is how to manipulate these variables so that the sum total of their properties equals a snug fit between form and desired functions.

Inferences cannot be as easily drawn from verbal statements collected from builders living in communities scattered around the Bay as they can from the relatively homogeneous sample of eight builders from Winterton, all of whom were born in the community and have lived most of their lives there. However, the consistency of responses and the uniformity of lexicon makes me confident that the model is valid for the entire bay.

Evidence in support of this contention is found in responses to the question "What makes a good boat?" elicited from six builders, all from different communities around the Bay. In order to convey the texture of these statements I will present them in full. They are as follows:

Joseph Dalton, Little Catalina

> I'd say a good flaring boat, and not too flat. But she's, she's not going to be so stable as the, as the flat and that. She's going to be throwing it out more. But when it comes to rough water, I'd say, yeah, [you want] the good flaring boat. And if they had some of those big ocean-going steamers with the good flare in them, there's nothing in the world could sink them. But they knock you about, see. They got to have something there to keep them, you know, in the water. 'Cause if you take all those bigger boats, here, those boats that get up to a thousand, a couple, three or four thousand ton, that size is the same as the side of a house, isn't it? See, well, this is, when they gets in bad weather, if they haven't

> got the ballast in them, see, they's, they's useless. They's rolling over, they's rolling over like a box. See, they got nothing to catch them. See? Only thing they got [is] the stabilizers on them, I suppose, all that. That's the part that I see. I'd say a good flaring boat, you know, in the ordinary boat, the fishing boat or anything like that. The good flaring boat is the rough water boat. But, now, you wants good sea legs, I guarantee you, to stand up in them.[101]

To summarize, Dalton has selected flare as the most crucial factor in the design of a good boat. In this instance, the portion of the hull that must possess flare is the bottom of the boat. And in singling out this feature he has also indicated that the ability of a boat to perform well in rough water is of paramount importance. A boat with a flaring bow will be less stable than a relatively flat-bottomed boat, he notes, but it is worth sacrificing some stability for seaworthiness in rough water. Reduced to its most basic message, Dalton's statement expresses the following form-performance pair:

Desired performance: seaworthiness in rough water.
Form correlate: flare in hull bottom.

<u>Edward Toope, Trinity</u>

> It should have good timbers into it, for sure, and good planking

on it. And it certainly needs a good keel into it for that matter, you know. Yeah, and also you'd, ah, you wants some nice, fair flare on it after it come above the, say, the bottom part, you know, to make a good seaworthy [boat].[102]

Toope began his answer with reference to structural integrity, rather than design quality, and stressed the desirability of satisfactory construction materials. In regard to vessel performance, however, he selected flare in the side of a hull, in the area above the waterline, as an important characteristic. This is translated into the following pair:

Desired performance: seaworthiness.
Performance correlative: flare in side of hull.

George Penney, Catalina

Well, ah, the first thing you got, you got to size up if you want to buy a boat is stability. You take a speedboat, [she's] got no stability because she's flat like a dory bottom. You got to get a different boat from a speedboat to have a good sea boat. Now, I've been out in them boats there, [speedboats], and I've been afraid, afraid they'd tip over, eh. But [with] the other kind [of boat], three men, four men can get on the side and haul a trap, [a] cod trap. No way

[to] turn over that boat.[103]

The form-performance pair Penney expresses is:

Desired performance: seaworthiness.
Performance correlate: proper hull shape (i.e., displacement hull).

Arthur Lambert, Clifton

. . . See, what it all amounts to in a boat that, that stern there got to go down for this head to come up . . . . If that stern can't get down, this head can't come up, see, you know. The boat, the boat got to have a, got to have a bottom that she can play off, see, in weather. And that's what makes her, that's what makes a good boat and a bad boat sometimes.[104]

The form-performance pair Lambert expresses is:

Desired performance: unspecified.
Performance correlate: proper stem-stern balance.

Austin King, Hickman's Harbour

> Well, the first thing you look for is the product in it, to see what kind of frame they got in it 'cause a lot of people build boats and they left the woods in the woods . . . . And you have to have a general idea anyway when you see a boat if it's seaworthy or not, you know. You might come along and say, "Well, boy, that's a beautiful boat," but someone else would come along and they wouldn't have it, you know . . . . You can generally tell by looking at it, you know, that's anyone [who] knows anything about a boat . . . .[105]

King begins by commenting on the importance of suitable building materials, wryly noting that some people lack sufficient knowledge of the correct trees to select in the forest and, consequently, leave the best lumber in the woods. His next observation is that a knowledgeable individual is simply able to recognize a seaworthy boat by eye. He gave no specific information about desired performance features except the implication that a good boat must be seaworthy.

Harold Barrett, Old Perlican

> I tell you, the first thing you got to have for a boat, you got to have a good backbone. If you haven't got as backbone, well, you got a shaky, shaky framework before you starts. Well, you got to have a good backbone. And then you got to have a good, ah, then you got to have good timbers.[106]

For Barrett, as with Toope and King, the quality of construction and materials were cited as the aspects of prime importance for the creation of a good boat. No form-performance relationships were elicited.

As these examples demonstrate, sometimes details of a model of design are revealed when an informant replies to a broad, open-ended question such as "What makes a good boat?" And when such information is forthcoming it is probably safe to assume that the form-performance pairs selected are those builders consider to be of greatest significance. These examples also demonstrate that form and performance relationships are not always the characteristics that pop into a builder's mind when he is asked to define a good boat, even though they would undoubtedly admit that form and performance are at least of equal significance.

After the initial question ("What makes a good boat?") has been posed and answers of one sort or another obtained, the next step is to probe more deeply with questions exploring performance characteristics. The following excerpt from an interview with Austin King provides an illustration:

> Taylor: Was there anything good about a boat with rising [in the bottom] like that?
>
> King: Well, they say they was good in the water, you know, in

rough water following it, you know.

Taylor: What about a flat-bottom boat like you used to build? What were the advantages to a boat like that?

King: Well, it's more steadier out in the water, you know, for doing your work, you know. And it wasn't so ticklish in the rough water.[107]

In discussing the advantages and disadvantages of flat-bottom and rising-bottom boats, King suggested two form-performance pairs:

Desired performance: performs well in a following sea.
Performance correlate: proper amount of rising in the bottom.

Desired performance: stability; functions as a stable fishing platform.
Performance correlate: proper amount of flatness in the bottom.

This excerpt from an interview with Obediah Meadus of Grates Cove provides further evidence of the perceived relationship between certain bottom configurations and vessel performance in rough water:

Meadus: A boat with a little bit of rising is a good boat. It's a lot better than one that's flat, right flat, 'cause one

> that's flat off, she's, she hits a lop [and] she's coming down [bangs fist on arm of chair] just like a rock: bang. But you take, you wants a little bit of rising. She'll, if there's a good man to the rudder, he can take her through a lot of lops. And she just goes up and falls on her side, like, rolls [with the sea].[108]

For Meadus, who fishes in some of the roughest water in the Bay, a boat's ability to remain seaworthy in heavy seas ("lops") is of paramount importance. Accordingly, the form-performance pair expressed is:

> Desired performance: seaworthiness in rough water.
> Performance correlate: proper amount of rising in the bottom.

In discussing design change over the years, Harold Barrett noted that in the past fishing boats were invariably wall-sided, a feature that caused them to take on water under certain conditions. Here he explains how this negative characteristic was corrected:

> Barrett: See, they used to have them, the older people, used to call them wall-sided.

> Taylor: Wall-sided?

Barrett: Yeah. Well, a wall-sided boat. She don't, she don't throw the water away, you know. When . . . she gets loaded, you know, water flips in with not too much trouble when she's wall-sided. But, ah, you got to have a certain amount of flare on a boat, but you can overdo it. And after you comes past the midship [going aft], what we call the midship bend, ah, you don't want too much flare. If you do [have flare aft], see, you got a wide boat on top and then you, she, she's narrow on the bottom. You got, you got no bottom on your boat. I don't, I don't know too much about it, but after fishing for fifty, this is my fifty-one year, I knows a little.[109]

In this case, the form-performance pair is clearly:

Desired performance: tosses water off the bows.
Performance correlate: flare in the side of the hull forward of the midship bend.

The types of performance characteristics that are desired are related to a number of factors, including boat type and size, intended use, and conditions within which the craft generally operates. In short, what is a fine craft for one fisherman fishing in a particular part of the Bay and utilizing a certain type of gear may be quite inappropriate for another man fishing in different water with a different sort of equipment. Joseph Dalton illustrates the sort of mismatches that can occur between form and function:

> [My cousin] built one. She was a thirty-five foot boat, and nine or ten feet wide. She was rising, pretty rising, [and a] flaring boat. And he sold her to [someone in] Bonavista. And one day he was asking somebody about it over there, [somebody] on the crew . . . . And [the crewman] said he rather beat he up [wreck the boat]. It was no good for they because those people was handlining, they was handlining, see. And they wanted something, now, right stable, see. You know, not a motion. "But," he said, "you give her a load," he said, "load her and get the wind." Well, there's nothing on they couldn't, couldn't sink her, you know, because she was, she was rolling right on all the time, see. You know, a good boat for the load, see, on top of the water all the time.[110]

Thus we can see that a boat that was an admirable craft for one set of circumstances (trap fishing in Trinity Bay) was found wanting in another set of circumstances (handlining in Bonavista Bay).

These responses to the question "What makes a good boat?," and responses to follow-up questions addressing specific performance characteristics, demonstrates that the set of form-performance correlates that reveal how Winterton builders structure knowledge is virtually identical to the set employed by all other builders of vernacular craft within the Trinity Bay region. Although there is a certain amount of ambiguity in regard to desired performance characteristics—especially seaworthiness—the above statements reveal a fair amount of consistency. Builders believe that, in general, the presence of rising in the bottom of a boat tends to increase seaworthiness in rough water but decreases effectiveness as a stable fishing platform in calmer conditions. Conversely, flat-bottomed boats are valued as stable fishing platforms, but are derided as uncomfortable "pounders" and "bangers" in rough conditions. The presence of flare in the side of a boat in the forward section is seen to limit the amount of water that enters the vessel, as opposed to wall-sidedness which results in a wet boat. Most of these associations were noted by all informants. Less commonly mentioned was the relationship between stem and stern shape and vessel performance. Hollowing, a feature of the bottom that is currently less popular than it was in the past, was rarely mentioned. Other general features of design one might expect to hear about from builders, such as the relationships between boat length, width, and depth, were not mentioned.

Even with this relatively consistent verbal data, one is left with the dilemma of whether the behavioral model inferred through these verbal descriptions actually exists in empirical reality, or is merely the invention of the researcher. In the case of the present study, the gap between reality and invention might be narrowed by a rigorous comparison between the notions boatbuilders hold about design (representational models) and the design-related actions they perform (operational models).[111] For example, the step following the formulation of representational models—which is what I have described above—might involve the assiduous measurement of boat hulls produced in the study area. The empirical data collected in this latter step could then be used to generate highly accurate data for the comparison of an enormous number of design features of, say, all boats built in the study area, all boats built of the same basic type within the study area, and all boats of the same type built by an individual builder. Such comparisons could yield mathematical definitions of builders' design concepts. For example, according to the corpus of boats measured, "hollowing" could be expressed both in terms of the range of concavity found, as well as the average concavity of all craft. Unfortunately, it was well beyond the scope of this study to amass the empirical data required for conclusions of this kind. Ideally, however, a comprehensive study would involve these two approaches—eliciting verbal data and recording accurate measurements of physical properties.

Correction and Improvement of Design

As noted earlier, in addition to the knowledge they have acquired through observation and imitation of the boatbuilding activities of relatives and neighbors, most Trinity Bay builders receive design-related information in the tangible form of half-models, moulds, and patterns. It is normally the case that these physical devices have been passed from one individual to another, usually from a more experienced to a less experienced builder. Sometimes ownership of a model or a set of moulds is transferred; sometimes the model or mould is lent so a copy can be made. In any event, the transference of these physical devices and the knowledge they represent clearly illustrates the fact that, in most cases, boatbuilding tyros can rely on their predecessors for designs. Moreover, the models and moulds beginning builders receive often represent the latest refinements of the design of a particular boat type. However, this is not to say that a beginner will be able to create as good a boat as a more experienced builder merely because he has the latter's model or mould. In addition to possessing the minimal design that the physical device represents, the beginner must possess the ability to transfer the design from the device to the nascent hull, as well as the skills required to fashion each of the vessel's component parts and combine them into a unified hull of adequate strength, weight, and water-tight integrity.

Aspiring boatbuilders know they must hone both design and construction skills if they are to advance their abilities and produce superior craft. In order to do this, they generally stick closely to the designs they have acquired from others, and try to copy the construction procedures employed by the most successful local builders. Provided that they build a sufficient number of boats, each individual's skills and self-confidence will increase over time. And having achieved a certain level of mastery they will probably attempt new ways of doing things. Within the realm of design, the old tried-and-true design may be altered in small ways. Over time, the number of improvements will gradually increase and at the end of his career the builder's creations will reflect a number of "incremental improvements" that he has made to the basic design he acquired as a novice. The process comes full-circle when he passes on his designs to younger builders.

This process (consisting of learning; performance, that is building boats; and transmitting knowledge) is characteristic not only of Trinity Bay boatbuilding, but also of all other forms of traditional expression. Whether the expression is a boat, a song, or a tale, all share the "common quality that as far as they continue to exist in their natural habitats, they are in continual and dynamic variation through space and time."[112] In addition, all are fashioned in such a way as to reflect the cultural values of the group that sustains their performance as well as the values of the individual performer. Toelken's definitions of tradition and dynamic are particularly illuminating:

> Tradition is here understood to mean not some static, immutable force from the past, but those pre-existing culture-specific materials and options that bear upon the performer more heavily than do his or her own personal tastes and talents. We recognize in the use of traditions that such matters as content and style have been for the most part passed on but

> not invented by the performer. Dynamic recognizes, on the other hand, that in the processing of these contents and styles in performance, the artist's own unique talents of inventiveness within the tradition are highly valued and expected to operate strongly.[113]

In order to more clearly understand how boat designs change over time in a particular place, one must recognize the structure of the boatbuilding tradition (the possible materials and options), as well as the ways in which individuals attempt to express their individuality within its boundaries.

Previously we have discussed at length some of the basic characteristics of Trinity Bay's boatbuilding tradition by focusing on available construction materials, measurement formulas, and design concepts. Given the demonstrable forcefulness of tradition in the Bay over time, we are left to answer the question: Why and how, in light of the conservative force of tradition, are designs changed? In other words, what is the dynamic element in Trinity Bay boatbuilding?

It is definitely the case that Trinity Bay boatbuilders' inventiveness is highly valued when exercised within the framework of tradition. When new boats are launched they are carefully scrutinized by local builders, fishermen, and other knowledgeable people, concerning how well they comply with the tradition. If a boat is judged a success--both functionally and aesthetically--the stocks of the builder and the owner will rise. Conversely, if the craft is judged to be wanting, the builder and the owner will lose face. Arthur Lambert described a typical example of this sort of scrutiny:

> And you know, in a big fishing place, like Old Perlican or Bay de Verde or Grates Cove, everybody is watching a new boat. First thing they looks at is how she's done and what kind of work is into it, and then they'll watch her and see what kind of weather boat she is.[114]

It is not difficult to understand how social risk of this kind can persuade builders and their clients to steer clear of designs that depart significantly from the design of a local boat type as it has evolved up to that time.[115] Even if a boat clearly performs as well or better than boats of conventional design, it will likely be greeted with derision if it departs from the traditional rules of "boatness" in ways which, to the outsider at least, may seem exceedingly minor. The shape of a stem, the slant of pilothouse windows, the sound of the engine, and even the color a boat is painted can all occasion considerable derogatory comments (at least initially) if they depart from local standards of acceptability.

In the overwhelming majority of cases, design improvement is not sought by creating a totally unique hull form (as a formally trained naval architect might do), but by making small, evolutionary changes in a local boat type. More specifically, builders tend to break the form of a craft down into a number of sub-systems and, when formulating a new design, alter only one sub-system while leaving all others the same. The sub-systems builders consider include: length, breadth, depth, bottom shape, flare, sheer, angle of stern, and rake of bow. This approach permits the builder to test, in a fairly scientific way, how performance quality is affected when one hull sub-system is changed while all others remain in check. Alexander refers to this process as the "homeostatic" or self-correcting design process characteristic of "unselfconscious" folk cultures.[116] The following excerpt from my interview with fisherman/boatbuilder Austin King of Hickman's Harbour illustrates this pattern well:

> Taylor: Do you change the designs of your boats from boat to boat?
>
> King: No, not usually. You kind of stick to the same pattern, you know, [unless] there's some little thing or other you notice you don't like. Why, you usually try to take the bug out of her, you know.[117]

Clearly, the success of this sub-systems approach to design change is dependent upon the testing of the boat under a variety of conditions by the builder. For fishermen who build boats for their own use this presents no problem since they closely observe their new crafts' performance throughout the fishing season. For example, Fred Jackson of Whiteway, a fisherman who builds boats in the off-season, observed that the first couple of boats that he built for himself were too blunt in the bow which resulted in a tendency to pound and push a lot of water. In addition, this bluntness slowed the boats down and their fuel efficiency was low. In subsequent boats, Jackson sharpened the bow, and this resulted in increases in hull speed and fuel efficiency.[118] For full-time builders, thorough testing of a craft is problematic. They have a limited time to test their boats and, to a large extent, must rely on the reports of their clients concerning vessel performance. Yet, full-time builders, indisputably the most reflective of the builders interviewed, generally articulated their desire for design improvement more forcefully than part-timers. As full-time builder Reuben Carpenter remarked:

> I always see something different that I want to do with a boat. I've never built one yet that after I had her finished I didn't say, "My gosh," you know, "I wish I'd have done this. I wish I'd have done something else here," you know. Or, "I would like to see a little more sheer, or a little less sheer." Or, you know, "the house was too far forward, and I like to see it further aft," or something. There's always something that you feel you'd like to do. I suppose if you didn't feel that way, you know, you'd be stagnant so you wouldn't make any changes.[119]

Obviously, when one analyzes all of the incremental changes a builder has made over the course of his career it is possible to obtain a clearer understanding of how he has individually contributed to improving boat design while working within the boundaries of tradition. While it is seldom possible for the researcher to directly observe the corpus of a builder's work, one may obtain a limited retrospective view by asking a veteran builder to describe changes that he has made in his boats over the years.[120] Arthur Lambert's description of his design changes is especially interesting in that it includes nearly all the major changes to the Trinity Bay trap skiff design made within the last fifty years.

> Lambert: We had our own moulds that we brought in with us when we come in [from Southport], but when Bax [Wiseman] come up here ([he's the] fellow married to my daughter), his father was a builder, so he and me went down [to Southport] and we got the moulds to a thirty foot boat. So, over time—that's twenty years ago, I suppose—over the years, we've altered it and broadened it out like we want it. Given the boat more flare forward. Well, seems like around here on the model [indicating] that, ah, when we come up the first couple of boats that we built that she was a little small, a little lean here [indicating]. It didn't give her enough quarter as she went to the counter . . . .

> Taylor: Around the crop of the bulge you're talking about?

Lambert: Yeah, right, yeah. And, ah, so we altered that and we, ah, fulled in a little bit there to give her a little more quarter. And then here forward [indicating], here forward we gave her [more breadth]. Now, the boats we build now is not like that model, the old kind, you know. We give 'em more, we made 'em bluffer here forward, and that give 'em more flare. And we rose 'em up. The first one I took, the first one I built off this one. Anyone that is used to boatbuilding can do that, and, when this boat goes on the water, well, she'll, she'll lie there like she is now, and she's low forward. That's alright when she's going, but, ah, a lot of people that have those boats is fishermen, see, and they wants to get forward to haul up a lobster pot, or haul up a trawl, or do something like that. Well, now, when they treads on the boat she, she, she's going down forward, and if there's a lop, something like that, you're going to get water. So what we done, we rose 'em up about four inches, four inches or five inches. We now add that up there on the breadth, see. And that made them a lot better, made 'em a whole lot better.[121]

Lambert's statements beautifully illustrate how a boat's negative performance characteristics prompt builders to alter their designs in order to eliminate these negative features. In his case, the initial boat design he and his son-in-law acquired from the son-in-law's father's moulds was found to be unacceptable largely because it was too narrow and too low at the sheer. Narrowness and low height of sheer were found to be serious shortcomings at the bow because they resulted in a lack of stability when fishermen were working forward and allowed water to come inboard in rough seas. Over the course of twenty years, Lambert and his son-in-law corrected these deficiencies by giving the hull greater breadth overall, introducing flare in the bow, and adding four or fives inches to the height of the sheer in the bow.

The actions of Lambert and his son-in-law mirror those of most other Trinity Bay boatbuilders. At work in this process are the twin forces of folklore process. That is, the desire for design change is balanced by the basically conservative force of tradition that tends to resist change.[122] Boatbuilders' awareness of how local boats have been designed in the past, as well as their sensitivity to the judgments of their peers, powerfully inhibit their freedom to depart from the ways boats have been designed. As we have seen, builders do make changes in boat designs, but such changes generally follow the traditional pattern. In the context of Trinity Bay, this means that changes in design are made gradually and incrementally in response to negative performance characteristics; rarely are they made for the sake of innovation.[123] Although few builders would ever claim that their designs are perfectly adapted to local uses and conditions, if a builder <u>did</u> perceive his design to possess no negative performance characteristics, then no changes would be required. For example, Fred

Jackson made changes in his small longliner design after each of the first three craft he built to this design, but he claims to have made no changes in the designs of any of the boats that followed.[124]

In the consideration of builders' desire for individual expression, one must also analyze the qualitative and quantitative differences in the design changes they introduce. One factor that underlies these differences is perceptual acuity. For example, some builders are able to make more precise determinations of positive and negative boat performance than others. Another factor is the level of motivation. Some builders are keenly interested in advancing their quest for design perfection, while others are satisfied with designs that are merely adequate for their intended purposes. A third factor relates to the builder's economic dependence on boatbuilding. For example, those who build boats only for their own use will likely be less inclined to adopt designs that are currently in vogue than full-time builders whose clients may demand such designs. In the latter case, if the builder cannot sustain himself financially by building craft to designs of his choice, he may have to accede to the design preferences of his clients (which may be at odds with his own notions of proper design) if he is to stay in business.[125]

Analysis of the incremental improvements of a large number of builders within a geographic region over time can permit the researcher to chart the evolution of design within the study area. For example, field data indicates that during the last generation the following appear to be the most significant changes to the designs of the Trinity

Bay's older boat types (i.e., the rodney and the trap skiff): (1) the length and breadth of the trap skiff type have increased significantly, (2) counters have widened, (3) counters have been given outward rake, (4) hollowing in the bottom has decreased, (4) flare has been added in the bow. In addition, a broad view of incremental improvements can help identify regional variations, as well as the contributions of particularly influential builders.

While I maintain that a hallmark of the design of boats around Trinity Bay is slow, incremental change at the sub-system level, I cannot state unequivocally that every builder operates in this fashion every time. From time to time, builders will break free of the inhibiting force of tradition and express their notions of what a boat should be in a fashion that is more daring (and, therefore, more individualistic) than the norm. In most instances, this means a design created by making major changes to more than one sub-system. Consequently, the resulting design--like a runner bursting through a pack of competitors to take the lead--appears to stand apart from other local craft that have evolved gradually and incrementally. Sometimes the builder who has come up with an arrestingly new design in this manner is a young builder who is relatively unschooled in local design conventions and is, accordingly, somewhat more inclined to give rein to his imagination than more experienced builders. Far more often, however, the builder who introduces a design that is far more his individual creation than a minor contribution to the local model of a given vernacular craft is a very experienced builder thoroughly steeped in the local boatbuilding tradition. By virtue of his mastery of local concepts and practices, coupled with considerable testing of designs under a variety of conditions, such a builder can sometimes formulate a new design by breaking the rule of incremental change. And, to a large extent, it is the individual's confidence both in his technical skills as a builder and in his reputation in his community that allows this to take place. Elsewhere, I have written of Herbert Harnum, a builder of this description from the community of Winterton, who produced a new design by synthesizing features of two local boat types--the rodney and the flat.[126] Llewellyn Meadus of Grates Cove is another who made such a synthesis.

Meadus' innovation was a design for a small outboard-powered fishing craft he devised in response to his dissatisfaction with outboard "flats" built to the standard local design. Having built a flat to the standard design, he and his brothers, Clarence and Obediah, fished in her for one season. Llewelyn relates the cause of his displeasure with the design in this frightening narrative about fishing with his brothers:

> We used her one year fishing. And we went out one day and we caught a fine lot of fish. And I had the after room just about filled and Clarence and Ob was throwing [fish] into the midship room, and the wind freshened a bit and every time her head would go up her stern would go down and in would come the water--in over us, see. I said, "My god, we got to get

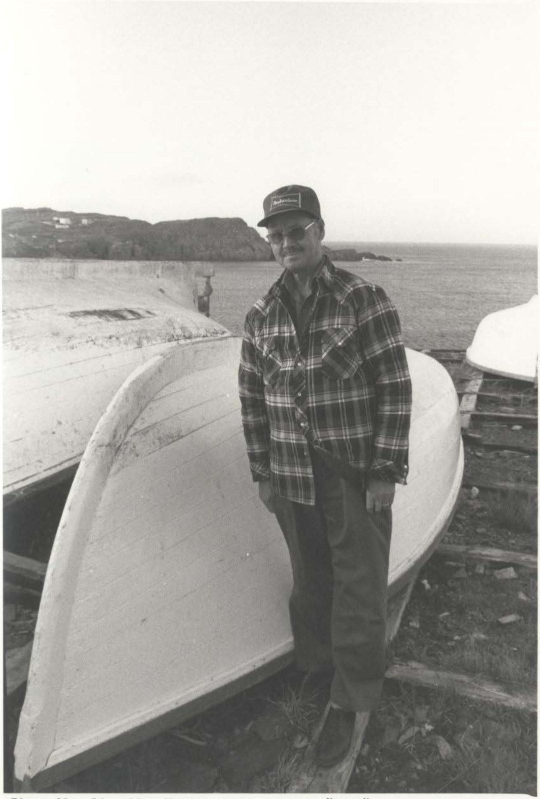


Plate 21: Llewellyn Meadus beside his new "flat"

> in out of this or we'll be drowned in this." And, you know, we had to run before the lop, coming in from out there, and I didn't think we was going to make it. I thought we was going to have to throw away some of the fish. And I said, "Never again" when we finished fishing that year. I said, "this, we got to get her beat up or sold or something." And we sold it. And we went then and got the frames and built the pattern like I got now.[127]

Having disposed of the unseaworthy flat, Llewellyn set his mind to the task of formulating a design for a craft of the same size (18-19 feet in length) and weight that would provide considerably more seaworthiness when fully loaded with fish. A flash of inspiration came during a conversation with a boatbuilder friend from a nearby community. According to Llewellyn, his friend happened to discuss how local fishermen had removed the inboard engine from a small, transom-stern motor boat and then, as an experiment, cut down the counter and mounted an outboard motor onto it. After reflecting upon this, Llewellyn took the basic idea of a small, outboard-powered boat with a transom stern and concocted a design with these features. The resulting 18 foot boat possessed a transom stern specifically designed to accommodate an outboard and this feature (borrowed from the displacement hull of the motor boat) imparted considerable seaworthiness. In subsequent craft, Llewellyn reverted to the normal manner of change and made incremental changes, one sub-system at a time. Specifically, he modified the design by making the stern broader in order to increase bearing, and by extending the overall length to 19 feet.[128]

Notes

1. The monthly trade publication National Fisherman was frequently cited by boat builders as a source of information about trends in fishing vessel design and construction.

2. For a number of years, the college offered a twelve-week course in St. John's on the construction of inshore fishing craft. Later, to better accommodate interested fishermen who could not easily travel to the provincial capital, the course was offered at several locations throughout the island. For a description of the development of this course, see my article "St. John's Has Taken on Naval Architecture and Shipbuilding."

3. Regional vocational schools frequently offer other courses of interest to boatbuilders. These include hands-on courses devoted to welding, electronics, and engine repair.

4. See, for example, Howard I. Chapelle, Boatbuilding: A Complete Handbook of Wooden Boat Construction (New York: W. W. Norton, 1941), 129-32, 190-8. Despite the relative uniformity of definitions of "mould" found in contemporary boat building guides, there is, in fact, considerable variety in the moulds used by boat builders around the world. For a useful summary of principal mould types, see Basil Greenhill, Archaeology of the Boat, 61, 63.

5. For example, the Dictionary of Newfoundland English defines this sense of the term as: "To shape the frame or skeleton of a boat or vessel by the use of thin strips of wood formed in the intended shape and proportions of the craft, or by a model . . . ." (Story, Kirwin, and Widdowson, eds., Dictionary of Newfoundland English, 335.) It is worth noting that the editors of the DNE have not included definitions of "mould" when used as a noun.

6. "Three-piece, adjustable template" is a term I have coined to more easily distinguish it from the two other basic types of moulds; Trinity Bay boatbuilders do not use the phrase.

7. "Rising board" is defined in the Dictionary of Newfoundland English as "a form used as a guide in determining the sheer of a boat or vessel during construction; rising square." (p. 414) This definition is incomplete since it does not include the necessary facts that the rising board is one component of a three-part system, and that it is used in the process of determining the shapes of timbers.

8. The fore hook sir mark is usually designated by the letters "FH," the midship bend sir mark by the letters "MB," or "MSB," and the after hook by the letters "AH." Occasionally, the transverse section half way between the fore hook and the midship bend, called the "first of fore," will be identified by the letters "FF," and the transverse section half way between the midship bend and the after hook, called the "first abaft," will be identified by the letters "FA."

9. In some cases, when a single set of moulds is used to derive the timber shapes of boats within a range of lengths, marks on the half bend indicate the appropriate sheer heights of principal timbers for craft of specific lengths.

10. Frequently, builders will take the intermediate steps of tracing timber shapes onto pieces of cardboard, cutting out these shapes, and then using them as patterns when transferring the shapes to timber stock. If the builder has determined that the timber shapes produced in this way are satisfactory and worth using in future craft, he may choose to trace them onto plywood or scrap wood and cut them out. These patterns, also called moulds, eliminate the need to manipulate the three-piece adjustable mould if an identical design is needed in the future.

11. Interview with Harold Barrett by David Taylor, June 16, 1982. MUNFLA accession number C6706. For a similar observation by boatbuilder Fred P. Hiscock of Winterton, see my study Boat Building in Winterton, Trinity Bay, Newfoundland, 91-2.

12. Chapelle notes that the partial use of this system was common in England as early as the sixteenth century. See Howard I. Chapelle, The Search for Speed Under Sail, 1700-1855 (New York: W. W. Norton, 1967), 16.

13. For example, when I interviewed him on June 16, 1982, boatbuilder Harold Barrett of Old Perlican speculated that early settlers "brought it back from England and Ireland when they came out. What they used to call a mould. They'd have a mould, you know, they'd build their boats by mould." (MUNFLA accession number C6706).

14. Howard I. Chapelle, The Search for Speed Under Sail, 15. Literature on whole moulding is relatively sparse. Relevant publications by twentieth century writers include: Wescott Abell, The Shipwright's Trade (1948; rpt. London: Conway Maritime Press, 1981), 32-92; William A. Baker, Colonial Vessels: Some Seventeenth-Century Sailing Craft (Barre, Mass.: Barre Publishing Co., 1962), 26-28; William A. Baker, "Early Seventeenth-Century Ship Design," American Neptune 14 (1954): 262-277; Howard I. Chapelle, American Small Sailing Craft, 8-18, and The Search for Speed Under Sail, 16-18; David King and Lance Lee, Half-Modelling (Bath, Me.: Bath Marine Museum, 1976), 4-5; Brian Lavery, ed. Deane's Doctrine of Naval Architecture, 1670 (1981;

rpt. Annapolis, Md.: Naval Institute Press, 1986), 25-26; Eric McKee, Working Boats of Britain, 122-3, 125; Douglas Phillips-Birt, The Building of Boats (New York: W. W. Norton, 1979), 184; John P. Sarsfield, "From the Brink of Extinction: Mediterranean Moulding," 84-89.

15. Baker, Colonial Vessels, 20.

16. Baker, Colonial Vessels, 20-1.

17. A drawing from Fragments of Ancient English Shipwrightry that features the image of a fish superimposed over that of a ship illustrates this concept beautifully. This drawing has been widely reproduced and can be found, for example, on page 36 of George Wallace's Sailing Ships (Toronto: Holt, Rinehart and Winston of Canada, Ltd., 1972).

18. Baker, Colonial Vessels, 23, 25. An illustration on page 24 of this work makes it easier to comprehend the meaning of narrowing and rising lines and their relationship to each other. For a similar illustration, see King and Lee, Half-Modelling, 6.

19. See Murray, A Treatise on Ship-Building and Navigation, 136-144, Plate V; Stalkartt, Naval Architecture, vol. I, 5-28, and vol. II, Plate I; and Rees, Rees's Naval Architecture (1819-20), Plate XIV.

20. Personal communication to the author, March 20, 1989.

21. See Mungo Murray, A Treatise on Ship-Building and Navigation, . . . 2 pt. 2nd. ed. (London: A. Millar, 1765) I, 132-147, Plate V; and, Marmaduke Stalkartt, Naval Architecture or the Rudiments and Rules of Ship Building Exemplified in a Series of Draughts and Plans with Observations 2 vols. (London: author, 1781), vol. I, 5-28, and Vol. II, Plate I. A brief discussion of whole moulding, as well as a superb illustration of the whole moulding apparatus, is included in an extensive article on "ship-building" contained in volume 32 of the 39-volume work, The Cyclopaedia; or Universal Dictionary of Arts, Sciences and Literature (London: n.p., 1819-20), by Abraham Rees. In 1970, this article was reprinted as a separate book: Abraham Rees, Rees's Naval Architecture (1819-1820): A Selection from The Cyclopaedia; or Universal Dictionary of Arts, Sciences and Literature (Annapolis, Md.: Naval Institute Press, 1970). Whole moulding is discussed on page 5 and an adjustable template used to design a 32 ft. ship's boat is depicted in Plate XIV under the heading "whole-moulding." Westcott Abell's The Shipwright's Trade contains considerable data about the methodologies of sixteenth- and seventeenth-century English ship designers whose work pertained to whole moulding. These designers include Matthew Baker, Phineas Pitt, and Anthony Deane. See Abell, The Shipwright's Trade, 36-61. Brian Lavery's Deane's Doctrine of Naval Architecture, 1670 contains a reprint of Anthony Deane's Deane's

Doctrine of Naval Architecture and Tables of Dimensions, Material Furniture and Equipment appertaining thereto. Written in the Yeare 1670 at the Instance of Samuel Pepys, Esq. See Lavery, Deane's Doctrine of Naval Architecture, 1670, 33-113. Deane's original manuscript is in the Pepys Library, Magdalene College, Cambridge, and is designated manuscript number 2910. Also on deposit at the Pepys Library is Fragments of Ancient English Shipwrightry, ca. 1586, which is attributed to Matthew Baker. This manuscript is designated number 2820. An illustration from the Baker manuscript showing the three principal ship's timbers erected on a keel —identical to the way the principal timbers of many Trinity Bay boats are erected today— is reproduced as Plate VI in Abell's The Shipwright's Trade. A French analogue to whole moulding is described by Jules Vence in his work Construction et manoeuvre des bateaux et embarcations à voilure latine, pêche-bateleage-pilotage-plaisance . . . (Paris: A. Challamel, 1897). Of particular interest is the description of a "gabarit de Saint-Joseph" (mould of St. Joseph) from Provence which is virtually identical to the adjustable mould described by Murray, Stalkartt, and Rees. See Vence, Construction et manoeuvre des bateaux et embarcations à voilure latine, 25-31. I am indebted to Walter Gaspard of Brussels, Belgium, for supplying me (via Richard Barker) with a translation of this section.

22. See, Murray, Treatise on Ship-Building and Naval Architecture, Plate I. A drawing of a similar adjustable mould appears in Plate I of Marmaduke Stalkartt's Naval Architecture (1781). Drawings of the apparatus by twentieth century interpreters of whole moulding can be found in Chapelle, American Small Sailing Craft, 12; Baker, Colonial Vessels, 26; Lee and King, Half-Modelling, 6; and McKee, Working Boats of Britain, 122. Frequently, drawings of the whole moulding apparatus by twentieth century draftsmen lack the detail found in the original drawings upon which their work is based.

23. For detailed analyses of the settlement of Trinity Bay and other areas of Newfoundland, see, for example, Mannion, ed., The Peopling of Newfoundland, and Head, Eighteenth Century Newfoundland.

24. A transcript of this inventory can be found on page 73 of W. G. Handcock's "Historical Documents and Reference Materials on Trinity, Trinity Bay," a manuscript on deposit at the Centre for Newfoundland Studies, Memorial University of Newfoundland, St. John's.

25. Philip W. Patey of Lewisporte, Notre Dame Bay, Newfoundland, informs me that he has seen moulds in eastern Notre Dame Bay that are evidently based on whole-moulding. According to an eighty-three year-old retired fisherman and boatbuilder whom he interviewed, two mould pieces, called the "rounding board" and the "rising board," were used to obtain the shapes of punts. Patey speculates that the third piece of the whole-moulding system may have been eliminated at some point in the past. Active builders whom Patey interviewed use half-models or

pattern moulds. (Personal communication to the author from Philip W. Patey, December 18, 1988.)

26. Chapelle states that "the Elizabethan system of designing lines remained in limited use in England until as late as 1717 and was employed in small-boat design even later. The system did not survive because it could not produce a fair form near the bow and stern." (Chapelle, The Search for Speed Under Sail, 16.) Lavery, in discussing the original meaning of "whole moulding," notes that "certainly this was how the term was understood in the nineteenth century, when it still survived in small boat design." (Lavery, Deane's Doctrine of Naval Architecture, 1670, 25.)

27. Chapelle, The Search for Speed Under Sail, 16.

28. Lavery, Deane's Doctrine of Naval Architecture, 1670, 25.

29. McKee, The Working Boats of Britain, 123. In a letter to me, McKee stated that he was referring only to the use of whole moulding in Great Britain. (Personal communication from Eric McKee to the author, May 18, 1983.)

30. Abraham Rees, Rees's Naval Architecture (1819-1820), 5.

31. Chapelle, The Search for Speed Under Sail, 16.

32. Abraham Rees, Rees's Naval Architecture (1819-1820), 5. Chapelle echoes this view, although he does not cite any supporting evidence. See Chapelle, The Search for Speed Under Sail, 16.

33. See, for example, John P. Sarsfield, "From the Brink of Extinction: Mediterranean Molding," 84-9; John P. Sarsfield, "Survival of Pre-16th Century Mediterranean Lofting Techniques in Bahia, Brazil," paper presented at the 4th International Symposium on Boat and Ship Archaeology, Lisbon and Porto, Portugal, October 2-6, 1985; John P. Sarsfield, "Master Frame & Ribbands: A Brazilian Case Study with an Overview of this Widespread Traditional Carvel Design and Building System," paper presented at the 5th International Symposium on Boat and Ship Archaeology, Amsterdam, September 12-15, 1988; and Raul F. Esmeriz Delerue, "A Barca da Arte da Xávega: Embarcação de Pesca Característica Litoral Algarvio," paper presented at the 4th International Symposium on Boat and Ship Archaeology, Lisbon and Porto, Portugal, October 2-6, 1985. Sarsfield's recent paper, "Master Frame & Ribbands," is of particular interest because, in addition to discussing the design system employed by contemporary builders of northeastern Brazil, it compares and contrasts the principal features of whole moulding, "Mediterranean moulding," master frame and ribbands, and gabarit de Saint-Joseph. He groups all of these under the general category of "master frame and ribbands," which he identifies as "the simplest and perhaps even the oldest method" of building vessels with the carvel

construction technique. (p. 1)

Photographs of primary timbers set up on the keels of small craft on the islands of Nevis and Antigua on pages 13 and 181 of Douglas C. Pyle's Clean Sweet Wind suggest that variations of the whole moulding system may be in use on Nevis, Antigua, and possibly other regions of the Caribbean with long-standing ties to eastern Canada, Great Britain and other European nations. A number of factors suggest the strong and intriguing possibility that the boat design traditions of Newfoundland and certain Caribbean islands have much in common: (1) early settlement and trade based on contact with Great Britain; (2) participation in the "triangle trade" linking Britain, eastern Canada, and the Caribbean; (3) on-going boat building traditions of considerable longevity; and (4) the similarity between contemporary vernacular boat types of Newfoundland and the Caribbean.

34. While conducting fieldwork for an intensive study of boatbuilding in the community of Winterton, Trinity Bay, in addition to Marcus French, I interviewed two other builders who employ the three-piece adjustable mould: Chesley Gregory, and Lionel Piercey. See my publication, Boat Building in Winterton, Trinity Bay, Newfoundland, 87-96.

35. At this point, the vessel's backbone --consisting of stem, keel, sternpost, and supporting knees and deadwoods-- will already have been assembled.

36. Interview with Austin King by David Taylor, May 25, 1982. MUNFLA accession number C6700.

37. Trinity Bay builders commonly refer to this area of the hull as the "crop of the bulge."

38. See, for example, interview with Austin King by David Taylor, May 25, 1982, MUNFLA accession number C6700. King, who has used the same set of moulds for a thirty-three foot boat and for a twenty foot boat, maintains that his moulds could be used to derive the timbers of vessels from ten to one hundred feet in length. As any naval architect would point out, this approach to vessel design is efficacious only within certain parameters. Craft of various sizes can indeed be designed with this approach, but as hull size increases designs thus derived are not necessarily the most efficient. The principal shortcoming of this method is its adherence to the faulty assumption that standard conditions--buoyancy, stability, and strength--will prevail regardless of vessel size.

39. Interview with Austin King by David Taylor, May 25, 1982. MUNFLA accession number C6700.

40. That is, the builder would use his three-piece adjustable mould to derive the shapes for three or more pattern moulds for a vessel of a size or design not previously executed. Thereafter, the three-piece mould would be laid aside (often to be stored in the rafters of the builder's workshop) and the pattern moulds would be used to derive the timbers of all subsequent craft of the new design.

41. "Clinker" and "lapstrake" are synonymous terms that refer to planks (strakes) that partly overlap one another and are fastened together in these areas.

42. Interestingly, the use of steamed timbers for small open boats known as speedboats is accepted. In fact, steamed timbers are the norm with speedboats. It is worth noting that speedboats and steamed timbers arrived on the Trinity Bay scene almost simultaneously. Speedboats, unlike other local boat types of much greater longevity, have never been associated with sawn, naturally curved timbers in any substantial way.

43. Interview with Kevin King by David Taylor, February 25, 1983. MUNFLA accession number C6958. For a discussion of opinions of steamed timbers held by boatbuilders and fishermen of Winterton, see my study Boat Building in Winterton, Trinity Bay, Newfoundland, 172-4.

44. Chapelle, The Search For Speed Under Sail, 150.

45. Howard I. Chapelle, The National Watercraft Collection. 2nd ed. (Washington, D.C., and Camden, Me.: Smithsonian Institution Press and International Marine Publishing Co., 1976), 12.

46. John W. Griffiths, Treatise on Marine and Naval Architecture, or Theory and Practice Blended in Ship Building. 4th ed. (New York and London: D. Appleton and Company, and John Weale, 1854), 91.

47. Chapelle, The National Watercraft Collection, 12. He also notes that this model type "was probably used in the late 17th century, along with the solid block model." (p. 12) Griffiths also discusses the origin of this model type, concluding that they were made in Europe as early as the mid-eighteenth century. See his Treatise on Marine and Naval Architecture, 92.

48. Chapelle, The National Watercraft Collection, 12.

49. I have abbreviated the processes of making half models and taking off their lines. For superb descriptions of these procedures by professional boat builders, see Walter J. Simmons, Lapstrake Boatbuilding Volume 2 (Camden, Me.: International Marine Publishing Co., 1980), 6-35; and Maynard Bray, "Sonny Hodgson's Half Models," Woodenboat 33 (March-April 1980), 41-48. Howard I. Chapelle provides technical information about lift models in The National Watercraft

Collection, 8-10; as well as a set of "Instructions for Taking Off Lines of Models and Drawing Lines" in his book Yacht Designing and Planning for Yachtsmen, Students and Amateurs, rev. and enlarged ed. (New York: W. W. Norton, 1971), 357-364.

Unfortunately, studies of verracular watercraft derived from half models usually fail to illuminate the fine points of half-model manufacture, use, and transmission within the community. A notable exception is the work of folklorist C. Richard K. Lunt. See his doctoral dissertation, "Lobsterboat Building on the Eastern Coast of Maine," 103-106, 117-137.

50. Chapelle, The National Watercraft Collection, 8.

51. See, for example, Chapelle, The Search for Speed Under Sail, 150-1; and Chapelle, The National Watercraft Collection, 8.

52. According to René de Kerchove's International Maritime Dictionary, "harpins" (harpens) are: "The continuation of the ribbands at the forward and after ends of a ship under construction and so fastened to keep the cant frames in original position until the outside planking or plating is worked . . . . Harpins are trimmed to required shape, while ribbands are made of straight timber and bent if necessary." René de Kerchove, International Maritime Dictionary, 2nd ed. (Princeton, N.J.: D. Van Nostrand Company, Inc., 1961), 356.

53. Griffiths, Treatise on Marine and Naval Architecture, 92. It is likely that Chapelle's suggestion that the lift model may have been "the result of a gradual evolution from a solid block model sawn into vertical sections" (The National Watercraft Collection, 8) was inspired by Griffiths' account.

54. Griffiths, Treatise on Marine and Naval Architecture, 91.

55. For example, discussions of the use of lift models are included in the following studies of vernacular craft of the twentieth century: Michel Desgagnés, Les Goélettes de Charlevoix (Ottawa: Les Éditions Leméac Inc., 1977), 69-71, 78-81; Peter J. Guthorn, The Sea Bright Skiff and Other Jersey Shore Boats (New Brunswick, N.J.: Rutgers University Press, 1971), 11, 51, 134, 136; Nils Nilsson, "Shipyards and Ship-Building at a Wharf in Southern Sweden," in Ships and Shipyards, Sailors and Fishermen: Introduction to Maritime Ethnology, ed. Olof Hasslöf, Henning Henningsen, and Arne Emil Christensen, Jr. (Copenhagen: Rosenkilde and Bagger, 1972), 279, 281, 293-298; Douglas C. Pyle, Clean Sweet Wind, 11, 191, 160; Eric McKee, Working Boats of Britain, 124-125. For a description of how Nathanael Herreshoff (undoubtedly one of the most innovative boat designers and builders in the annals of American naval architecture) made and used half models, see L. Francis Herreshoff, Capt. Nat Herreshoff: The Wizard of Bristol (Dobbs Ferry, N.Y.: Sheridan House, 1986), 129-136.

56. Anon., <u>Weekly Herald</u> (Harbour Grace, Nfld.), March 2, 1853, p. 2. This brief article also notes that the vessel was built under the supervision of James Moore.

57. Interview with George Penney by David Taylor, May 26, 1982. MUNFLA accession number C6701. My photographs of Penney's half-models are on deposit at the Canadian Centre for Folk Culture Studies, National Museum of Man, Ottawa. See: accession numbers 82-8810 to 82-8820.

58. The standard term for these perpendicular lines is "waterlines."

59. Interview with Joseph Dalton by David Taylor, May 29, 1982. MUNFLA accession number C6703. My photographs of Dalton taking the lines off a half-model are on deposit at the Canadian Centre for Folk Culture Studies, National Museum of Man, Ottawa. See: accession numbers 82-8704 to 82-8709.

60. Stone demonstrated this procedure for me when I visited him on May 25, 1982.

61. In shipyards, the expansion of a vessel's timber shapes generally took place, out of necessity, on a large wooden floor known as the mould loft floor. The entire process of [illegible]ving accurate, full-scale drawings of timbers and other component parts became known as "lofting" or "laying down."

62. I recorded an interview with Toope on May 27, 1982 (MUNFLA accession number C6702), and one with Kevin King on February 25, 1983 (MUNFLA accession number C6958).

63. See, for example, Chapelle, <u>The National Watercraft Collection</u>, 10-11; Greenhill, <u>Archaeology of the Boat</u>, 296; and Allan H. Vaitses, <u>Lofting</u> (Camden, Me.: International Marine Publishing Co., 1980), 55. Vaitses defines the term as: ". . . the traditional name for a body plan-size board on which a vessel's moulds or frames can be drawn out and assembled." (p. 55)

64. This intriguing device is discussed and sketched in Maxwell Collett's article, "The Harbour Buffett Motor Boat," <u>The Newfoundland Quarterly</u> 67, no. 2 (July 1969), 15-20. Collett defines the "gate" as: ". . . a large wooden graph with pegged holes at each coordinate. The gate represented a cross-section of one side of the would-be boat, and by manipulating the pegs, the desired shapes was determined at given intervals of timbers." (p. 15) According to Collett, the gate was used in conjunction with lift models.

65. "Reference board" is the term I have chosen for these devices. The builders who use them have no specific term.

66. From fore to aft, the names Toope uses for the first five timbers are: fore hook, first of fore, midship bend, first abaft, and after hook. Toope had no special name for the sixth timber, but remarked that "extra" would be as good a designation as any.

67. My photographs of this particular reference board are on deposit at the Canadian Centre for Folk Culture Studies, National Museum of Man, Ottawa. See: accession numbers 82-8681 to 82-8685, 82-8641, 82-8642.

68. Interview with Joseph Dalton by David Taylor, May 29, 1982. MUNFLA accession number C6703. Dalton's half-model, carved to a scale of 1" = 1,' is for a 35' x 9' trap skiff. The first boat Dalton built from the model was launched in 1957.

69. It is worth noting that only one builder contacted--professional builder Warren Brookings of Petley--had taken the trouble to mount his attractive models on the wall of his shop.

70. The making of full-rigged models of vessels is a form of folk cultural expression commonly found in maritime communities around the world. In the Newfoundland context it is an especially strong and widespread tradition. Unfortunately, a detailed analysis of this fascinating topic is beyond the scope of the present study.

71. For an insightful analysis of miniature forms, see Susan Stewart, <u>On Longing: Narratives of the Miniature, the Gigantic, the Souvenir, the Collection</u> (Baltimore: Johns Hopkins University Press, 1984), 37-69. Of particular relevance to the discussion of fully-rigged models is Stewart's trenchant observation: "Today we find the miniature located at a place of origin (the childhood of the self, or even the advertising scheme whereby a miniature of a company's first plant or a miniature of a company's earliest product is put on display in a window or lobby) and at a place of ending (the productions of the hobbyist: knickknacks of the domestic collected by elderly women, or the model trains built by the retired engineer); and both locations are viewed from a transcendent position, a position always within the standpoint of present lived reality and which thereby always nostalgically distances its object." (pp. 68-9).

72. Interview with George Penney by David Taylor, May 26, 1982. MUNFLA accession number C6701. Here, he speaks of his experiences in his home community of Keels, Bonavista Bay.

73. Interview with Harold Barrett by David Taylor, June 16, 1982. MUNFLA accession number C6706.

74. Interview with Harold Barrett by David Taylor, June 16, 1982. MUNFLA accession number C6706.

75. My photographs of one of Stone's half-models and the three-piece mould used by his father are on deposit at the Canadian Centre for Folk Culture Studies, National Museum of Man, Ottawa. See: accession numbers 82-8731 to 82-8743.

76. See: Hilda Murray, "Fishing Boats of Elliston, Trinity Bay," (unpublished manuscript, 1970), 18. In describing the boatbuilding tradition of Harbour Buffett, Placentia Bay, Maxwell Collett implies that mould use and model use overlapped in the community during the twentieth century. See: Collett, "The Harbour Buffett Motor Boat," 15.

77. Builders contacted who use half-models are: Warren Brookings (Petley), Joseph Dalton (Little Catalina), William King (St. Jones Within), Kevin King (St. Jones Within), George Penney (Catalina), Clement Stone (Lower Lance Cove), and Edward Toope (Trinity). It is also worth noting that the Trinity Museum, in the community of Trinity, has a modest collection of nineteenth and twentieth century half-models. These include models of large fishing schooners as well as smaller inshore fishing boats.

78. Builders who use the three-piece mould are: Marcus French (Winterton), Chesley Gregory (Winterton), Llewellyn Meadus (Grates Cove), Lionel Piercey (Winterton), and Eleazor Reid (Winterton). Mould use by Winterton builders is extensively discussed in Taylor, Boat Building in Winterton, 87-96.

79. McKee, Working Boats of Britain, 113.

80. Interview with Arthur Lambert by David Taylor, April 8, 1980. MUNFLA accession numbers C6698 and C6699.

81. Interview with Edward Toope by David Taylor, May 27, 1982. MUNFLA accession number C6702.

82. More specifically, to make a wider boat the width of the bottom is increased in the area roughly half-way between the turn of the bilge and the point of intersection with the keel. One-half of the desired expansion is made on each side (port and starboard) of each mould. To make a deeper boat, the height of the sheer is increased. To make a longer boat, distances between timbers are increased.

83. Jackson's stock designs are for boats 22, 28, 30, 35, and 40 feet in length. Carpenter's stock designs are for boats 38, 45, 48, and 65 feet in length.

84. During my February 25, 1983, interview with full-time builder Kevin King (MUNFLA accession number C6958), he told me that he has thirty-one pattern moulds (one for each timber) for the thirty-three foot trap skiff he builds.

85. There are exceptions to this practice. For example, professional builder Russell Bishop of Hatchet Cove uses patterns for stems and stern knees. When I interviewed him on November 16, 1983 (MUNFLA acc. no. C6708), he explained that he takes the stem pattern into the woods with him when he searches for trees with the proper curvature. Bishop also employs patterns for timbers, deadwoods, and counters. His reliance on these patterns is indicative of the control he seeks over hull form, a degree of control commonly sought by full-time builders, but not part-time builders.

86. Interview with Joseph Dalton by David Taylor, May 29, 1982. MUNFLA accession number C6703.

87. Interview with George Penney by David Taylor, May 26, 1982. MUNFLA accession number C6701.

88. Interview with Eleazor Reid by David Taylor, February 4, 1978. MUNFLA accession numbers C4432 and C4433. Also quoted in Taylor, Boat Building in Winterton, 104-5.

89. Henry Glassie, "Folk Art," in Folklore and Folklife: An Introduction, ed. Richard M. Dorson (Chicago: University of Chicago Press, 1972), 268.

90. Glassie, "Folk Art," 268.

91. Fishermen's keen ability to identify the distinguishing characteristics of individual boats was driven home to me during the course of fieldwork with Maine lobstermen during the 1970s. In the community of Friendship (a fishing harbor with well over 100 lobster boats), early on an extremely foggy morning when nothing could be seen beyond a distance of six feet, I observed a fisherman identify individual craft by the sounds of their engines alone.

92. For a discussion of "the individual nature of boats," see Gilmore, The World of the Oregon Fishboat, 109-118.

93. Glovertown is located in the middle region of Bonavista Bay.

94. Interview with Reuben Carpenter by David Taylor, November 24, 1983. MUNFLA accession number C6709.

95. Interview with Reuben Carpenter by David Taylor, November 24, 1983. MUNFLA accession number C6709.

96. Ladislav Holy and Milan Stuchlik, "The Structure of Folk Models," in The Structure of Folk Models, ed. Ladislav Holy and Milan Stuchlik. ASA Monograph no. 20 (New York: Academic Press, 1981), 23.

97. Taylor, Boat Building in Winterton, 106.

98. For formulas used by other Winterton builders, see: Taylor, Boat Building in Winterton, 108-9.

99. Holy and Stuchlik, "The Structure of Folk Models," 22.

100. Peter Caws, "Operational, Representational, and Explanatory Models," American Anthropologist 76 (1974), 1-10.

101. Interview with Joseph Dalton by David Taylor, May 29, 1982. MUNFLA accession number C6703.

102. Interview with Edward Toope by David Taylor, May 27, 1982. MUNFLA accession number C6702.

103. Interview with George Penney by David Taylor, May 26, 1982. MUNFLA accession number C6701.

104. Interview with Arthur Lambert by David Taylor, April 8, 1980. MUNFLA accession numbers C6698, C6699.

105. Interview with Austin King by David Taylor, May 25, 1982. MUNFLA accession number C6700.

106. Interview with Harold Barrett by David Taylor, June 16, 1982. MUNFLA accession number C6706.

107. Interview with Austin King by David Taylor, May 25, 1982. MUNFLA accession number C6700.

108. Interview with Obediah Meadus by David Taylor, June 16, 1982. MUNFLA accession number C6705.

109. Interview with Harold Barrett by David Taylor, June 16, 1982. MUNFLA accession number C6706.

110. Interview with Joseph Dalton by David Taylor, May 29, 1982. MUNFLA accession number C6703.

111. Representational and operational models are terms coined by anthropologist Peter Caws in his article "Operational, Representational and Explanatory Models," American Anthropologist 76 (1974), 1-10.

112. Barre Toelken, The Dynamics of Folklore (Boston: Houghton Mifflin Company, 1979), 30.

113. Toelken, The Dynamics of Folklore, 32.

114. Interview with Arthur Lambert by David Taylor, April 8, 1980. MUNFLA accession numbers C6698, C6699. When he says "how she's done," Lambert means the method of construction. When he says "what kind of

work is into her," he means the quality of construction.

115. For a penetrating discussion of how the status of Oregon commercial fishermen is reflected by their boats, see: Gilmore, The World of the Oregon Fishboat, 117-118, 197-204.

116. Christopher Alexander, Notes on the Synthesis of Form (Cambridge: Harvard University Press, 1967), 55-70.

117. Interview with Austin King of Hickman's Harbour, May 25, 1982. MUNFLA accession number C6700.

118. Interview with Fred Jackson by David Taylor, December 9, 1983. MUNFLA accession number C6710.

119. Interview with Reuben Carpenter by David Taylor, November 24, 1983. MUNFLA accession number C6709.

120. Moulds, models, and plans the builder has used can yield more empirical data about design change. A builder's collection of photographs of the boats he has built can also be used to shed light on design change over time.

121. Interview with Arthur Lambert by David Taylor, April 8, 1980. MUNFLA accession numbers C6698, C6699.

122. The "twin laws" of folklore process—conservatism and dynamism—are discussed in Toelken's, The Dynamics of Folklore, 34-36.

123. Although his approach is not strongly focused on cultural processes, design scholar David Pye could easily be assessing the merits of the folk cultural design process when he states: "The best designs have always resulted from an evolutionary process, by making successive slight modifications over a long period of time, not through a feverish insistence on making frequent obvious changes for the sake of offering something which looks 'really new and different.' Innovation often hinders improvement." See: David Pye, The Nature and Aesthetics of Design (London: Barrie and Jenkins, 1978), 150.

124. Interview with Fred Jackson by David Taylor, December 9, 1983. MUNFLA accession number C6710.

125. For an example of a builder who, because of the success of the boats he built, could retain control over design decisions, see Janet Gilmore's discussion of Oregon builder Wilbur Humbert in The World of the Oregon Fishboat, 114-5. For a discussion of the client-builder relationship, see Lunt's "Lobsterboat Building on the Eastern Coast of Maine," 113-117. The dynamics of client-craftsman relationships (including those of boatbuilders and fishermen) in a Newfoundland outport are carefully analyzed in Louis J. Chiaramonte's concise study,

Craftsman-Client Contracts: Interpersonal Relations in a Newfoundland Fishing Community (St. John's: Institute of Social and Economic Research, 1970).

126. Taylor, Boat Building in Winterton, 128, 131.

127. Interview with Llewellyn Meadus by David Taylor, November 3, 1983. MUNFLA accession number C6707.

128. When I interviewed him in 1983, Llewellyn told me that the current dimensions for this craft were: 19 feet in length, 78 inches wide at the midship bend, 64 inches wide at the transom, and 39-1/2 inches deep at the midship bend.

CHAPTER 2, SECTION 1: The Study Area--Hardangerfjord

The site of research in Norway encompassed several small communities along the middle section of Hardangerfjord, a serpentine body of water located in western Norway (Vestlandet). This fjord is one of the most prominent and famous in this country of fjords, and offers spectacular vistas of dark-blue waters, towering waterfalls, and compact villages nestled at the base of snow-capped mountains. Linked to the North Atlantic via Husnesfjord and Bømlafjord to the southwest, it forms an important inland waterway stretching 121 kilometers in length. Hardangerfjord itself begins in the area of Sunnhordland, where it abuts Husnesfjord. From there it extends northeast to the community of Utne, where it forms two branches: Eidfjord to the northeast, and Sorfjord to the south. These two branches terminate at the communities of Eidfjord and Odda, respectively. In addition to Eidfjord and Sorfjord, the main fjord is divided into a number of smaller fjords, including Kvinnheradsfjord, Maurangerfjord, Samlafjord, and Utnefjord. Two major islands--Borgundøy and Halsnøy--lay at the beginning of the fjord, and another--Varaldsøy--resides in its middle section. At its widest point, the fjord is roughly fifteen kilometers across. According to the local system of geographical reference, the

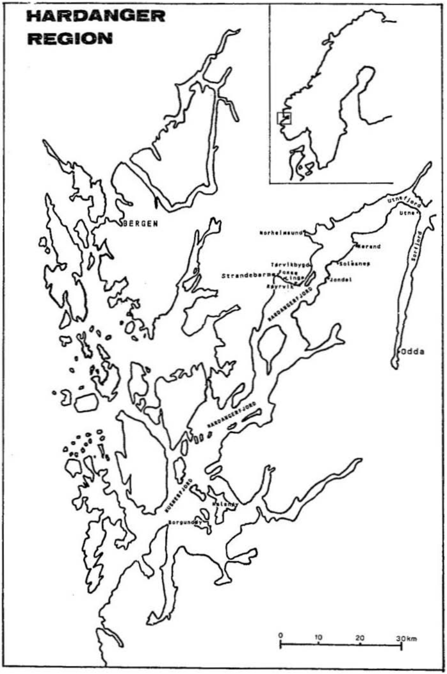


Figure 6: Map of Hardanger Region

mouth of the fjord is called the outer fjord, the center section is the middle fjord, and the final, most inland section is the inner fjord.

Ferry service provides the principal transportation link between the eastern and western shores of the fjord, and serves two routes: between Tørvikbygd and Jondal, and between Gjermundshamn and Løfallstrand. With the exception of a short section between Årvikstrand and Flatabø on the eastern side of the fjord, highways trace the shores of the fjord. On the western shore, two roads run to Bergen. From Odda, a road runs southwest to the regional center of Haugesund. And from Eidford, a road runs eastward across the highland plateau known as Hardangervidda, and, eventually, to Oslo.

All of the Hardangerfjord region lies within the fylkeskommune (county) of Hordaland, one of Norway's nineteen administrative sections. The total population of Hordaland is 397,480, which represents slightly less than ten percent of the population of Norway.[1] Hordaland fylkeskommune is divided into thirty-three sub-regions, each with a designated regional center.[2] The administrative center for the entire fylkeskommune is located at Bergen, the largest city in western Norway, and the nation's second largest city (after Oslo), with a population of approximately 207,000.

Fieldwork for the present study was carried out in an area 60-70 kilometers east of Bergen, in the fylkeskommune sub-regions of Kvam (population: 8,714), located on the western shore of middle Hardangerfjord; and in Jondal (population: 1,300), situated opposite Kvam, on the eastern shore of the fjord. In Kvam, the specific

Plate 22: Colin Archer sailboat, faering, and seksaering in front of Kristian Djupervåg's shop

communities where fieldwork took place were the villages of Fosse, Linga, Røyrvik, and Tørvikbygd. And in Jondal, fieldwork was carried out in Jondal, Solesnes, and Herand. Each of these seven communities is quite similar in that all have small populations (less than 300 residents), all are situated close to the shores of the fjord, and all have economies based on a combination of small-scale farming, dairying, fruit-growing,[3] and tourism. Many residents of the area who are not engaged in these pursuits in their home communities work in various service industries based on the western shore of the fjord in the regional centers of Strandebarm and Norheimsund.

Hardangerfjord: Topography, Geology, Vegetation, and Climate

The territory of the Hardanger region is one of dramatic contrasts. Within a narrow coastal band, land elevation leaps upward sharply from water level to heights of 1,000-1,500 meters. Similarly, the depth of water in the fjord drops precipitously, achieving depths of 300-500 meters throughout most of the fjord, and descending to 791 meters near Utne. The steepness of the land also brings about startlingly swift changes in vegetation zones. For example, after one drives eastward through the lush and verdant summer pastures of the community of Jondal (elevation about 400 meters), within the space of ten steeply ascending kilometers one encounters the edge of a large icecap known as Folgefonna (220 sq. kilometers).

In geological terms, Hardanger is a small section of a large region, extending throughout nearly the entire length of western

Norway, known as the "zone of Caledonian folding."[4] Six hundred to four hundred million years ago, this zone, consisting of deep troughs and high mountains, was formed during the Caledonian mountain-building cycle. The composition of the component rocks along the coast of western Norway, from Hardangerfjord to Tromsø, is principally granite and gneiss. To the east of this band lies another band consisting of Cambro-silurian limestones and shales. The line dividing these two geological zones is evident today in the form of fault lines. In many cases, these fault lines, or structural weaknesses, are traced by fjords. "Hardangerfjord, for instance, is carved out between the basal complex of the Caledonian range (to the north-west) and a zone of metamorphosed Cambro-silurian rocks (to the south-east)."[5]

The vegetation within the present-day Hardanger region is divided into five major zones: boreonemoral, southern boreal, middle boreal, northern boreal, and low alpine. The boreonemoral zone runs in a thin strip along the western shore of the fjord from Granvin to Leirvik, and along the eastern shore from Uskedal to Holmedal and encompasses the islands of Borundøy and Halsnøy. This zone is dominated by coniferous, birch and grey alder forests. Stands of deciduous forest with oak, ash, elm, lime, and hazel can also be found in areas that possess rich soils and a favorable climate. The agricultural landscape within this zone is characterized by meadows and grasslands interspersed with oaks. The southern boreal zone runs in a narrow band along the shores of Sorfjord and Eidfjord, along the eastern shore from Utne to Uskedal, and in a strip inland of the boreonemoral zone on the western shore.

This zone is dominated by coniferous forests as well as alder forests and bogs. White birches are often found within the agricultural landscape.

In most parts of the outer and middle fjord, inland of the southern boreal zone and at higher elevations, the middle boreal zone is found. This zone features coniferous as well as grey alder forests. Brown birch commonly occurs in the agricultural landscape. Along the eastern shore of Sorfjord and all along Eidfjord, in a strip inland of the coastal southern boreal zone, is the northern boreal zone. This zone, just below the timberline, is dominated by birch forests and bogs. Summer farming is common in the area. Finally, at an elevation above the timberline, along the western shore of Sorfjord and the eastern and western shores of the middle and outer fjord, is the low alpine region. This band of vegetation consists of a variety of evergreen shrubs as well as bogs.[6]

Largely as a consequence of the warm water and air currents associated with the Gulf Stream, the climate of the Hardangerfjord region is quite mild with unusually high winter temperatures for its latitude, but fairly cool summers. During the winter months (November-March), the mean temperature averages about 3.4°C, and during the summer (June-August) the mean average is in the neighborhood of 13.2°C.[7] As a result of the prevailing westerly winds, western Norway receives the highest annual rate of precipitation in all of Scandinavia. In 1984, for example, Bergen received a total of 1,646 mm of precipitation.[8]

History and Economy

The precise date of the settlement of the Hardangerfjord region is not known, but archaeological evidence of Stone Age agriculture suggests that settlement occurred approximately 4000 years ago. At the time of earliest settlement, and for many years thereafter, traditional farming was the principal subsistence activity. The outer part of the fjord, in particular, has always been an agricultural region, although considerable lumber harvesting took place there during the sixteenth, seventeenth, and eighteenth centuries. The major areas of timber production during this era were Sunnhordland, at the beginning of Hardangerfjord, and the area to the southeast called Ryfylke. These were important areas for timber export to Scotland during the seventeenth and eighteenth centuries. This industry declined as more and more of the lumber resource was depleted. Of special significance to the present study, however, is the fact that the timber resources of these regions have always provided the material basis for boatbuilding.

Population in the Hardangerfjord region began to grow in the early nineteenth century. One striking result of this expansion was an increasing subdivision of land. This was due to the traditional rules of inheritance that specified that a family's eldest son inherited the family homestead. The options of all other sons were, therefore, limited. They had, perhaps, four major options: clear new land and become husmann (tenant farmers under the family homestead), work on the sea as fishermen or sailors, work in handicraft production, or work as boatbuilders.

In the nineteenth century, residents from communities scattered along the whole length of the fjord became involved in the great western Norwegian herring fishery that commenced when enormous numbers of herring came to the west coast around 1809-10.[9] The desire to exploit this bountiful resource produced a great need for people to serve as fishermen, fish processors, and fish transporters. It also created a heavy demand for fishing boats.

In response to this boom in the fishery, people began an annual migration from the inner sections of Hardangerfjord to the coast in order to work in the fishery. Consequently, a kind of double economy was created in the region. People tended small farms where they raised grain, vegetable crops (especially potatoes), and tended dairies, and supplemented income accrued from these agricultural activities with monies earned through seasonal participation in the herring fishery.

During the 1820s and 1830s, a type of sloop-rigged sailing craft known as the jakt began to be built in the Hardanger area.[10] Vessels of this type were either operated by the men who built them or sold to people along the coast for use in the herring and cod fisheries or in coastal trade. As Christensen observes:

> During the nineteenth century, the "Hardanger jakt" was not only busy carrying local produce to Bergen; it also served coastal traffic and took part in the herring export to the Baltic. Many skippers took their jakts north to the Lofoten cod

> fishing grounds, laden with grain and salted meat, butter, etc. These goods they exchanged for fish, which was salted in the hold. In March or April, the skipper would sail south along the coast, and "hire the cliffs" of a local farmer for drying his salted fish. In due course, the finished product was exported to Portugal, as the main ingredient for Baccalao, but in the meanwhile many hands were busy stacking the fish when rain or strong sunshine threatened to reduce the quality, spreading it on the cliffs again on overcast, windy days when conditions for drying were good.[11]

Boatbuilding activities increased during the nineteenth century, and during this period larger vessels began to be built and were sold mainly to merchants in the emerging coastal town of Haugesund, to merchants in Bergen, and to customers in Stavanger.

Involvement in fruit farming by Hardanger residents increased in the nineteenth century, and cargoes of fruit, other agricultural products, lumber, and small four-oared boats (_færingar_) were carried to market centers in _jakts_. As Molaug notes:

> They went to Stavanger in the sloops, and sold their products there. Logs of firewood and fruit were lying in the hold, and the four-oared boats were piled on the deck. It was quite a sight to see all these sloops lying close together, filling the entire harbour at Steinkaret. This could be seen

as late as the 1920s.[12]

Around 1870, the herring disappeared from the western coast of Norway. As a consequence, many of those who had prosecuted the fishery either went to northern Norway and continued in fisheries activities, or they went into overseas shipping. At about the same time, the Hardangerfjord region experienced a heavy out-migration. For those who remained, attention turned away from the sea and focused more heavily on specialized and labor-intensive farming such as fruit growing, to which the fjord is especially well suited because it is sheltered and has hot summers. Boatbuilding was carried on in the region after the 1870s, but the building of large vessels for overseas shipping declined as a result of a slump in overseas commerce. However, a strong demand continued for smaller fishing vessels and for coastal craft used to bring agricultural products to the towns along the sea coast and to carry goods back to the Hardanger region.

From the 1880s onward, tourism has been an important industry in the region. Steamers from Bergen made regular trips along Hardangerfjord so visitors could view the spectacular landscape. Also, British tourists began to visit the area, many of whom came to take part in recreational fishing for salmon and trout. One consequence of the burgeoning tourist industry was the establishment of many small hotels and pensions which, in turn, created new employment opportunities for residents of the area.

Beginning in the early part of the twentieth century, the growing use of electricity as well as the use of electric power for large-scale manufacturing led to major changes in many parts of the fjord. One enormous change was the establishment of big industrial plants in two primary locations, Odda and Tyssedal, communities in the inner fjord region at the end of Sorfjord. Major international companies established manufacturing plants there: an aluminum plant at Tyssedal, and electro-chemical plants at Odda producing carbide, cyanamide, superphosphate, aluminum, and zinc. In addition, in the middle fjord region, a ferro-alloy manufacturing plant was established near Utne, and an electro-metallurgical plant was established at Ålvik. Because of this industrialization, two significant changes occurred: (1) employment opportunities were created for local people, and (2) the abundance of jobs resulted in an influx of new people to the area.

From the 1920s onward, there has been a dual economy in the Hardanger region consisting of large manufacturing concentrated in a few places, and traditional economic pursuits consisting of a melange of farming, fruit growing, dairying, and handicraft production carried on in many places. Typically, the region's small, family-run farms were labor-intensive operations with relatively high acreage-production ratios. Since the inter-war period, fruit growing (especially apples, cherries, pears, and plums) has supplanted dairying as the most important element of the agricultural economy.[13]

After 1945, a high and sustained demand for labor arose within the region. In-migration occurred in the inner fjord up until the 1950s, and in the outer fjord in the early 1960s, the latter in response to the establishment of an aluminum plant at Husnes in 1963. Other industries were also established, including textile plants in and around Odda. Meanwhile, in a number of regional centers such as Norheimsund, tertiary service industries proliferated.[14] Up until the 1970s, there were no significant employment problems within the Hardanger region. In more recent times, however, considerable out-migration has occurred from all parts of the fjord as a result of decline in a number of industries.[15] Many who have departed have found employment in the Norwegian oil industry, a sector of the national economy that has taken on a decisive significance since the mid-1970s.[16] According to the most recent plan for Hordaland fylkeskommune, further reductions in employment in local industry are anticipated. "Industry today [1983] is in a state of transition; and Hordaland has high employment in many of the branches which are beset with problems, e.g., shipbuilding, ready-to-wear clothing, furniture, and metal-production. Even if the international economic situation should improve in the near future, the industry's ability to survive is dependent upon whether concerns can successfully undergo a readjustment and rationalization process."[17]

Today, within many areas of the fjord, elements of the traditional economy revolving around small, family farms are still common. Within the study area, such farms are numerous and they tend to be devoted to fruit growing and dairying. In several instances, income from these pursuits is supplemented by income derived from the building of small wooden boats. Typically, these farms are situated along the shore and run straight inland. In most cases, a farm will have one or more small boat houses (naust[18]) at the water's edge, fruit groves and farm buildings will occupy the land close to the shore, and the slopes further inland will be used for grazing. It is worth noting that the number of family farms of this general description may increase in the future since, in its efforts to make all arable land in the fylkeskommune productive, fylkeskommune officials are advocating an increase in family farms.[19]

The Boatbuilding Industry

Archaeological evidence indicates that boatbuilding in the Hardanger region is an extremely old activity. For example, there is a Bronze Age rock carving in Herand depicting several large vessels.[20] Also, the remains of a boat, dated to the start of the Christian era, were found at Tofte, on the island of Halsnøy in Sunnhordland.[21] During historic times, Hardanger's reputation for boatbuilding has always been strong and, along with northern Norway and some areas of eastern Norway, it is one of the three areas of the country where the activity is carried out on a fairly large scale. Most Norwegians would agree that Hardangerfjord is best known as a center for the construction of traditional wooden boats. Perhaps the central reason for the establishment and continuity of the region's boatbuilding industry is its abundant timber resources. Consequently, a large number of boats from the region have been sold to fishermen from the coast, a region where the demand for boats has always been high, but where the supply of wood for boatbuilding has not always been sufficient.

In Hardangerfjord, as well as the other parts of the country, boat shops tend to be small operations employing 1-6 workers. Operations of this size, if efficiently run, are probably preferable to larger operations. According to Norwegian economic historian Helge Nordvik, "If you build for a limited market, and you get your order by, essentially, being a skilled manufacturer who can deliver, and where delivery dates often aren't all that important, as long as you get a good product then I would tend to think there are a lot of advantages to being fairly small."[22] As will be discussed in detail below, there are two basic categories of boatbuilders: farmer/boatbuilders who build boats in order to supplement income derived from agricultural pursuits, and full-time builders who earn the majority of their income from the construction of boats.

Government Policy and Boatbuilding

In Norway, unlike Canada, there are no direct subsidies for fishing vessel construction, as such. However, the nation's fairly liberal tax laws permit generous depreciation allowances which, in turn, serve as a stimulus for the construction of new vessels. At least two other government policies also support vessel construction in indirect ways. First, commercial fishermen have access to long-term loans through the Statensfiskarbank (State Fishermen's Bank) at interest rates well below those of regular commercial banks. Second, boatbuilders themselves are eligible for federal business development grants, but only if their boatbuilding operations are located in regions of the country which have been targeted to receive such development assistance.

Notes

1. Statistisk Sentralbyrå, Folketalet i Kommunane 1983-1985. Noregs Offisielle Statistikk B-523 (Oslo: Kongsvinger, 1985), 28-31.

2. See Appendix G for a listing of these sub-regions.

3. The fjords of western Norway, including Hardangerfjord, are probably the most northerly fruit-growing districts in the world. As Sund points out, "The more continental climate, including the oven effect of the mountain walls, makes the growing of apples, pears, plums and soft fruit a profitable use of the steep slopes." See: Tore Sund, "Norway," in A Geography of Norden, edited by Axel Sømme, 235-287 (New York: John Wiley & Sons, 1961), 248.

4. Brian Fullerton and Alan F. Williams, Scandinavia: An Introductory Geography (New York: Praeger Publishers, 1972), 8. This zone extends northwest from present-day Stavanger to North Cape.

5. Fullerton and Williams, Scandinavia, 10.

6. Asbjørn Moen, "The Regional Vegetation of Norway; that of Central Norway in Particular," Norsk Geografisk Tidsskrift 41, no. 4 (Dec. 1987), 179-226.

7. Nordiska Statistiska Sekretariatet, ed. Nordisk Statistisk Årbok 1985 (Stockholm: Norstedts Tryckeri, 1986), 31. In the absence of statistics specific to the Hardanger region, these figures reflect the averages of Bergen, the closest city for which records are kept.

8. Nordiska Statistiska Sekretariatet, ed. Nordisk Statistisk Årbok 1985, 29.

9. Interview with Dr. Helge Nordvik by David Taylor, December 13, 1983. MUNFLA accession number C6697.

10. For a detailed discussion of the development of the jakt in Sunnhordland and Hardanger, see: Atle Thowsen, "En Studie i Vestnorsk Trebåt- og Treskipsbygging," Sjøfartshistorisk Årbok 1966 (Bergen: Bergens Sjøfartsmuseum, 1966), 21-45. For a good description of the physical features of the jakt, see: Gøthe Gøthesen, Norskekystens Fraktemenn: Om Seilfartøyer i Kystfart. Norske Båter Bind II (Grøndahl & Søn Forlag A.S, 1980), 68-83. See also: Trygve Solhaug, De Norske Fiskeriers Historie 1815-1880 2 vols. (Bergen, Oslo, and Tromsø: Universitecsforlaget, 1976), I, 201, 238-240; II, 375, 640.

11. Arne Emil Christensen, ed. Inshore Craft of Norway (Greenwich: Conway Maritime Press, 1979), 35.

12. Svein Molaug, Along the Coast in Olden Days (Oslo: Dreyers Forlag A/S, 1986), 13.

13. The principal areas for fruit growing are the western shore of Sorfjord between Utne and Odda, the eastern shore of the middle fjord between Herand and Utne, and some parts of the western shore of the fjord including the area between Norheimsund and Öysterse and other territory to the northeast.

14. Sund, "Norway," 267. By "tertiary industries" I mean commerce, finance, services and communications. Within the Norwegian context, agriculture, fishing, forestry, and mining are the primary industries, and handicraft production, manufacturing, and construction are the secondary industries.

15. For example, as stated in Hordaland Fylkeskomme's Fylkesplanen 1984-87, (Bergen: A.S. Centraltrykkeriet, 1983): "In 1981, employment in industry was approximately 34,300, down about 2,000 from 1970." (p. 232, translation from Norwegian).

16. As a result of its North Sea oil and gas deposits, Norway was the first western industrialized nation to become a net exporter of oil.

17. Hordaland Fylkeskommune, Fylkesplanen 1984-1987, 232. This passage is translated from Norwegian.

18. For an outstanding photographic depiction of boathouses from different parts of the Norwegian coast, see Svein Molaug, Vår Gamle Kystkultur 2 vols. (Oslo: Dreyers Forlag A/S, 1985), I, 217-272. See also, Arne Emil Christensen, ed., Inshore Craft of Norway (Greenwich: Conway Maritime Press, 1979), 20-1.

19. Hordaland Fylkeskommune, Fylkesplanen 1984-1987, 40.

20. These carvings have been dated at 3,500 years before present.

21. Christensen, Boats of the North, 21-2. See also: Haakon Shetelig, "Oldtidens Fartøier," In Nordisk Kultur, edited by Johns. Brøndum-Nielsen, Otto v. Friesen, and Magnus Olsen, vol. XVI, 87-102 (Copenhagen: J. H. Schultz Forlag, 1934), 93.

22. Interview with Dr. Helge Nordvik by David Taylor, December 13, 1983. MUNFLA accession number C6697.

CHAPTER 2, SECTION 2: Hardangerfjord Boatbuilders

According to Norwegian boat scholar Atle Thowsen, throughout the history of boatbuilding in the Hardanger region, boatbuilders have fallen into three basic categories: the self-sufficient farmer, the itinerant boatbuilder, and the resident boatbuilder.[1] Although I did not encounter any travelling boatbuilders during my time in the field (nor did I hear of any), there are many contemporary examples of builders who occupy the other two categories.

The self-sufficient farmer, to use Thowsen's term, is an independent farmer who, in addition to keeping a small herd of dairy cattle, growing grass for fodder, and, perhaps, tending a grove of fruit trees, also builds small boats. In other words, much in the same manner as non-professional, part-time boatbuilders of Trinity Bay, they are occupational pluralists who derive their annual incomes from two or more economic activities. Four of the builders interviewed for the present study fall into this category: Einar Kolltveit of Røyrvik,[2] Alf Linga of Linga, and Harald Røyrvik and his son Einar of Røyrvik. Einar Kolltveit, Alf Linga, and Harald Røyrvik all live on small farms that have been handed down to them in their families; all three live in small villages on the western shore of Hardangerfjord, not far from

Strandebarm. Einar Røyrvik lives on his father's farm and builds boats with his father and helps with the farm when he can spare the time from his regular job at Fjellstrand Aluminum Yachts in Omastrand. As part-time boatbuilders who also work small family farms, all four carry on a tradition that has been followed in the region for hundreds of years. While there are still, in addition to these four, many other farmer/boatbuilders in the region, their number is small compared to the proportion of males who followed this course in the past.[3] As Einar Kolltveit (b. 1911) recalled, when he was a youth, "there were more than one hundred boatbuilders in our little community [of Strandebarm]."[4] And he went on to explain that in the past: "Nearly everyone around the area built boats. The farms were small, and they needed the food they grew for themselves. Selling boats was a way of getting cash."[5]

Kolltveit, Linga, and the two Røyrviks all acquired boatbuilding knowledge from close male relatives. Alf Linga learned from his grandfather, Harald Røyrvik learned from his uncle,[6] and Einar Kolltveit and Einar Røyrvik learned from their fathers. For all of these men, boatbuilding was learned in an informal way. For example, Einar Kolltveit recalled that he was in his father's workshop from the time he could walk, and gradually acquired boatbuilding skills by observing his father and imitating his actions. His father watched him to see that the work was properly done and helped him get the shape of the hull "into his head."[7] By the time he was fourteen years of age, he had picked up enough experience to build a small boat by himself.

Plate 23: Interior of Harald Røyrvik's shop with 19' gavlbåt under construction

From that time on, except for a two-year stint with a boatbuilding company in Os, he worked in partnership with his father as a boatbuilder and a farmer.[8]

In addition to informal training, another characteristic shared by the farmer/boatbuilders interviewed is that they all build types of small boats common to the region. Some of the boat types they build have been built in the area for hundreds of years; other types are of relatively recent origin. Furthermore, all the boats they build, regardless of type, are built with the clinker construction method. One of the principal methodologies in the history of boatbuilding and a hallmark of Scandinavian boat and ship construction, clinker construction is distinguished from other methodologies in two key ways: (1) a shell of planks is formed first and timbers are then fit into it; and (2) the planks overlap, with the lower edge of each plank overlapping the upper edge of the next plank below. The clinker methodology, as well as aspects of hull form, represents an undeniable link between contemporary Hardanger craft and vessels of the Viking age.[9] This continuity is strikingly apparent when one compares a 1100 year-old small boat from the Viking Age Gokstad ship find with a contemporary Oselvar færing from western Norway and observes only minor differences in form and construction.[10]

Historically, the products of Norwegian folk culture have illustrated a large degree of regional diversity. Prominent examples of this are regional costume (bunad), vernacular architecture,[11] and boat types. In regard to boat types, little data exists to shed light on regional differentiation before the nineteenth century.[12] However, in terms of western Norway in general and the study area in particular, a fairly good record of regional boats from the late nineteenth and early twentieth centuries exists thanks to the pioneering efforts of Bernhard Færøyvik (1886-1950), who assiduously documented the forms of boat types, as well as the nomenclature (often regionally distinctive) associated with them.[13] Færøyvik found substantial evidence of regional differentiation in western Norway since every distinct community or district generally had its own characteristic sub-types within the types commonly found in the western part of the country. Thus, boats of the same basic type came to be identified by their region of origin because they reflected aspects of hull form, construction technique, or decoration common to their regions. For example, in an article on the boats of Hordaland _fylke_, Færøyvik identified the three primary families of local craft: (1) Oselv boats, (2) Strandebarm boats, and (3) Hardanger-Sunnhordland boats. The differences between the boats from these proximate regions were small. Oselv boats were characteristically lightly-built and had unusually wide planks. _Færingar_ and _seksæringar_ from Os seldom had more than three planks per side. In contrast, Strandebarm boats and Hardanger-Sunnhordland boats had planks that were somewhat narrower, and _færingar_ from these areas generally had five planks per side.[14] In regard to regional differences, it is generally the case that the further one travels from any given location the greater the differences between boats of the same type.[15]

Plate 24: New *faering* at Jondal *trebåtmessa*

In addition to being categorized according to place of origin, it was a common practice to classify boats according to the number of oars they carried. By this system, the smallest type was the færing, or four-oared boat. The next larger was the seksæring (six oars), followed by the åttring (eight oars), the tiæring (ten oars), and the tolværing (twelve oars). The færing was used for transportation close to shore and for fishing. The seksæring was regularly used for inshore fishing along the coast. And the larger åttring, tiæring, and tolværing were used for fishing as well as for the transportation of goods and livestock. This naming system based on number of oars was used all along the western coast of Norway.[16] Today, while the old system of classifying boats by the number of oars they carry is still well known, not all of these types are constructed regularly. Largely because outboard and inboard engines revolutionized vessel propulsion, most of the old types were gradually replaced by new hull forms which better accommodated engines. While the færing is still in demand (mainly as a recreational sailing and rowing boat), the other types, especially the åttring, tiæring, and tolværing, are very rarely built.

Boats have also been classified according to principal use. For example, a vessel might be a fiskebåt (fishing boat), a kirkebåt (church boat), or a postbåt (mail boat). However, these are not exclusive categories, and a boat might belong simultaneously to categories based on use, region, and number of oars. For example, a six-oared mail boat from Hordaland is a seksæring, a postbåt, and a Hordalandbåt.[17]

Plate 25: 100 year-old seksaering owned by Djupervåg family

At present, four basic boat types are regularly built by the farmer/boatbuilders interviewed: the færing, the speglbåt, the gavlbåt, and the snekke. The færing is a double-ended open boat, usually in the 14-18 foot range, that is generally propelled by oars or by sails. Some are equipped with small outboard motors that are mounted on brackets or in wells. Throughout most of its history, the færing has been a general-purpose working boat.[18] Its principal employment, however, has been as a fishing craft in the fjords as well as on the open sea. The speglbåt (also called speilbåt[19]) reflects the evolutionary development of the færing type in response to the outboard motor. Although the forward section of this 14-18 foot craft is very similar to that of the old-style double-ended færing, its stern is squared-off so that an outboard can be mounted upon it. Speglbåtar can also be rowed, but they do not slip through the water as easily as their antecedent, the færing. As a result of the popularity of small, light-weight boats that can be powered by outboard motors, the speglbåt is probably the most ubiquitous craft to be found in the study area today. This type of boat is used for general transportation and for inshore fishing.

The gavlbåt is an inboard-powered boat in the 22 to 33 foot size range that is used primary for commercial fishing. Sometimes gavlbåtar are open boats, and sometimes they are outfitted with aluminum pilot houses set forward of amidships. This boat type has two features that are particularly distinctive: an over-hanging transom stern, and a wooden roller for fishing nets that is mounted athwartships at the

Plate 26: 32 ft. <u>gavlbåt</u> built by Alf Sørnes

stern. Because the first part of the name of this type--gavl--means gable, as in the gable end of a house, one can easily conclude that this craft's squared-off transom stern (which resembles the gable-end of a house) was considered to be its most prominent feature when it first appeared along the coast.[20] The gavlbåt is used primarily for commercial fishing, although a few are used as spartan pleasure craft. The snekke or motor-snekke is a clinker-built, double-ended, inboard-powered boat used by families for recreational cruising in the fjords and other protected waters.[21] These craft are descendants of small sailing boats with half-decks. Snekker are the Norwegian equivalent of the North American cabin cruiser. Sometimes they are open boats with a small windshield forward of the cockpit; sometimes they are equipped with small pilot houses. Often snekker are fitted out with bunks, small galleys, and other fixtures that enhance the comfort of cruising. According to Christensen, the snekke is a typically Norwegian boat type that "combines the old and the new particularly well."[22]

Among the builders interviewed, Einar Kolltveit has built færingar almost exclusively, specifically vessels between 13 and 20 feet in length that reflect the basic designs emblematic of Strandebarm and Os.[23] Over the years, having built some 800 boats, he has earned a national reputation, especially as a builder of the Os-type færing known as the Oselvar.[24] In addition to færingar, however, he has also built a few snekker up to 24 feet in length. Alf Linga builds only færingar and speglbåtar; the latter since 1950. Alf has not kept an accurate count of the number of boats he has built, but estimates that

Plate 27: Motorsnekke

the total is somewhere between 500 and 1000. Harald and Einar Røyrvik build færingar, speglbåtar, snekker, and gavlbåtar, but the majority of their creations have been motor-powered snekker and gavlbåtar. Harald and Einar also do repair work from time to time. For example, in 1982 they repaired an old kirkebåt (church boat) from the community of Varaldsøy.[25] Harald has maintained a record of every boat he has built and claims that over 800 vessels have gone out of his shop since he started building boats in the spring of 1929. When Harald was starting out as a boatbuilder he built mostly færingar. He also built larger craft of the same general proportions called åttring (eight oars) and tiæring (ten oars) that were rigged for sail.[26]

The boatshops of all the farmer/boatbuilders interviewed are located on their farms. Alf Linga's shop is a room within his barn, Einar Kolltveit's shop is in the basement of his house, and Harald and Einar Røyrvik's shop is a low, single-story structure adjacent to the family dwelling.

As we have noted earlier, the marketing of boats built in the Hardanger region beyond their home territory has long been a feature of the local boatbuilding industry. Along with other goods, boats were placed aboard larger vessels and carried to market centers, such as Bergen and Stavanger, where they were sold. Harald Røyrvik (b. 1911) remarked that he remembered seeing ships from Hardanger sailing out of the fjord with rowing boats loaded on their decks.[27] Einar Kolltveit remembered that the local boatbuilders had ships that could carry as many as 70 or 80 small boats at a time southward, sometimes journeying as far as Oslo to sell the cargo. Arne Emil Christensen claims that because Hardanger boats were marketed over a fairly large area, their designs were copied by other builders and the Hardanger type gradually supplanted the vernacular craft of other localities.[28]

Hardanger boats were also marketed by buyers who came from the large cities and bought boats from the builders, took them back to other regions and sold to fishermen in coastal areas. According to Einar Kolltveit, this was a common practice before World War II. Kolltveit himself sold a large number of boats, Oselvar in particular, to L. H. Berge, an entrepreneur who had a shop in Bergen. Today, the farmer/boatbuilders interviewed sell their boats to middlemen who run boat stores, and also directly to customers who hear about their boats by word of mouth. For example, Alf Linga sells his boats to boat stores in Stavanger and Haugesund, and directly to customers from such communities as Eifjord, Kristiansand, Sogn, Sunnfjord, and Oslo. Einar Kolltveit sells his boats directly to his customers. In recent years, as a result of publicity generated by a boatbuilding exhibition he put on at the Norsk Sjøfartsmuseum in Oslo, all his boats have been sold to customers in eastern Norway. Harald and Einar Røyrvik sell to a middleman from Stavanger, and directly to customers who come from many parts of Norway. All of the builders rely heavily on word-of-mouth for advertizing, and, apart from the brochure distributed by the boatbuilders' association (Hardanger Trebåtbyggjarlag) to which they all belong, they do not issue sales brochures or purchase advertizing in any form. Because none of these men is totally dependent on

Plate 28: Pram

boatbuilding for their incomes, word-of-mouth advertizing is all that is needed to maintain a flow of customers that meets or exceeds the number of boats they are able to produce. All of these builders display their boats in an effort to drum up sales at the annual wooden boat festival (trebåtmessa) that is held in Jondal for a weekend during the month of June.[29]

The prices charged for boats are fairly consistent from builder to builder. For example, in 1983 Harald and Einar Røyrvik charged 6200 kroner for a 18 foot færing with four planks per side. Einar Kolltveit charged between 6000 and 7000 kroner for a similar craft, but could ask 16,000 kroner for an Oselvar of the same size because this type is highly prized and the demand is high. Alf Linga charged 7200 kroner for a 16 foot færing, and 7000 kroner for a 17 foot speglbåt.[30]

The other principal category of boatbuilder in the region is what Thowsen labels the "resident boatbuilder." Because I believe this term is rather ambiguous (the farmer/boatbuilders are resident, too), I will instead use "full-time builder." Full-time builders are professional boatbuilders who derive all or the bulk of their incomes from the activity of boatbuilding. Those interviewed for this study who fall into this category are Kristian Djupervåg of Tørvikbygd, Sverre Haugen of Herand, Sigvald Selsvik of Solesnes, and Alf Sørnes of Fosse. The manner in which they learned to build boats does not differ substantially from the way the farmer/boatbuilders discussed above learned. Djupervåg, for example, learned boatbuilding from his father, beginning when he was eleven or twelve years old, by helping out after he got home from school in the afternoon. When he was older, he served a two-year apprenticeship at a boatshop in Os where he mainly worked on motor boats. Sverre Haugen has also been building boats since childhood and learned from his father and from his grandfather.[21] Sverre took a half-year course in a carpenter's shop in order to learn how to use woodworking machinery, but has received no other formal training that might be applied to boatbuilding. Sigvald Selsvik also learned boatbuilding from his father. He recalls that he began building boats with his father when he was fourteen or fifteen years of age around the time of his confirmation, a rite of passage that announced that a young person was grown up and ready to work as an adult. He acquired additional training by serving as an apprentice to a carpenter, and as an apprentice in a boatshop in Son, near Oslofjord. Alf Sørnes also learned from his father, a boatbuilder in Fosse since 1935.

While their training is virtually identical to that of the farmer/boatbuilders, the full-time builders differ from farmer/boatbuilders in a number of important ways. First, collectively they build a much wider range of boat types, including the older boat types of the region as well as newer types, some of which came from other regions. The boat types built by the full-time builders interviewed include: færingar, prammar, speglbåtar, gavlbatår, kryssar, sjarkar, and sailboats designed by Colin Archer and L. F. Herreshoff. Some of the builders construct a wide range of types in order to appeal to as many customers as possible. Such is the case with Alf Sørnes who advertises that he builds "alle typar opp til 24 ft." ("all types up to 24 ft."). Specifically, his products include prammar, færingar, speglbåtar, and gavlbåtar. Sigvald Selsvik also produces a wide range of craft, including rowing boats and snekker up to 22 feet in length, and recreational and commercial fishing boats in the 26-33 foot range. Similarly, Sverre Haugen builds recreational and commercial fishing craft--gavlbåtar, kryssarar, sjarkar--up to 40 feet in length. In contrast to these three builders, Kristian Djupervåg specializes in the construction of sailing craft from the late nineteenth and early twentieth centuries, and is the only builder in the region (and one of the few in Norway) to do so.

Before venturing further into the discussion of full-time builders, it is helpful to pause for descriptions of the boat types they build that have not previously been discussed. The pramm (pram) is a small, clinker-built open rowing boat with a flat bow that is semicircular in cross-section. Usually under ten feet in length, they are used close to shore in protected waters and usually function as dinghies for larger fishing and pleasure craft. The kryssar is a decked, carvel-planked, double-ended boat, 25-40 feet in length, that is powered by an inboard engine. Kryssarar are principally used for commercial fishing along the Norwegian coast, but examples of the design are also used for recreational cruising. The sjark is another vessel used primarily for commercial fishing. It is a decked, carvel-planked craft powered by an inboard engine and is in the 30-40 foot size range. Two features of the sjark's hull form make it especially

Plate 29: 30 ft. kryssar under construction by Sverre Haugen

distinctive: a nearly vertical bow stem, and an over-hanging transom stern. Like the _gavlbåt_ and the _snekke_, the contemporary _kryssar_ and _sjark_ are descendants of vessels that were developed in the early twentieth century in response to the arrival of the inboard, marine engine. Kristian Djupervåg stands alone in building recreational sailing craft of the late nineteenth and early twentieth centuries. In particular, he specializes in vessels designed by Colin Archer (1832-1921) a prolific, highly innovative, and influential boat designer and builder who was born in Larvik, Norway. Djupervåg has achieved a nation-wide reputation as a builder of double-ended, carvel-planked, 30-45 foot sailing craft originally designed by Archer to serve as fishing vessels, pilot boats, and rescue craft (_redningskøyte_).[32] In addition, his reputation as a builder is such that he was hired by the Norsk Sjøfartsmuseum to restore _Gjøa_, the vessel used by Roald Amundsen to explore the Northwest Passage in the years 1903-1906.[33] Although he is a relatively young man (born 1944), his skills are held in very high regard and his peers consider him to be the most accomplished builder in the Hardanger region.

The types of craft these full-time builders construct are indicative of the two basic strategies they use to capture a share of the market. One strategy is to offer as wide a variety of products as possible in order to attract a large number of clients with varying requirements. This strategy has been adopted by Alf Sørnes and Sigvald Selsvik. The other strategy is to specialize in a limited number of types and attempt to capture a large share of a limited client base.

This is clearly the case with Sverre Haugen, who caters almost exclusively to commercial fishermen, and also with Kristian Djupervåg, whose customers are mostly recreational sailors with the financial resources to afford large, custom-built wooden yachts. However, the range of boats a full-time builder elects to build is not always solely the result of a calculated decision about marketing. For example, Sigvald Selsvik enjoys the challenge of building new designs and takes pride in the fact that he can successfully respond to requests for craft of all kinds. For him, building a limited number of boats over and over again would be extremely tedious even if this was a more lucrative way of running his business. And one reason that Sverre Haugen chooses to service a narrow segment of the market, apart from whatever financial success accrues from this approach, is that he derives satisfaction from the fact that he is carrying on the family tradition of boatbuilding--a tradition that has always been based on the construction of boats for commercial fishermen. For Haugen, additional satisfaction is derived from his sustained attempt to gradually improve the limited number of boat designs that have been handed down to him.

While all four of the full-time builders advertise their work through the sales literature distributed by the Hardanger Trebåtbyggjarlag, like the farmer/boatbuilders they rely mainly on word-of-mouth for attracting customers. As Sigvald Selsvik put it succinctly, "Someone sees the boat I built, asks for my address, then the next customer comes."[34] Selsvik's customers are mostly from the

Bergen area, the Stavanger area, and southern Norway (Sørlandet). Sverre Haugen sells most of his boats to fishermen along the western coast of Norway, mainly in the kommune of Bømlo which is part of Hordaland fylke.[35] The customers for Alf Sørnes's varied line of boats come mainly from western Norway, and Kristian Djupervåg's clients come from eastern and western Norway and from other northern European countries.

Not surprisingly, full-time builders differ substantially from the farmer/builders in regard to the complexity of their operations and the level of investment in equipment and facilities. Largely as a result of the fact that they tend to build larger craft than farmer/builders, the full-timers periodically hire other builders to work with them on projects. For example, while Kristian Djupervåg's father and brother work with him year-round, he has employed up to seven additional boatbuilders for the duration of certain projects. Sverre Haugen and Sigvald Selsvik frequently hire an extra person to work with them on a temporary basis. In the area of investment in equipment and facilities, all the full-time builders have more equipment and larger shops than the farmer/boatbuilders. Djupervåg, Haugen, Selsvik, and Sørnes all have large boatshops, conveniently located at the water's edge, that are used exclusively for boatbuilding.

While in the Trinity Bay region of Newfoundland I found a good deal of difference in the degree to which part-time builders and full-time builders used boatbuilding to define occupational identity, I found no appreciable difference around Hardangerfjord. Hardanger builders all recognize that they belong to one of the two basic categories discussed above, but everyone, regardless of categorization, asserts pride in his identity as a boatbuilder with a similar degree of conviction. They all have a deep appreciation for and understanding of Norwegian folk culture and traditions. Furthermore, unlike the overwhelming majority of Newfoundland informants, all the Hardanger builders contacted displayed a keen awareness of their personal involvement in a process of cultural expression that has been integral to the history and culture of their homeland for hundreds of years.[36]

To summarize then, within the Hardanger region there are two parallel branches within the ongoing tradition of boatbuilding. One branch is represented by occupational pluralists (farmer/boatbuilders) who engage in boatbuilding as part of the annual cycle of subsistence activities on small family farms. In almost every way, they have carried on in the manner of their fathers before them. Of particular significance is the fact that they continue to build the same types of small, clinker-built boats that were built in their families and communities in the past. And, with the exception of changes made to hull forms as a result of the introduction of the inboard and outboard motors, the boats they produce and the manner in which they construct them are links to a tradition that has been carried on for approximately 50 generations. Although attitudes toward change vary from individual to individual, farmer/boatbuilders, who derive prestige and economic success largely through the replication of designs that are valued because they represent the past, tend be to quite conservative. Indeed, a builder such as Einar Kolltveit, who is widely regarded as something of a living national treasure because of his skill in building the Oselvar, sees no value whatsoever in changing a revered boat form that, in his eyes, has achieved perfection.

The other branch of the ongoing tradition is represented by full-time builders who, as a group, build older-style, clinker-planked vessels and newer-style, carvel-planked vessels. They have more invested in equipment and facilities than farmer/boatbuilders, and also differ in that they hire other builders to work with them on a temporary basis. In general, full-time builders tend to be more progressive about design and construction practices than farmer/boatbuilders and are, therefore, more accepting of change. This attitude stems not from any disrespect for the old ways and the old boat types, but from the recognition that they must be open-minded about design change if they are to be responsive to the changing needs of their customers. However, to say that all full-time builders accept change with the same degree of equanimity would be inaccurate. I would not, for example, make the claim that full-time builder Kristian Djupervåg, who bases his reputation on reproductions of sailing craft of the late nineteenth and early twentieth centuries, is any more progressive than farmer/boatbuilder Einar Kolltveit.

One thing that all the builders interviewed have in common is membership in the Hardanger Trebåtbyggjarlag, the association of wooden boatbuilders of the Hardanger region.[37] Founded in 1980, this collective seeks to conserve the local boatbuilding tradition. The members of the association have endeavored to advance this goal in a number of ways, including setting standard prices for boats of the same type and size, raising public awareness of wooden boats through advertizing and other means, and trying to improve the market for their boats in Norway and beyond. According to Kristian Djuervåg, who is the leader of the association in fact if not in title, members of the association "work to get the Norwegian wooden boat known all over the world."[38] The association makes use of brochures, articles in newspapers and magazines, and photo-exhibits to spread the word about members' products. The association's handsome color brochure skillfully promotes Hardanger boats by presenting a brief history of boatbuilding in the area, explaining the basic differences between clinker-built and carvel-built boats, and providing a list of the twenty-two members of the association along with their names, addresses, telephone numbers, and descriptions of the types of boats they build.[39] (The list of the association's members is included in the present study as Appendix F.) Another strategy that the association uses to promote Hardanger boats is the sponsorship of an annual wooden boat festival known as the trebåtmessa.[40] Held in the community of Jondal over one weekend during the month of June, this event enables local boatbuilders to display their wares before hundreds of prospective customers in the attractive setting of Jondal harbor. But the trebåtmessa is much more than a boat show, it is a weekend-long celebration of the traditional Norwegian wooden boat. For example, the 1983 trebåtmessa included rowing boat races, lectures on maritime culture, an open house at the Jondal boatbuilding school, and even a raffle of a rowing boat by the local Lions Club. In addition to scheduled activities such as these, a great deal of socializing occurs amongst the dozens of wooden boat owners and their families and friends who have journeyed to Jondal in their boats.

Notes

1. Atle Thowsen, "En Studie i Vestnorsk Trebåt- og Treskipsbygging," Sjøfartshistorisk Å[illegible]k 1966 (Bergen: Bergens Sjøfartsmuseum, 1966), 70-1.

2. Einar Kolltveit's son Olav V. Kolltveit also builds boats but was not interviewed for this study. He learned boatbuilding from his father and, after earning a university degree in engineering, returned to the family farm to work at farming and boatbuilding.

3. Other contemporary builders from the Strandebarm area who fit into this general category are described by Scott Danielson in his brief article, "The Wake in the Fjord," Woodenboat 28 (May/June 1979), 43. The builders he mentions, in addition to those interviewed for the present study, are: Thorbjørn Fosse of Fosse, Sigurd Oma of Oma, and Ole Drange of Drange.

4. Interview with Einar Kolltveit on June 16, 1983, by Erling Flem and David Taylor. MUNFLA accession number C6684. Translation by Erling Flem.

5. Interview with Einar Kolltveit by Erling Flem and David Taylor, June 16, 1983. MUNFLA accession number C6683.

6. Harald's father was also a boatbuilder, but he died when Einar was seven years old. Einar's grandfather was a boatbuilder, too.

7. Interview with Einar Kolltveit by Erling Flem and David Taylor, June 16, 1983. MUNFLA C6683. Translation by Erling Flem.

8. It should be noted that when Einar was eighteen years old, he moved to Os where he worked for two years as an apprentice to the boatbuilding company of Askvik and Sons. There, he learned how to build the færing sub-type known as the Oselvar. He moved back to Strandebarm at the end of the two years.

9. This continuity is extremely well documented. See, for example: Arne Emil Christensen, Jr., Boats of the North: A History of Boatbuilding in Norway (Oslo: Det Norske Samlaget, 1966), 11, 21-41; Arne Emil Christensen, Jr., "Viking Age Ships and Shipbuilding," Norwegian Archaeological Review, 15, nos. 1-2 (1982), 19-28; Anton W. Brøgger and Haakon Shetelig, The Viking Ships: Their Ancestry and Evolution 1951 rpt. (London: C. Hurst, 1971); Haakon Shetelig, "Oldtidens Fartøier," Nordisk Kultur, (København: J.H. Schultz Forlag, 1934), XVI, pt. A, 87-102; Nationalmuseet, Nordlandsbåden: analyseret og provesejlet af Vikingskibshallens Bådelaug. Working Papers of the National Museum of Denmark, 12 (Copenhagen: Nationalmuseets, 1980);

Ole Crumlin-Pedersen, "The Ships of the Vikings," in The Vikings: Proceedings of the Symposium of the Faculty of Arts of Uppsala University, June 6-9, 1977, edited by Thorstein Andersson and Karl Inge Sandred (Uppsala: Almquist and Wiksell, 1978), 32-41; Basil Greenhill, Archaeology of the Boat: A New Introductory Study (Middletown, Conn.: Wesleyan University Press, 1976), 60-88, 174-188, 202-233; and Douglas Phillips-Birt, The Building of Boats (New York: W. W. Norton, 1979), 81-117.

10. For a photographic comparison of these two vessels, see: Arne Emil Christensen, Jr., "Viking Age Ships and Shipbuilding," Norwegian Archaeological Review 15, nos. 1-2 (1982), 21. The Gokstad ship, excavated in 1880 in the Oslofjord area of eastern Norway, is one of the most magnificent examples of Viking Age shipbuilding. The restored vessel, along with two small boats and other accompanying artifacts, is now housed at the Vikingskipshuset (Viking Ship Museum) in Bygdøy, near Oslo. The first comprehensive report on the Gokstad excavation was: Nicolay Nicolaysen, Langskipet frå Gokstad ved Sandefjord (Kristiania: A. Cammermeyer, 1882).

11. For an early description of the variety of farm buildings in western Norway, see: Samuel Laing, Journal of a Residence in Norway During the Years 1834, 1835 and 1836 (London: Longman, Orme, Brown, Green and Longmans, 1836). According to Mead, in all of Scandinavia, the "diversity and function in farm buildings reaches its fullest expression in western Norway . . . All of these various buildings are constructed from local materials in traditional architectural styles and are decorated with regionally distinct motifs." See: W. R. Mead, An Historical Geography of Scandinavia (London: Academic Press, 1981), 187.

12. Christensen, Boats of the North, 74.

13. Færøyvik is a remarkable example of a dedicated amateur scholar whose tireless efforts established a tremendous legacy for future generations. Born into a fishing/farming family in Solund, western Norway, he became a school teacher and settled in Bergen. In the 1920s, viewing the advent of the new types of engine-powered vessels as the death knell for the older boat types, he was inspired to document the older boat types before they vanished. Much in the manner of a modern folklorist or ethnologist, fieldwork formed the cornerstone of his research. As Christensen has observed, "Bernard Færøyvik was of the firm opinion that the only way in which it would be possible to reconstruct the origin and evolution of Norwegian boats, and to understand the part played by local conditions in this process, was to document the local craft in use along coastal and inland waterways." (Inshore Craft of North, p. 8) He wrote at least 24 scholarly articles, and over 50 newspaper articles on Norwegian boats and ships. Examples of his meticulous lines plans, sketches, photographs, and fieldnotes form the basis of Inshore Craft of North, and his son

Øystein's book Vestslandsbåtar. Bernhard Færøyvik's voluminous fieldnotes and other unpublished materials are on deposit at the Bergens Sjøfartsmuseum in Bergen. Biographical information about Færøyvik can be found in Christensen, Inshore Craft of Norway, 7-9; and Øystein Færøyvik, Vestlandsbåtar, 8-9.

14. Bernhard Færøyvik, "Båt- og Skipsbyggjekunst i Hordaland," In Hordaland Landsbrukmuseums Årbok 1950 (Bergen: Hordaland Landsbrukmuseum, 1950). These findings are also discussed in Arne Emil Christensen, Jr., Norkse Båter: Et Oversyn de Förindustrielle Båttyper (Oslo: Universitetet i Oslo, Institutt for Folkelivsgransking, [1962]), 25-6.

In 1983, when Erling Flem and I questioned boatbuilders Harald and Einar Røyrvik about the difference between færingar from Os and færingar from their home area of Strandebarm, they remarked that a three-plank (trebording) færing from Strandebarm and a three-plank færing from Os are nearly identical, but færingar from Os can be distinguished from those of Strandebarm because they have decorative stripes (staff) on the planks.

15. In comparing the nineteenth and early twentieth century boat types from the whole of Norway, boat scholars have frequently placed them in three regional groups: boats of eastern Norway, boats of western Norway, and boats of northern Norway. The differences in form and construction that are characteristic of these regions are well articulated in Christensen, Inshore Craft of Norway and are presented with outstanding clarity in Asbjørn Klepp's Nordlandsbåtar og Båtar frå Trøndelag (Oslo: Grøndahl & Søn Forlag A.S, 1983), and Øystein Færøyvik's Vestlandsbåtar: frå Oselvar til Sunnmorsåttring (Oslo: Grøndahl & Søn Forlag A.S., 1987).

16. Christensen, Boats of the North, 77.

17. Bernhard Færøyvik's drawings of such a craft are on page 32 of Christensen's Inshore Craft of Norway.

18. Some of the many uses of the færing include employment as lifeboats and seine boats on larger craft, as lighters, and as mail carriers.

19. In Norwegian, speil literally means "mirror." The name of this boat type has this prefix because its stern resembles a hand mirror. In North American, this feature is often described as a "wine glass" stern.

20. In basic form, the gavlbåt appears to be related to a sail- and oar-powered type known as the notbåt (seine boat). For examples of notbåtar, see: Christensen, Inshore Craft of Norway, 74; and Færøyvik, Vestlandsbåtar, 122, 124-5, 131.

21. The evolution of the snekke is discussed in Gøthesen, Skagerakkysten, 28-33, 35-37.

22. Christensen, Boats of the North, 93.

23. The majority of his boats have been 15, 16, or 17 feet in length. He has built only one as large as 20 feet.

24. As confirmation of his outstanding reputation, Einar has demonstrated the construction of the Oselvar at the Norsk Sjøfartsmuseum in Oslo, and has been the subject of at least one article in a popular magazine. The magazine article is Bjørn Skauge, "Bygging av Oselver: Blant de Fineste Båttradisjoner Vi Har," Kysten no. 2 (1980), 11-14.

25. Vessels of this type were used to carry large numbers of people to church. For examples of church boats from Hardanger, see: Christensen, Inshore Craft of Norway, 28-9; Øystein Færøyvik, Vestlandsbåtar: Frå Oselvar til Sunnmorsåttring (Oslo: Grøndahl & Søn Forlag A.S, 1987), 80; and Thowsen, "En Studie i Vestnorsk Trebåt- og Treskipsbygging," 49, 55-6. Photographs of church boats from Hardanger as well as other regions of Norway are included in Molaug's Vår Gamle Kystkultur, II, 108-9, 126. To date, the most detailed study of the church boat is Albert Eskeröd's book Kyrkbåtar och Kyrkbåtsfärder (Stockholm: LTs Förlag, 1973), which discusses the use of this vessel type in Sweden.

26. According to Christensen, this system of classification was also the norm in northern Norway. In eastern Norway, however, boats were classified only by general size and fell into three categories: small boats, medium-size boats, and large boats. See Christensen, Boats of the North, 77.

27. Interview with Harald and Einar Røyrvik by Erling Flem and David Taylor, June 18, 1983. MUNFLA accession number C6694.

28. Christensen, Boats of the North, 78.

29. The Trebåtmessa, sponsored by the Hardanger Trebåtbyggjarlag, was first held in Jondal in 1980

30. It should be noted that a hefty sales tax of 20% is added to these prices.

31. Sverre's grandfather opened a boatshop in Herand in 1891.

32. The most prominent Norwegian naval architect of his day, Colin Archer is probably best known as the designer and builder of Fram, the vessel used by Norwegian polar explorers Fridtjof Nansen and Roald Amundsen. Following a careful study of Norwegian fishing craft, he advocated a shift away from the old boat types based on Viking Age designs to newer, heavier, and more seaworthy designs. His robust and seaworthy double-ended sailing vessels in the 30-45 foot range continue

to be built in Europe and North American and are held in high esteem by recreational sailors. For more detailed information about Archer and his role in the development of Norwegian vessel design, see: John Leather, Colin Archer and the Seaworthy Double-Ender (Camden, Me.: International Marine Publishing Co., 1979); Tor Borch Sannes, Colin Archer: Skipene (Oslo: Bokhandlerforlaget A/S, 1978); Tor Borch Sannes, Colin Archer: Skøytene og Lystbåtene (Oslo: Norsk Maritimt Forlag A/S, 1979); and Gøthe Gøthesen, Skagerakkysten, Norske Båter Bind I (Oslo: Grøndahl & Søn Forlag A.S, 1979), 96-117.

33. Gjøa was built in Rosendal, Hardangerfjord.

34. Interview with Sigvald Selsvik by Erling Flem and David Taylor, June 17, 1983. MUNFLA accession number C6690. Translated by Erling Flem.

35. Bømlo is a large island, surrounded by scores of small islands, in the southwest of Hordaland. According to fishing vessel registration statistics for 1982, Bømlo kommune has the third-highest number of registered vessels (223) in Hordaland. See Fiskeridirektøren, Register over Merkepliktige Norske Fiskefarkoster 1982 (Bergen: I Kommisjon Hos A/S Lunde & Co. Forlag, 1982), 365-9.

36. One indication of this level of understanding was that none of my Norwegian informants expressed the slightest bit of surprise or bewilderment that I had traveled from North America to learn about their boatbuilding activities. In contrast, many of my Trinity Bay informants were amazed that I had driven all the way from St. John's just to talk with them about something as quotidian as building boats. Ascertaining why there is a conspicuous difference between the degree to which Trinity Bay and Hardangerfjord builders perceive themselves to be involved in an ongoing cultural process requires an extended discussion of social history that is beyond the scope of the present study. However, it would appear that one of the primary reasons is that maritime culture (of which boatbuilding and boat use are obviously key elements) has always been of overwhelming importance throughout Norway, while in Canada maritime culture, though important, has never enjoyed as lofty a status in the national identity. Furthermore, Newfoundland has often been viewed (often negatively) as a place with a culture at some remove from the Canadian cultural mainstream.

37. The Hardanger Trebåtbyggjarlag has analogues in the now defunct Strandebarm Trebåtbyggjarlag, which was founded in 1930 (see: Thowsen, "En Studie i Vestnorsk Trebåt- og Treskipsbygging," 66), and in the Os Båtbyggjarlag, founded in 1914 and still in operation.

38. Interview with Kristian Djupervåg, June 16, 1983. MUNFLA C6687.

39. This brochure is titled Vinnaren (The Winners), and is distributed by the Hardanger Trebåtbyggjarlag, 5620 Tørvikbygd, Norway.

40. The first trebåtmessa was held in Jondal in 1980.

CHAPTER 2, SECTION 3: Major Changes Affecting Hardanger Boatbuilding Since 1850

As in the context of Trinity Bay, in order to better understand boatbuilding in the Hardanger region today it is necessary to look back in time and consider the major changes that have affected the industry. In Hardanger, a period of significant change appears to have begun around the middle of the nineteenth century. The most important changes have been the advocacy of newer, more seaworthy hull f individual reformers, trade groups, and agencies of the state government; the teaching of the carvel construction technique by state-appointed travelling instructors; the introduction of inboard and outboard motors; the introduction of new materials for boatbuilding, especially fiberglass; the revival of interest in the older boat types; and the establishment of a school for wooden boatbuilding in Jondal.

Design Change

As will be discussed in detail in the following two sections, throughout nearly the entire history of boatbuilding in western Norway, vessels have been built exclusively with the clinker construction method, an approach that involves the formation of a shell of overlapping planks into which timbers are inserted for added support. Another longstanding characteristic of Hardanger boatbuilding has been the high degree of regionalization in boat form that has existed. Clinker-built, place-specific boat types and sub-types remained in use with relatively little modification until the middle of the nineteenth century. According to Christensen, around 1850 "a gradual change set in, and the old types were slowly superseded by new ones."[1] This era of change in boats was, in all likelihood, one consequence of major societal changes that were occurring between 1850 and 1900. As Mead states, during this period:

> Along the maritime margins there is local and regional evidence to show that the age-old integration between fishing and farming is changing. Many farmers whose ancestors manipulated sail and rudder in seasonal harmony with plough and scythe withdraw from the sea. . . . The social homogeneity of 1850 is disrupted, as it is locally disrupted in the agricultural field by the replacement of labor intensive operations by capital intensive operations. In the process, a professional class of fishermen appears. They are the trawler men who operate decked cutters, and whose bigger boats (very occasionally employing steam engines) take to the offshore banks to deep sea fishing and to Icelandic waters.[2]

While the impetus for change in fishing vessel design and construction was supplied by a move to professionalize the fishing industry, the specific agents of change were individual boat designer/builders, trade or governmental bodies dedicated to the general improvement of the commercial fishery, and the importation of fishing vessels from England. A prime example of the former is boatbuilder Gjert Gundersen, a native of Jondal (Hardanger) who moved to the Lista peninsula on the south coast during the early part of the nineteenth century. There he produced a design for a fishing boat that combined the best features of the heavy and sturdily-built pilot boats of eastern Norway with those of the flexible, light-weight craft of western Norway. The design that Gundersen developed was copied by other boatbuilders in the area, and slowly the new type, that came to be known as the Listabåt or Listerbåt, gained acceptance. These boats were especially popular with west coast herring fishermen who found these sprit- or gaff-rigged vessels more able sailing craft than the square-rigged vessels of western and northern Norway, and better pulling (rowing) boats than the eastern types. The Listabåt was such a successful design that, particularly after 1860, builders from all along the west coast of Norway began to copy it in order to meet the demands of fishermen. Boatbuilders from the Hardanger region appear to have been strongly affected by the Listabåt since their boats were among the first to reflect aspects of this new design. A photograph taken of a Hardanger boat in 1911 that appears in Øystein Færøyvik's book Vestlandsbåtar clearly shows the influence of the Listabåt.[3] In short, the acceptance of the Listabåt was a pivotal event in that it signalled a clear shift away from the old construction methods and sail rigs. To a large extent, at least for fishermen of the west coast, this vessel led to a redefinition of the fishing boat.[4]

During the second half of the nineteenth century, concerted efforts were made to improve Norwegian fishing craft by individual reformers and various formal bodies. In 1863, C. F. Diriks, the superintendent of lighthouses, wrote an article published in Folkevennen in which he analyzed existing fishing boat types and proposed improvements.[5] In the following year, fishing boats were displayed in Ålesund in conjunction with a fisheries exhibition. In 1865, an international fisheries exhibition was held in Bergen, and one component of the event was a regatta involving thirty decked and open boats. In 1868, a fishing boat regatta involving nearly 300 vessels was held in Stavanger in order to test the various regional boat types against each on the basis of efficiency and safety. Other regattas were held in Arendal in 1886, Harstad in 1891, Tromsø in 1894, and Bergen in 1898.[6]

In 1895, another formal attempt was made to improve Norwegian fishing vessels when the Bergen-based Selskabet til Norske Fiskeriers Fremme (Society for the Advancement of Norwegian Fisheries) commissioned the distinguished Norwegian naval architect and boatbuilder Colin Archer to design and build a sail-powered fishing boat especially suited for the fisheries of Nordland and Finnmark. Following a survey of the vessels of the region and discussions with local fishermen, Archer concluded that he could develop a safer and more seaworthy vessel than the characteristically shallow, open (undecked) boats that had been used in these regions of northern Norway for generations. The design he created was for a 44' x 13'-11" ketch-rigged vessel with heavy inside and outside ballast, and pronounced flare at the ends. In major departures from the old local designs, Archer specified that this craft would be carvel-planked rather than clinker-planked, and decked rather than open. Although fishermen were initially reluctant to abandon the old designs for Archer's radical new design, they eventually came to appreciate the merits of the vessel. It was an excellent sailing vessel that was stronger, safer, and more seaworthy than craft previously used in the rough waters off the northern coast and, because these qualities allowed fishermen to spend more time fishing, it was a more profitable craft as well.[7] Due in large measure to fishermen's reluctance to abandon the vernacular craft of their regions, the improved fishing boat designs advocated by such bodies as <u>Selskabet til Norske Fiskeriers Fremme</u> were slow to gain acceptance. However, resistance to the new designs was gradually overcome and fishermen began to shift away from clinker-built, flexible, open craft to sturdier, more seaworthy decked, carvel-planked vessels.

During the latter part of the nineteenth century and the early years of the twentieth, a significant number of English sail-powered fishing smacks were sold to Norwegian interests when English fishermen adopted large steam-powered trawlers. Perhaps because they were better suited to conversion to engines than the narrow, lightly-constructed indigenous craft, the design and construction of the English smacks began to be copied by Norwegian boatbuilders.[8] The English smacks were characteristically carvel-built decked vessels with straight stems, long after decks, and two masts, and fishing smacks built in western and northern Norway began to take on these features. Thus, contemporary fishing smacks of western and northern Norway that are commonly regarded as typical of these regions are actually derivatives of a turn-of-the-century English boat type.[9]

Carvel Planking (Skeleton Construction Technique)

Along with the recognition that stronger, more seaworthy vessels were needed for the fisheries off the coasts of western and northern Norway, came the realization that use of the carvel construction technique (skeleton construction--frames first, then planks fastened to them) would assist boatbuilders to achieve these goals more successfully than they could through the use of the old clinker construction technique (shell construction--planks first, then frames). Consequently, around 1900, the Norwegian government initiated a program for teaching boatbuilders how to build with the carvel technique. This teaching was carried out by a "state travelling teacher of carvel work" (vandrelærarar kravellbygging).[10] The instructions the travelling teacher imparted to boatbuilders, along with the importation of large numbers of carvel-built English sailing smacks, and, later, the acceptance of motors, led to the widespread acceptance of the carvel technique. As a result, throughout Norway today, many builders are adept in both the clinker and carvel techniques.[11]

Inboard and Outboard Motors

The inboard engine was introduced during the early years of the twentieth century. Colin Archer, for example, drew designs for motor-powered fishing vessels as early as 1901.[12] During this period decked fishing smacks were being built and many were outfitted with motors.[13] These smacks were replacing the square-rigged, open boats that carried fish to Bergen.[14]

The introduction of inboard engines had a number of ramifications, many of which are identical to those that took place in Newfoundland. As noted in an earlier section of this work, engines allowed greater speed, range, and carrying capacity, and permitted boats to travel in conditions that would seriously inhibit travel for boats propelled only by oars and sails. The introduction of engines also resulted in increased vessel cost, including expenditures for the purchase of engines, allied gear, and fuel, and for maintenance and repair. In regard to vessel construction, engines required heavier scantlings so that boats could accommodate propeller shafts, and to bear the weight and vibration of engines. Heavier construction was also required in order to permit vessels to endure the pounding that resulted from the increased speeds that engines could provide. In terms of overall vessel design, boats tended to become larger since greater loads could be carried. In short, the boatbuilders active at the time when engines were being introduced were bombarded with a totally new set of problems.

The new designs that emerged as a result of the advent of engines gradually replaced the largest of the inshore fishing boat types, in general, the vessels over 20 feet in length known in western Norway as seksæring, åttring, tiæring, and tolværing. Names for the new designs were generic, as in motor-fiskebåt (motor-fishing boat), and specific on the basis of hull form (e.g., gavlbåt, sjark, snekke, kryssar). Regional differences also surfaced and these persist to the present.

Between 1915 and 1920, outboard motors were introduced to Norway. However, because of their extreme weight and notorious unreliability, they were rejected by commercial fishermen. By the 1950s, however, outboards had been greatly improved and were lighter and much more reliable than their predecessors. As a result of these improvements, small boat fishermen began to seriously consider them as a practical alternative to propulsion by oars and sails. The manufacturer closest to the Hardanger region was Kjapp Motorfabrikk, located in Bergen. This firm initiated production of a 3 horsepower outboard motor in 1950. Following the lifting of import restrictions in 1957, outboards manufactured in other countries began to be sold in Norway, and by the end of the 1960s they were widely used throughout western and northern Norway.[15]

As was the case with larger vessels outfitted with inboard engines, the adoption of outboard engines for small boats--16-18 ft. færingar, in particular—brought a number of advantages, including: freedom from dependence on the wind for sail-power and human energy for oar-power, increased speed, and the ability to travel over a greater area. Outboard motors also permitted a reduction in crew size which, in turn, resulted in more cargo capacity for fish and gear and higher profits for the skipper.

The adoption of the outboard motor also presented a central problem to the fishermen who wished to use them on their boats: What was the most satisfactory way to modify the old types of sail- and oar-powered boat types, the overwhelming majority of which were double-ended, so that they could successfully carry outboards? Fishermen and boatbuilders tackled the problem and, by trial-and-error, arrived at a number of solutions. As Djupedal has written in his analysis of Nordfjord fishermen's approaches to the modification of færingar, four basic methods of adapting small boats for outboard motors were tried: (1) mount the outboard on the sheer strake in the vicinity of the starboard quarter; (2) attach brackets to the sternpost and mount the engine on the bracket; (3) slice off a portion of the pointed stern and insert a small transom and mount the engine on the transom; (4) cut a square or rectangular hole in the bottom of the after section of the hull, build a well around the hole, and mount the engine in the well.[16] However, none of these approaches was without problems. One fundamental drawback with the first three solutions is that the weight of a stern-mounted outboard significantly disrupts the balance of the light and relatively narrow færing. As a consequence, boats become stern-heavy and the forward section of the hull tends to lift out of the water when the boat is in motion, a dangerously unstable attitude, especially in rough water and high winds. Another drawback, especially prominent with the third approach (i.e., cutting off a portion of the stern), is that in the eyes of most fishermen, modifications ruin the aesthetic appeal of a færing. As Knut Djupedal said of his Nordfjord informants:

> No one, not even those who have done it, likes to cut the stern off a double-ended færing and replace it with a transom. It "destroys" the boat, they say. The sweep of the sheer from stem to stern, the graceful curves of the stems and strakes are broken, and the vessel's appearance seems shabby and bastardized. A centuries-old tradition of design and construction, and use, which has taught generation after generation what a "proper" boat should look like, is violated . . . .[17]

Einar Kolltveit, an informant for the present study, echoed these sentiments. When asked if he had ever built færingar with cut-off sterns, he said "Yes, I have done that, but they were so ugly that I stopped building them. . . . It should never be cut off in the stern."[18] Similarly, when a prospective customer asked Alf Linga to build him a færing with a cut-off stern, he refused and tried to convince the man to buy a square-stern speglbåt instead. As Linga explained, he was not willing to build such an ugly-looking boat.[19]

Although the fourth approach (mounting an outboard in a well) does

Plate 30: <u>Speglbåt</u> with outboard motor

less damage to the aesthetic dimension of the færing, it too is problematic because it is technically the most difficult modification to accomplish.

One other approach has been taken in an effort to adapt small boats to the outboard motor. This approach is not a modification of a small element of an existing færing, but, instead, a reconfiguration of the færing design. Known in the Hardanger region as the speilbåt or speglbåt, this design features a forward section (roughly, from amidships forward to the stem) almost identical to the old færing design, but with a wider, wine-glass stern. This new design is better suited to the outboard motor mainly because its wider stern resists being pressed down by the weight of the motor, thereby counteracting the tendency for the bow to lift when the boat is in motion.[20] As Harald Røyrvik explained, during the early 1950s, he and other boatbuilders recognized that the double-ended færing was not able to adequately support the weight of an outboard and, as a result

> We started making boats with speil--square stern. First, we just cut off the top of the stern and fastened a wooden triangle there. But they were still bad. They didn't carry enough weight in the stern. So we started building with the square stern, which has been common up to now.[21]

Finally, the introduction of the outboard motor has led to the development of a new hull form, a design virtually unrelated to any previous small boats of the region. This new design is the passbåt (speedboat), a wide, square-sterned boat with a relatively flat bottom. In terms of form and origin, the passbåt is a planing hull design that, in most respects, is identical to the Trinity Bay speedboat.

New Materials

Since the 1960s, the introduction of new materials for boatbuilding has had a major and expanding impact on the wooden boatbuilding industry. In Norway, as in the United States and other countries, increasing numbers of inshore commercial fishermen and recreational boaters have turned to fiberglass as a hull material because it requires less upkeep than wood. While in the not so distant past nearly all boats under 40 feet in length were fashioned of wood, today they comprise a considerably smaller share of commercial and recreational fleets. For example, commercial fishing boat registration statistics for 1982 show that 27% of Hordaland's fleet is made up of fiberglass boats and 68% is made up of wooden boats.[22] It should be no surprise that as this trend continues builders of wooden boats are becoming increasingly pessimistic about the future of their segment of the industry and less inclined to encourage their offspring to become boatbuilders. For example, when Einar Røyrvik was asked if he would teach his young son to build boats, he replied: "That depends. If it's possible to make a living I will."[23]

Hardanger wooden boatbuilders regard the burgeoning fiberglass boatbuilding industry not only as a direct threat to their livelihoods,

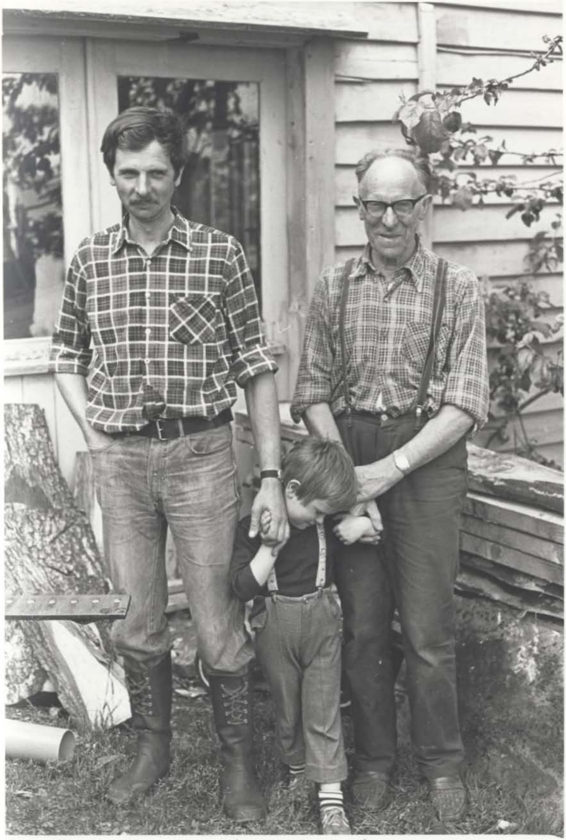


Plate 31: Harald and Einar Røyrvik with Einar's son

but also as a serious threat to the Norwegian boatbuilding tradition. As they correctly point out, fiberglass boats are mass-produced products that have no technical or material connection with the old tradition. Furthermore, they speculate that if the popularity of fiberglass boats continues to grow, the likelihood is great that this trend will lead to a decline in the number of builders with the skills required for the design and construction of wooden boats, skills that have been passed on in Norway for many generations.

In connection with the use of fiberglass as a boatbuilding material, it is worth noting that many manufacturers have selected designs based on hull forms previously executed in wood.[24] One likely reason for these decisions is that it is easier to market a proven hull form than an unproven form, even if the construction material is different. Functional considerations aside, another reason for selecting old hull forms for execution in a new material is their aesthetic appeal. In other words, the "rightness" of a boat's appearance is an important factor in determining its marketability. For example, the fact that some fiberglass rowing boats are moulded in such a fashion that they appear to possess over-lapping (clinker) planks is clearly indicative of manufacturers' attempts to sell boats by replicating the look of the older boat types in a new, non-traditional material.[25] To builders of traditional wooden boats, this is heresy. It is readily apparent to them that even if the shape of a fiberglass boat is exactly the same as that of a wooden boat it will perform differently in the water because of the weight difference between the two materials. As Kristian Djupervåg observed:

> In Oslofjord and southeast coastal Norway, they build plastic boats after Colin Archer in design, but they aren't similar in the sea. I have never been on board of one, but people tell me there is something wrong with the seaworthiness of something like that. They are not feeling the sea in the same manner as a wooden Colin Archer.[26]

A remark by Alf Linga sums up his colleagues' disdain of fiberglass boats:

> If those [fiberglass boat] factories would stick to making boat bailers [(auskjer)], it would be fine. Those are fine in plastic. But I don't like the boats they make.[27]

To Danish ethnologist Ole Crumlin-Pedersen, who is able to take a more detached look at this phenomenon, the shift from wood to fiberglass presents a opportunity for analyzing what is retained from an old tradition of building when a new one is introduced:

> The course of development from wood to plastic, then, shows that the new material, plastic, must fight for its place in constructions that are "thought in wood" and that have been determined by traditions of form developed on the basis of

> the "old" material, before the new material is accepted, and in the long run is allowed to express itself in the constructions in accordance with its own qualities.[28]

Apart from its negative impact on the wooden boatbuilding segment of the industry, the growing acceptance of fiberglass boats has at least one other clear implication for the future of Norwegian boatbuilding. Because fiberglass boats are invariably mass-produced from moulds,[29] the incremental improvement of design that is a prominent feature of wooden boatbuilding is virtually eliminated. As folklorist Richard Lunt explained this phenomenon in regard to the construction of fiberglass lobsterboats in Maine, "There is considerable investment in the making of a hull mould, so the tendency is to use it for a very long time before even considering changing the model, if ever. This means change of hull form will slow, or entirely cease for the fiberglass builders."[30]

Revivalism

Norwegians have had a deep and longstanding interest in their national heritage. By the middle of the nineteenth century, Peter Christen Asbjørnsen and Jørgen Moe collected and published Norwegian folktales as part of an intellectual movement sweeping through Northern Europe known as romantic nationalism.[31] At about the same time traditional narratives were being collected, attempts were being made to recognize other aspects of Norwegian folk heritage as part of the effort to define and celebrate nationality.[32] Inevitably, however, the passage of time brought social and economic changes that profoundly affected traditional values and, concomitantly, many forms of folk cultural expression. In many instances, threats to valued elements of folk culture provided an impetus for the conservation, investigation, or revival of that which was threatened.

As has been shown above, examples of social, economic, and technological forces contributed to the alteration of the design, construction, and use of wooden boats in the Hardanger region are abundant. During the 1970s and early 1980s, galvanized by a perception that the nation's celebrated wooden boatbuilding tradition was in dire straits because of these forces, many citizens of Norway began to participate in a revival of older, traditional boats, boats strongly linked in the popular imagination to the past, to a sense of place, and to the seafaring heritage of the nation.[33] This upswell of interest in traditional wooden boats manifested itself in a number of ways. For example, affluent urbanites began to buy traditional rowing and sailing craft--especially the færing--for recreational purposes.[34] In a related development, the Båtlaget for Bevaring av Tradisjonelle Norske Båttyper (Boat Association for the Preservation of Traditional Norwegian Boat Types) was formed.[35] In the late 1970s, magazines were established that focus on boats and other aspects of maritime culture. An example of such a magazine is Kysten, a publication out of Oslo "forbund for bevaring og bruk av eldre fartøyer og kystmiljo" (dedicated to the preservation and use of older vessels and the coastal environment).[36] In 1977, the Oslo publisher Grøndahl and Søn Forlag released the first volume of its very popular Norske Båter (Norwegian Boats) series.[37] In 1979, Grøndahl also published Christensen's Inshore Boats of Norway. In the 1980s, interest in the oldest examples of Norsk boatbuilding was made tangible with the launching of two full-size replicas of Viking Age vessels built by Sigurd Bjørkedal of Bjørkedalen: the Saga Sigla, launched in 1983; and a reproduction of the Oseberg ship, launched in 1987. All of these manifestations of an interest in reviving the tradition of building wooden boats have affected the Hardanger boatbuilding industry in large and small ways. Perhaps the outcome with the greatest impact for the region, however, was the founding of a boatbuilding school.

Boatbuilding School

During the early 1970s, Hardanger municipal officials and boatbuilders came to the realization that the continuation of the local boatbuilding industry was in some jeopardy. This conclusion was based on the observation that many of the builders at that time were in their sixties and seventies and their knowledge was not being passed on to the younger generations. As a direct result of this concern for the continuity of the area's famous boatbuilding tradition, in an effort spear-headed by the mayor of the community of Jondal, a school for wooden boatbuilding named Trebåtbyggjarskulen i Jondal (Wooden Boatbuilding School of Jondal) was built in 1980, the second school of its kind in Norway.[38] Established as an adjunct to the Norheimsund

Yrkesskule (Vocational School) located directly across the fjord, the boatbuilding school began with a one-year course of study. According to Arnt Hammer, the school's director, the primary mission of the institution is to save traditional boatbuilding in Hardanger by teaching young people how to build the wooden boats of the region.[39]

The school has one full-time instructor (Hammer), and three part-time instructors. Two of the faculty members are professional boatbuilders well-versed in Hardanger's boatbuilding traditions: Arnt Hammer, a native of Kysnes with over forty years of experience as a builder; and Sigvald Selsvik, a long-time resident of Solesnes with over fifty years of experience.

Applicants for admission to the boatbuilding school must have at least nine years of general education. The school accepts about ten students per year, and these students have come from Hardanger communities, as well as many communities in southern and western Norway. The school curriculum is based on a forty-hour work week consisting of 28 hours devoted to hands-on boatbuilding, and another 12 hours divided among such topics as naval architectural theory, technical drawing, technical English, and physical education. During each year of study at the school, every student is involved in at least two boatbuilding projects. Each student's first project is the single-handed construction of a small, clinker-built Hardanger boat type, either a small færing or a speglbåt. For their second project all the students work together to build a carvel-built boat of approximately 28 feet in length.

The establishment of the boatbuilding school at Jondal represents an important change in the history of Hardanger boatbuilding in several ways. Of greatest importance is the fact that the school is the first institution in the region dedicated to formal training in boatbuilding; training consisting not only of practice in construction, but also instruction in naval architectural theory and draftsmanship. As has been discussed above, all previous training in boatbuilding in the region was carried out informally and mainly consisted of observation and imitation of the boatbuilding activities of family members, followed by one or two-year apprenticeships at full-time, professional boatshops. In another noteworthy departure from the old system of learning, students at the school receive instruction in the old clinker method of building, as well as the more recent carvel construction technique. Finally, the school set a precedent in training female students. Throughout the previous history of Hardanger boatbuilding, boatbuilding has been the exclusive province of males.

It is worth noting that most established boatbuilders in the region are of two minds concerning the boatbuilding school. On one hand, they support the school because they view it as a sincere and worthwhile effort to sustain boatbuilding in the region. On the other hand, they are unhappy with the brevity of the school's one-year course of instruction which, they feel, is not enough time to impart the training necessary to adequately prepare a person to obtain a job in a boatshop. As Kristian Djupervåg remarked:

One year in Jondal [boatbuilding school]--they are not a boatbuilder yet. Most of them can perhaps build a boat themselves, but not all of them. So they have to have some more apprentice [experience]. And it's difficult to get with a boatbuilder because it's very expensive to hire a man in Norway . . . . And the boatbuilder can't get so much work out of a young man and it totally costs him his money.[40]

Notes

1. Christensen, Boats of the North, 85.

2. Mead, An Historical Geography of Scandinavia, 256.

3. Færøyvik, Vestlandsbåtar, 83.

4. Perhaps the earliest scholarly discussion of the Listabåt is Eilert Sundt's article "Det Norske Arbeidet--Listerbaaden," Folkevennen (1865), 273-292. More recent discussions of the Listabåt and its influence may be found in: Christensen, Inshore Craft of Norway, 22-3, 26; Christensen, Norske Båter: Et Oversyn de Förindustrielle Båttyper (Oslo: Institutt for Folkelivsgransking, 1962), 24-6; Færøyvik, Vestlandsbåter, 82; and Gøthe Gøthesen, Skagerakkysten Norske Båter Bind I (Oslo: Grøndahl & Søn Forlag A.S, 1979), 51-54.

5. C. F. Diriks, "Om de Forskejellige Slags Baade i Norge," Folkevennen (1863), 310-356.

6. These activities are briefly discussed in Christensen, Inshore Craft of Norway, 14-15; and Færøyvik, Vestlandsbåter, 66-7. The 1868 regatta at Stavanger is described in Gøthesen, Skagerakkysten, 88-95. A contemporary description of the international fisheries exhibition held in Bergen in 1865 appears in the September 17 and October 1, 1865, issues of Illustreret Nyledsblad. References to other contemporary descriptions of nineteenth century regattas and exhibitions are cited in Færøyvik, Vestlandsbåter, 172-3.

7. For more information about Archer's efforts to improve fishing vessel design, see: John Leather, Colin Archer and the Seaworthy Double-Ender (Camden, Me.: International Marine Publishing Co., 1979), 72-81; Gøthesen, Skagerakkysten, 105-108; and, Tor Borch Sannes, Colin Archer: Skøytene og Lystbåtene (Oslo: Norsk Maritimt Forlag, 1979), 235-252. Archer's own account can be found in his report "Forslag til Fiskerskøite for Nordland og Finmarken," In Norske Fiskeritidende 1895, 325-35 (Bergen: [Norske Fiskeritidende], 1895).

8. These smacks were principally from the ports of Grimsby and Lowestoft. See: Christensen, "Lucien Basch: Ancient Wrecks and the Archaeology of Ships--A Comment," 141. For a discussion of the influence of English vessels and fishing practices during the nineteenth century, see: Alan Hjorth Rasmussen, "The Triumph of Deep Sea Fishing in the North Sea." In The North Sea: A Highway of Economic and Cultural Exchange, edited by Arne Bang-Andersen, Basil Greenhill, and Egil Harald Grude (Oslo: Norwegian University Press, 1985), 217-226.

9. Christensen, Boats of the North, 91-2. Christensen notes that, in contrast to the English-influenced smacks of western and northern Norway, the smacks of southern and eastern Norway were influenced mainly by the sailing smacks designed by Colin Archer. (p. 92)

10. Arne Emil Christensen, Jr., "Lucien Basch: Ancient Wrecks and the Archaeology of Ships—A Comment," International Journal of Nautical Archaeology and Underwater Exploration 2, no. 1 (1973), 141; and Christensen, Frå Vikingskip til Motorsnekke, 86.

11. Christensen, Boats of the North, 91; Arne Emil Christensen, Jr., "Lucien Basch: Ancient Wrecks and the Archaeology of Ships—A Comment," 141. Shell-building techniques (clinker) and skeleton-building techniques (carvel), as well as composite forms, are discussed in Olof Hasslöf, "Main Principles in the Technology of Ship-Building," 42-62.

12. For Archer's drawings of a ketch-rigged auxiliary fishing boat, see: Tor Borch Sannes, Colin Archer: Skøytene og Lystbåtene, 250-1.

13. Christensen, Boats of the North, 86.

14. Noted in Mead, An Historical Geography of Scandinavia, 257.

15. Knut Djupedal, "The Nordfjordfæring of Western Norway: Changes in an Ancient Small Boat Tradition in Response to New Technology," Mariners' Mirror 72 (August 1986), 334.

16. Djupedal, "The Nordfjordfæring of Western Norway," 335-339.

17. Djupedal, "The Nordfjordfæring of Western Norway," 339-340.

18. Interview with Einar Kolltveit by Erling Flem and David Taylor, June 16, 1983. MUNFLA accession number C6683. Translated by Erling Flem.

19. Interview with Alf Linga by Erling Flem and David Taylor, June 17, 1983. MUNFLA accession number C6688.

20. For a discussion of the development of a similar craft in the Nordfjord region, see: Djuperdal, "The Nordfjordfæring of Western Norway," 343-348.

21. Interview with Harald and Einar Røyrvik by Erling Flem and David Taylor, June 18, 1983. MUNFLA accession number C6694. (Translated by Erling Flem.) Harald believes he was the first to build a speilbåt in his area. After he shipped the first boat of this type to a middleman in Stavanger, he received word that the craft was quite satisfactory, and that a customer had requested a similar craft 15 feet in length and 27 inches across the stern. Harald filled his order and apparently this craft was so popular that it resulted in a flood of orders.

22. Fiskeridirektøren, Register Over Merkepliktige Norske Fiskefarkosten 1982 (Bergen: I Kommisjon Hos A/S Lunde & Co. Forlag, 1982), 359-91. The actual numbers of vessels are: 1279 of wood, and 503 of fiberglass. The remaining 5% are made of steel, aluminum, or composite materials.

23. Interview with Harald and Einar Røyrvik by Erling Flem and David Taylor, June 18, 1983. MUNFIA accession number C6694. Translation by Erling Flem.

24. For a brief discussion of the manufacturing of fiberglass færingar in the community of Selje, Nordfjord, see: Djupedal, "The Nordfjordfæring of Western Norway," 348-349.

25. For a discussion of interactions of this kind between folk and popular culture, see: Henry Glassie, Pattern in the Material Folk Culture of the United States (Philadelphia: University of Pennsylvania Press, 1968), 17-33. Although he is writing about the influence of popular culture on folk culture in America, Glassie could easily be writing about fiberglass boats replacing wooden boats in Norway when he states: "The popular object has been accepted by the innovative individual because it saves him time, is more quickly produced or bought, and is easier to use than the traditional object--and also because it is new." (p. 19) It is interesting that no less an authority on (and champion of) traditional Norwegian wooden boatbuilding than Arne Emil Christensen equates fiberglass boats with the old wooden boat types on the basis of what he claims is a shared construction technique. As he states in his book Boats of the North: "It looks as though the tradition of clinker work may well be continued in other materials. In many places, among them Hardanger, the traditional forms are now executed in plastic. As plastic boats are built in shell construction, the new material goes well with the traditional form of hull." (p. 94)

26. Interview with Kristian Djupervåg by David Taylor, June 16, 1983. MUNFIA accession number C6687.

27. Interview with Alf Linga by Erling Flem and David Taylor, June 17, 1983. MUNFIA accession number C6688. Translated by Erling Flem.

28. Ole Crumlin-Pedersen, "Skin or Wood? A Study of the Origin of the Scandinavian Plank-Boat," In Ships and Shipyards, Sailors and Fishermen: An Introduction to Maritime Ethnology, edited by Olof Hasslöf, Henning Henningsen, and Arne Emil Christensen, Jr., 208-234 (Copenhagen: Rosenkilde and Bagger, 1972), 218.

29. This introduces yet another definition of "mould." In the construction of fiberglass boats, a mould is a form used to create a full-size, one-piece hull.

30. Lunt, "Lobsterboat Building on the Eastern Coast of Maine: A Comparative Study," 225.

31. Peter Christen Asbjørnsen and Jørgen Moe, Norske Folkeeventyr. 2 vols. (Kristiania: J. Dahl, 1841-1844). Other European romantic nationalists of this general period were the Grimm brothers in Germany, Elias Lönnrot, Eero Salmelainen, and Julius and Kaarle Krohn in Finland, and Douglas Hyde in Ireland, among others. For a helpful overview of national romanticism in Scandinavia during the middle to late nineteenth century, see: W. R. Mead, An Historical Geography of Scandinavia (New York: Academic Press, 1981), 182-220. For a survey of post-eighteenth century literary movements that served as an impetus for national romanticism in Scandinavia, see: Bengt Holbek, "Nordic Research in Popular Prose Narratives," In Trends in Nordic Tradition Research, edited by Lauri Honko and Pekka Laaksonen, 145-162. Studia Fennica 27 (Helsinki: Suomalaisen Kirjallisuuden Seura, 1983).

32. Mead, An Historical Geography of Scandinavia, 183-4.

33. Interestingly, a similar revival of interest in traditional wooden craft was also occurring in the United States, and this movement kindled interest in European boatbuilding traditions, especially those of Norway. American wooden boat revivalists evinced particular reverence for the Norwegian boat types that are descendants of the vessels of the Vikings. In 1979, Woodenboat, a magazine driven by a fervent revivalistic impulse, published four articles on Norwegian boatbuilding in a single issue (no. 28, May/June). During the previous year, The Apprenticeshop, a boatbuilding school run by the Maine Maritime Museum in Bath, Maine, built two Norwegian færingar. The Apprenticeshop's publication Norse Boatbuilding in North America (Bath, Me.: Maine Maritime Museum, 1980) describes the building of the færingar, and explains that through the building of the boats "We inspire new generations by celebrating, revering and interpreting the past, but we gain purpose in explaining that the essence of the Viking Age lay in what was done--what was designed, built, taken to sea, often in extremes, and used. New generations must experience the legacy of centuries of ingenuity, technology, and the quiet, timeless power of harnessing natural forces." (p. 26)

34. It should be noted, however, that the recreational use of these boat types did not begin in the 1970s. Pleasure boat regattas have been held at least since 1871. Clubs for recreational sailors have been in existence for some time as well. For example, Oselvarklubben, a national organization for owners of sailboats of the Oselvar type, was founded in 1945.

35. According to Greg Owen, members of Båtlaget for Bevaring av Tradisjonelle Norske Båttyper are concerned with "saving undecked rowing and sailing boats in a way that gives life and meaning to a cultural treasure. In addition to doing museum type work, the

organization promotes rowing-sailing gatherings, and lends old boats to people who will use and maintain them." See: Greg Owen, "Timber, Sail & Oar," Woodenboat 28 (May/June 1979), 38.

36. Another publication of this general type is Sjøgang, the organ of the Bergen Seilskøyteklubb (Bergen Sailing Vessel Club).

37. To date, five volumes in the Norske Båter series have been published: Gøthe Gøthesen's Skagerakkysten (1977) and Norskekystens Fraktemenn (1980); Fredrik Denneche's Lystbåter og Kappseilas (1981); Asbjørn Klepp's Nordlandsbåter og Båter fra Trøndelag (1983), and Øystein Færøyvik's Vestlandsbåter: frå Oselvar til Sunnmorsåttring (1987).

38. The first school for wooden boatbuilding is the Saltdal Vidaregåande Skole (Saltdal Continuing School), located in Rognan, northern Norway. The school was founded in 1940 as a training facility for carpenters and boatbuilders. In 1980, the school established a two-year boatbuilding program. For more information on the school's curriculum, see: Gunnar Eldjarn and Bjørn Skauge, "A Norwegian Boatbuilding School," Woodenboat 23 (July/August 1978), 80-85.

39. Fieldnotes from interview with Arnt Hammer, director of Trebåtbyggjarskulen i Jondal, by Erling Flem, June 12, 1983.

40. Interview with Kristian Djupevåg by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6687.

CHAPTER 2, SECTION 4: Hardanger Design Systems

This section will examine the various components of the process of boat design in the Hardanger region. Attention will be focused upon systems of measurement and measurement devices, measurement formulas, and the use of moulds, half-hull models, and levels that are used to check adherence to the initial design. In addition, the aesthetic aspects of boat design and construction will be discussed as well as the degree to which builders express their individuality through the design process. Finally, the question "What makes a good boat?" will be explored.

Transmission of design-related knowledge

As discussed in the previous section on Hardanger builders, the builders within the study area have learned the bulk of their boatbuilding knowledge in an informal way, by watching and copying the actions of relatives and, in some cases, the actions of master builders with whom they apprenticed.[1] Only one of the seven Hardanger builders interviewed received formal training in boatbuilding. This individual--Kristian Djupervåg--took a short course on naval architectural drafting and, in so doing, learned to read standard naval architectural lines plans. For those builders who acquired training mainly by observation and imitation, the designs they utilize are based mainly on what has worked in the past, rather than upon the rules and principals of naval architecture. Accordingly, since they lack principles that can be used to expand design possibilities beyond the boundaries of local convention, their designs, as well as their construction practices, tend to be highly regionalized.

In addition to the design-related information that is passed from one builder to another by observation and imitation, considerable data is imparted in the form of physical artifacts. As in Trinity Bay, moulds and models are among these artifacts. Unlike Trinity Bay, however, Hardanger builders often pass on notebooks full of design data to their sons, as well as actual boats that have been built and used by family members. The second case--the preservation of boats--is an especially striking departure from the Trinity Bay practice of disposing of boats when they have fulfilled their usefulness. In the Hardanger region, boats are treated with considerably more reverence. For example, it is very common for families to retire small rowing and sailing boats from service and store them in boathouses where they sit as prized heirlooms and tangible links to a family's maritime heritage. For the boatbuilders in these families, the old boats serve additionally as a kind of reference file of the construction techniques employed and designs executed by their predecessors. The availability of such highly-valued and personal artifacts reinforces Hardanger builders' predilection for maintaining the old ways characteristic of

Plate 32: Boathouses like these are often used to store boats for many years

the place and the family. This inclination is particularly strong among the farmer/boatbuilders in the study area.

Field research indicates that while neighboring boatbuilders appear to maintain highly amicable relationships with each other, they tend to be fairly secretive about their design procedures, particularly the formulas they employ to derive the basic essential elements of hull forms. For example, when asked about the coded markings on the measuring stick he uses to lay out the principal proportions of the small boats he builds, Alf Linga said he would explain their meanings as long as the researcher did not reveal them to his neighbor who is also a boatbuilder. However, even though builders may not have direct access to the measurement formulas other builders use, they can observe their neighbors' finished craft and determine whether the distinctive design elements they discern should be incorporated into their own work. Another venue at which builders can inspect the work of other builders is the annual trebåtmessa at Jondal, where dozens of new boats are on display, including craft from areas of Norway beyond Vestlandet. Builders also observe new boats that journey along Hardangerfjord, and boats they see during their own travels throughout the region and beyond. Other sources of information about boat design alternatives are books and magazines about boatbuilding, commercial fishing, and seafaring.

To a much greater extent than the majority of Newfoundland builders interviewed, all Norwegian informants possess a very keen sense of the regionalism of boat types throughout the nation, past and present, and identify themselves strongly with the boatbuilding heritage of their own region. This identification is displayed most tangibly in the form of the boats they build, boats that simultaneously reflect the designs of region (western Norway), sub-region (Hardanger), and individual family (Haugen, Kolltveit, Linga, Røyrvik, etc.). As we shall see, two consequences of this deep-seated attachment to place and family are a tremendous allegiance to local designs and a very conservative approach to design change.

As in the case of Trinity Bay boatbuilders, the builders of the Hardanger region utilize a number of tools that assist them in translating design concepts to the physical reality of the completed craft. Many of these tools were introduced hundreds of years ago and are components of the ancient system of training based on observation and imitation, with a minimum of verbal interaction. These tools, which may be classified as "mnemotechnic aids,"[2] are products of a pre-industrial era wherein reading and writing were not deemed essential for carrying on craft production. As Christensen points out, these devices were created because ". . . in former times, a craftsman both needed, and could record, the forms and dimensions of the things he made, and that the means he employed were unconnected with the use of writing."[3]

<u>Measuring Sticks, Measurements, Measurement Formulas, and Rules-of-Thumb</u>

It is not surprising that the builders who build the oldest boat types--clinker-built færing and other small craft that are the present-day incarnations of Viking Age vessels--also employ mnemotechnic aids of great longevity. Although the most accomplished builders, including men like Einar Kolltveit and Harald Røyrvik, take pride in the fact that they can fashion the shape of a craft almost entirely by eye, they do rely upon a small number of tools to help them execute well-formed hulls. One such aid is a home-made, wooden measuring stick known as a båtalen, båtal, båtalne, or simply alen, in the Hardanger region, and alnmål, båt-ell, båtmål, and mål elsewhere.[4] The name of this device is derived from an old unit of measure known as the "alen" or "ell" which is equivalent to 21 inches. Although the first use of these tools cannot be accurately established, the fact that the device is not consistent with the normal alen of 24 inches, but with the longer of the two Norwegian alen of the Middle Ages at least suggests its antiquity.[5]

Usually rectangular in section, the båtalen has marks or symbols inscribed upon or carved into one or more of its four faces. These marks and symbols correspond to a number of crucial measurements associated with the shape of a boat of a specific overall length. For example, the båtalen owned by the late Alfred Søvik, a renowned boatbuilder from Os, on display at a museum in the vicinity of Bergen,[6] has markings that correspond to distances from (1) the top edge of the garboard to a string running down the centerline of the hull between the top of the sheer at the forward stem and the top of the sheer at the after stem, (2) the distance between the reference string and the

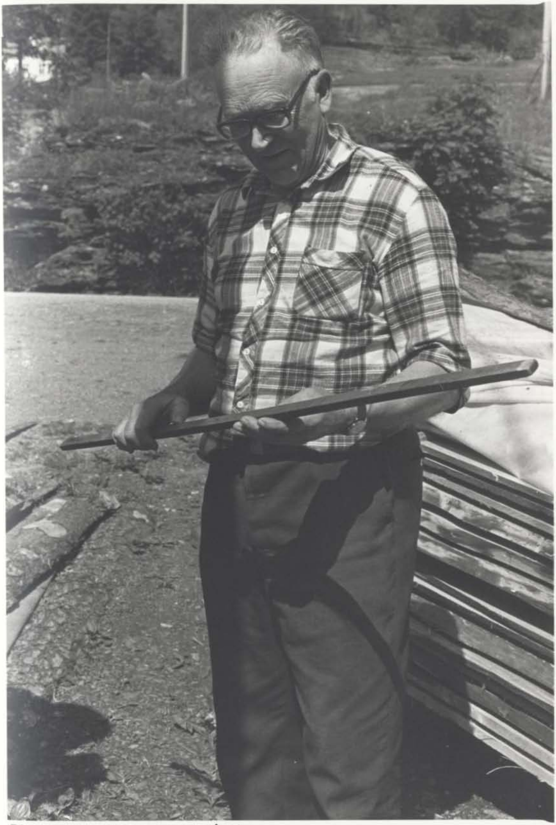


Plate 33: Alf Linga with båtalen

sheerline at various points, and (3) the distance between the reference string to the top of the keel at the points (forward and aft) where it is joined to the backbone component known as the lot. The various measurements of Søvik's båtalen are identified with coded symbols known only to the builder who owned it. One face of the measuring stick is marked "9 1/2 alen," meaning that the various markings correspond to the design of a Oselvar 9-1/2 alens in length. Since an alen is a unit of measure equivalent to 21 inches (tommer), then a 9-1/2 alen boat would be a boat 16'-7.5" in length between the stems.[7] On another face are markings that are identified as those corresponding to a "10 alen" boat, or one 17'-6" in length between the stems.

Of the boatbuilders interviewed for the present study, four said they now use båtalen or used one in the past; all of these builders are from the farmer/boatbuilder category. Specifically, the builders are Alf Linga, Einar Kolltveit, and Harald and Einar Røyrvik. Alf Linga uses a båtalen handed down to him by his father to measure the height of the sheer at the inner stem (reisingamål), the distance between the reference string (running between the stems at the forward and after sheer heights) and the keel, and also to determine the locations of the forward set of timbers (framband) and the after set of timbers (belrong). Although Alf uses his båtalen for only these measurements, he acknowledged that builders of the past probably relied upon the device for many more. Harald and Einar use a båtalen, too. Harald explained that these devices are used mainly for small boats, færingar and speglbåtar in particular. One båtalen in his possession is inscribed with the essential measurements for one boat type in five different lengths: 9 alen, 10 alen, 11 alen, 12 alen, and 13 alen. It is interesting to note that on the opposite side of his inherited båtalen, Harald has inscribed markings in feet and inches which he has converted from the original alen-based measurements. Today, Einar Kolltveit does not use a båtalen for the Oselvar boats he builds, but did use one as a young man during his apprenticeship in Os. He recalled that he used a båtalen to determine the height of sheer (reisingå) at the forward and after stem, the distance between the height of sheer at the forward stem and the junction of the lot and the keel, and also the distance between the height of sheer at the after stem and the junction of the forward lot and keel.[8]

Based on this small sample, it would appear that contemporary Hardanger builders rely less on the båtalen than their predecessors and, for those who continue to use them, the device is used in a partial way. The decline of importance of the båtalen is directly related to two practices: the recording of the principal dimensions of boats in a builder's notebook (often handed down from father to son); and a shift away from the old alen-based unit of measurement to the English system (based on feet and inches) or the metric system.[9] A page from Harald Røyrvik's notebook contains the following information concerning the design for a three-plank ("3-bording") færing from Strandebarm:

Lengd (length)= 15-1/2'[10]

Breidd (breadth)= 4'-7-1/2"

Djup på midten (depth at middle)= 16-1/2"

Reist framme (sheer height at forward stem)= 27"

Reist bak (sheer height at after stem)= 24"

Breidde på midten av borda (breadth between the top edges of the two garboard planks when installed)= 23-1/2"

Breidde på midten av borebord (breadth at middle of the second plank)= 9-1/2"

Breidde på midten av rip (breadth at middle of the sheer plank)= 10-1/2"[11]

Einar Kolltveit expressed the basic approach of the farmer/boatbuilders in regard to design replication when he explained that while he has the design of a given boat in his head, he follows a particular routine to ensure that the boat shape is executed properly. Part of his routine involves the use of various controls that prevent him from making mistakes. The most powerful control is represented by the measurements he has recorded in a notebook. These measurements, which apply to each of the basic variations of the types he builds, specify length, breadth, and depth of hull, and breadth of all planks. When he is ready to build a new boat, Einar begins the transference of the chosen design from written measurements to full-scale in his shop by performing two basic operations. First, he stretches a string above the place where the boat is to be built and marks it off according to the length of the boat he wishes to build.[12] Second, he establishes the lengths of the forward and after stems (the stamn and the bakstamn) by measuring from the top of the forward stem at the sheer to the forward end of the keel, and from the top of the stem at the sheer to the after end of the keel. In addition to a meter stick, other devices, which will be discussed below, are used to check that the key measurements recorded in Einar's notebook are accurately transferred to the hull during the construction process.

In addition to the precise measurements recorded in a notebook, or, perhaps, on a scrap of wood (plankebitar), many of the builders interviewed employ general formulas for determining aspects of hull form. Sometimes these formulas are written down, sometimes they are not. Such formulas are most often used in establishing the height of the sheer at the midpoint of the hull, and the location of the midship timber (midtband). According to Harald Røyrvik, for færingar and other old boat types, the height of the sheer at the hull midpoint was determined by the formula: "one inch on each alen."[13] In other words, for a boat 9 alen in length, for example, the height of the sheer at the hull midpoint will be 9 inches below the horizontal line that runs between the two stems at their sheer heights, for a 10 alen boat the sheer height will be 10 inches below, and so on. Sverre Haugen recalled a slightly different formula for the old boat types: one inch per alen, plus one inch. For example, in the case of a boat 17 alen in length, the sheer at the hull midpoint would be 18 inches (17+1) below the horizontal line.[14] (For the gavlbåt, snekke, and other, more recent, types, Harald and Sverre establish the sheer line (spring) by eye according to what looks right.)

Formulas are also used to determine the location of the midship timber (midtband), the transverse section of greatest breadth. The placement of the midship timber is especially important because its location is a critical factor in creating proper hull balance. As Einar Kolltveit explained: "If the middle rib comes too much forward in the boat, the back end of the boat will rise up and the front end will cut down into the sea."[15] Measurement formulas for the placement of the midship timber are usually quite simple. For example, Einar Kolltveit places the midship timbers of the Oselvar he builds approximately 3 inches aft of the midpoint of the hull.[16] Harald Røyrvik uses a similar formula: for a 16 foot færing, the midtband is placed approximately 6 inches aft of the hull midpoint; for longer boats the distance aft of the midpoint is a little less.[17] According to Harald, there were no set formulas for determining the placement of the midtband of larger boats, such as gavlbåtar and snekker. For these boats, builders decide the location of the midtband on a case-by-case basis.

In establishing the essential boundaries of a hull shape (i.e., length, breadth, and depth), builders also rely on a number of unwritten rules of thumb that have been passed down to them by word-of-mouth. For example, builders of færingar often establish the height of the sheer at the after stem by taking the sheer height at the forward stem and subtracting fire fingerbreidder (four fingers' breadth)—the width of four fingers of one hand.[18] Alf Linga recalled that an old boatbuilder once told him that one way builders used to establish the locations of boat parts was based on the distance between a builder's two elbows when his arms are bent at the elbow, with forearms brought in front of the chest and parallel to the ground, with opposite thumbs touching. Another unit of measure, known as a famn (fathom), is equal to the distance between the tips of the left hand and the tips of the right hand when arms are fully extended, away from the body, at shoulder level. As Linga explained, in a small boat the distance between the framband (fore timber) and the midtband (midship timber) is equal to one famn, and the distance between the midtband and the belrong (after timber) is equal to one famn minus fire fingerbreidder (four fingers' breadth).[19] Obviously, because of anatomical differences between builders, these units would vary from individual to individual.

It should be noted that measurement formulas and rules of thumb are employed mainly by the farmer/boatbuilders who continue to construct the old clinker-built boat types. Builders who use half-hull models and lines plans (both of which will be discussed below) rarely employ them since all basic features of hull form can be readily extracted from their models and plans. For all the builders, however, the ability to judge aspects of hull form by eye is of utmost importance.

Båtvater (Boat-Levels)

Another tool used by boatbuilders to control variance of hull forms is known in the Hardanger region as the vater, båtvater, bordmål, bordvinkel, or løddskjeva, and elsewhere as the pass, legpasser, or loddbrett. The name of the tool has usually been translated into English as "boat-level" or "check-level." This device, invariably consisting of a small wooden board with a weight line hanging from the top, is a variant of the common plumb-bob that is used to check the angles of a boat's planks at various locations during the construction process. The boat-level is used to ensure that the angle of each plank on one side of the hull corresponds to its mate on the opposite side of the hull, thus assuring that the hull will be bisymmetrical and properly balanced. The device is employed by holding its legs directly atop the inboard face of a given plank and observing where the weighted string lines up. If the plank angles do not match, then one plank can be adjusted up or down with the use of wooden sticks (skore) before the next plank above is fastened to it. In some cases, a variant of the boat level is used in a somewhat more sophisticated way. For example, instead of being used to merely equalize plank angles between one side of a hull and the other, lines inscribed or incised on the surface of the level make it possible to use the device to precisely replicate plank angles. Obviously, this usage permits a much greater degree of control than the previous application. Christensen, in attempting to distinguish between the two types of boat-levels, labels the former a "kontrollvater" (control-level), and the latter a "byggevater" (building-level).[20]

The provenance of the boat-level is unknown, but it appears to be a device that has been used throughout Scandinavia. The earliest printed illustration of the device to come to light is contained in Åke Classon Rålamb's book Skeps Byggerij eller Adelig Öfnings Tionde Tom, published in Stockholm in 1691.[21] According to Christensen, probably the earliest datable level in a Norwegian museum collection is an example in the Tromsø Museum (northern Norway) dated 1780.[22] Fortunately for contemporary scholars, chroniclers of Norwegian folk culture have devoted some attention to these devices. For example, prolific scholar Eilert Sundt mentions the device in an 1865 article on Nordland boats, and identifies it as a "passer" (adjuster).[23] In Christensen's terminology, this would be classified as a building-level. In describing the use of the device, Sundt writes:

> The shape of the boat naturally depends on how the strakes lie and stand . . . To adjust this, one uses the "adjuster" seen in drawing no. 4—a plumb-line and a board marked with the angles experience has taught that a boat of a particular size must have for the various planks at set distances from the stems. But experienced boatbuilders judge by the eye alone, and remark that a man who needed an "adjuster" could hardly be expected to build a good boat even with its help. Since even though the intention is to build a boat of a particular size, for which the angles of the "adjuster" are meant, it will often be the case that there are not sufficient materials to hand from which to choose, so that it is

> impossible to get every single plank of exactly the same breadth as in the boat serving as a model: but it is evident . . . that if the lowest bottom plank is broader and the next two relatively narrower . . . then the angle of every single plank must be altered in order to get the average angle of all three together the same."[24]

In an article written in 1934, Ernst Klein discusses an example of the building level from Sweden called a "pass," and acknowledges the use of similar devices in Norway.[25] More recently, several scholars have cited the use of the boat-level in western Norway (Weibust 1961), northern Norway (Thowsen 1966; Klepp 1983), and Finland (Törnroos 1968, 1978).[26]

Within the study area being considered here, five of the builders interviewed were found to possess versions of the boat-level, including farmer/boatbuilders and full-time builders; two of the five use them on a fairly regular basis. Harald and Einar Røyrvik use two building-levels and they refer to them as "løddskjeva"[27] or "vateren."[28] Each is made of a single piece of wood, about 6" wide by 10" long, that has a notch cut into one of the narrow sides in order to create a pair of legs. A weighted string hangs from a hole bored 1-3/4" below the top of the board. Several shallow, straight-line grooves are cut into the face of each board, radiating from the string hole. Each groove represents the proper angle for a particular plank of clinker-built boat. One of the Røyrvik's levels contains the plank angles for a boat

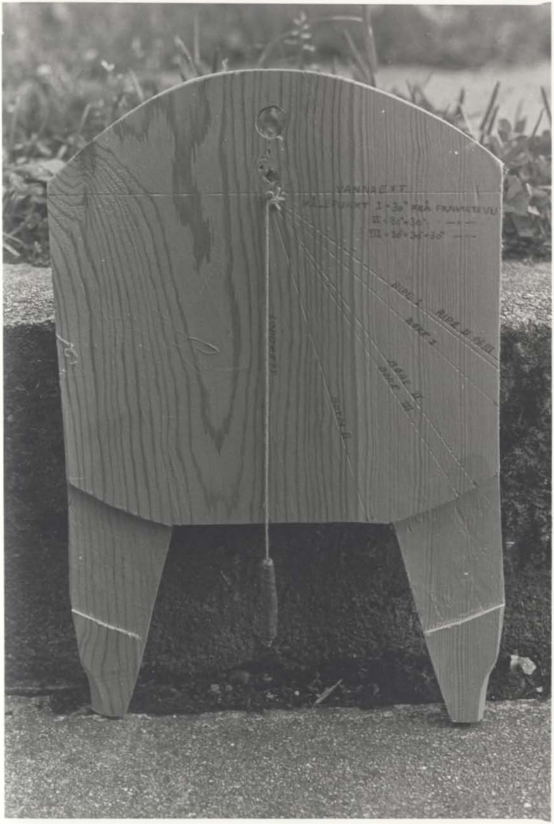


Plate 34: Einar Kolltveit's løddskjeva

with four planks per side, and the other has the plank angles for a craft with six planks per side. For example, Harald Røyrvik explained that the grooves in the level used for a four-plank færing represent the angles, at the middle of the hull, of the following planks: (1) the botnabord, (2) the børebordet, (3) the midtbøre, (4) and the ripe.[29]

Einar Kolltveit owns a boat-level he calls a løddskjeva that is almost identical to the one used by his neighbor, Harald Røyrvik. It is fashioned from a single piece of plywood and has grooves inscribed on its face representing the correct angles for each of three strakes of planking that go into an Oselvar. The names of these strakes are botnbord (garboard), børe (second strake), and ripe (sheer strake). Because each of the strakes consists of two or three component parts, Kolltveit has incised the angles for each (seven in all).[30] The points on the hull where the angles should be checked--the measuring points (målepunkt)--are written on the level, too. For example, Kolltveit specifies that the first sheer strake (ripe I) and the first part of the second plank (børe I) must be measured 30 inches aft of the forward stem (framstavn). The second sheer strake (ripe II), the second part of the second strake (børe II), and the second part of the garboard (botn II) must be measured 60 inches aft of the forward stem. Finally, the third sheer strake (ripe III) and the third part of the second strake (børe III) must be measured 90 inches aft of the forward stem. Kolltveit is pictured demonstrating how his level is used to check the angle of the garboard plank (botnabord) of an Oselvar in Plate 35.

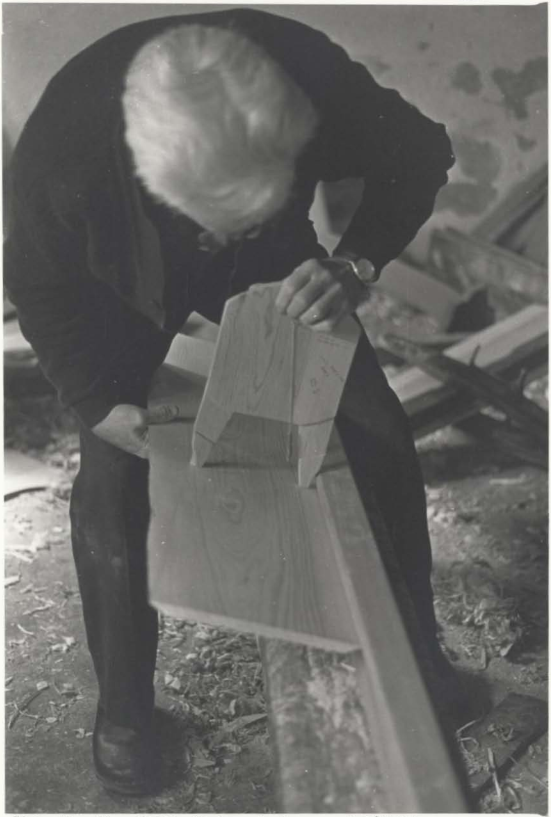


Plate 35: Einar Kolltveit demonstrates use of løddskjeva

Although he has used a boat-level in the past, he now prefers to use another device for checking plank angles, a type of mould called a skant.

Not far from the boatshops of Røyrvik and Kolltveit is the shop of full-time builder Alf Sørnes. Sørnes also has a løddskjeva that he uses for the færingar he builds, and it resembles those of Røyrvik and Kolltveit.

Across the fjord live two professional builders who also own boat-levels--Sigvald Selsvik of Solesnes, and Sverre Haugen of Herand. Selsvik refers to the device he owns as a "bordmål" (plank-measure) or a "bordvinkel" (plank-angle). Although it serves the same function as the levels employed by the builders on the opposite side of the fjord, Selsvik's tool is shaped differently. Instead of being shaped like a rectangle with feet, his is in the form of a narrow triangle with a another piece of wood in the shape of an arc fastened near its base. At the top of the triangle, a weighted string is fastened. A series of evenly-spaced grooves are incised in the front surface of the arc-shaped piece, and these grooves serve as marks for lining up plank angles.[31] Since specific plank names are not inscribed on the device, according to Christensen's system of classification, this is a check-level. Selsvik, who employs half-models, moulds, and drawings to obtain the shapes of many of the boats he builds, explained that the bordmål can be used to establish the forms of all sizes of clinker-built boats without the use of moulds.[32] Selsvik's neighbor, Sverre Haugen, has a boat-level that has been handed down to him, and it is

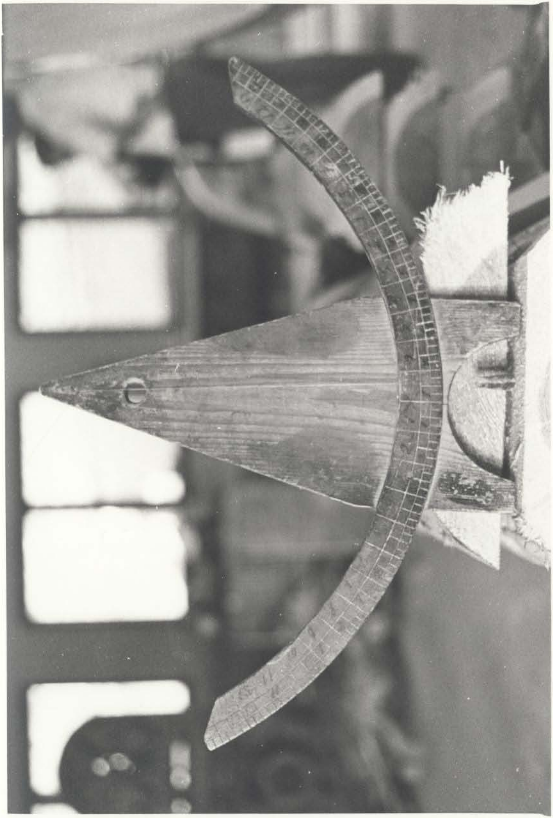


Plate 36: Bordmål owned by Sverre Haugen

nearly identical to Selsvik's. Although he, too, relies on half-models and moulds for the boats he builds, Haugen understands how the boat-level is used. As he explained the use of these devices by boatbuilders of the past, "From the beginning, they had an idea of how the boat should be when it is finished. For each plank they added, they used a vater [level], which is also called a sladre [tattle-tale]."[33] He added that the level

> was used on three points on the keel, and was placed on the planks. The scale here [on the level] is inches, and for each plank this was written down--how much the level showed. [For example,] here's 1/4 inch, 1/2 inch, 3/4 inch, and 1 inch. If the plank was lying 5 inches, then they wrote that down.[34]

To summarize, five of the builders interviewed own variants of the old "boat-level" (known variously as bordmål, bordvinkel, løddskjeva, sladra, and våter) that has been documented in Norway (especially western and northern Norway), and in other Scandinavian countries. These devices are used for verifying angles of planks in clinker-built boats. The three informants from the western side of the fjord who use them (Harald Røyrvik, Einar Røyrvik, and Alf Sørnes) employ rectangular devices that have the angles of specific planks marked on them. Kolltveit's boat-level is of the same type, but he no longer uses his. These devices may all be classified as "building-levels." In contrast, the two informants from the eastern side of the fjord who own boat-levels (Haugen and Selsvik) possess tools of a different shape that feature a graduated scale that is not specific to individual plank angles. The levels that these builders own can, therefore, be classified as "check-levels." It is noteworthy that Haugen and Selsvik, who use half-models and moulds extensively, have little experience with the use of their boat-levels, and retain them mainly because of their value as heirlooms and as physical links to old-time boatbuilding practices.

Moulds

As discussed in a previous section on changes that have occurred in the building of Norwegian wooden boats since 1850, a major development was the introduction of the carvel (skeleton) construction technique around 1900. Inevitably, one outcome of training builders steeped in the clinker (shell) construction technique about carvel building resulted in a certain amount of cross-over from one technique to the other. A prime example of this is the borrowing of the use of moulds for transverse hull sections (a characteristic of the carvel technique) for the construction of clinker-built craft. Previously, moulds were foreign to clinker building. As Christensen asserts: "Boatbuilders working in the genuine clinker tradition do not use moulds as a rule; if they do, they will tell you that moulds have been adopted within living memory."[35] The reason why clinker builders were not previously accustomed to the use of moulds is rooted in the fundamental difference between the problems of construction they face and those that are faced by carvel builders. The essential difference is that the builder of a clinker hull can check (by eye and with devices such as the boat-level) and adjust the hull as the work progresses. Moreover, each plank is temporarily fastened in place, then rechecked before it is permanently installed. The builder of the carvel hull, however, cannot as easily adjust his work since many timbers and other component parts—not all of which are directly connected as in the manner of the planks of a clinker hull—must be fashioned before they can be assembled and thus reveal the shape of the nascent hull. In short, then, builders who use the clinker technique have much more freedom to adjust the hull form as it develops, and, consequently, do not need a number of moulds of transverse sections to ensure that they adhere to a design that will not become visible before a considerable amount of construction material is shaped.[36]

Within the study area, builders who employ the clinker technique and builders who use the carvel technique both use moulds. The borrowing of the transverse mould from the carvel building tradition is quite apparent in the work of clinker builder Harald Røyrvik and his son Einar. For many of the <u>snekker</u> they build, the Røyrviks employ a mould that is a pattern for the full transverse section at the midpoint of the hull. Called a "<u>midtmalen</u>" ("middle mould"), it is not fastened to the hull, but is set into it from time to time to check on the shape of the developing shell. In essence, then, the <u>midtmalen</u> functions as an enormous boat-level. When asked if he ever used a full set of timber moulds after the carvel fashion, Harald Røyrvik replied that a

Plate 37: Midtmalen set in place in hull of boat under construction by Harald Røyrvik

full set of rib moulds ("fullt spantsett") would take up too much room inside the hull. He explained that a single midtmalen is sufficient because the remainder of the hull can be "measured with the eyes."[37] Plate 37 shows a midtmalen positioned within the hull of a 19 foot[38] gavlbåt under construction in the Røyrvik's shop. Alf Linga also uses midtmalen for the færingar and speglbåtar he builds. He explained that he does not have moulds specific to all sizes of the two types he builds because they would take up too much space in his shop, and it would be difficult to keep them from getting mixed up. He has moulds for craft 14 and 17 feet in length and fashions the shapes of larger or smaller boats by adding to or subtracting from these moulds.

Clinker-builder Einar Kolltveit uses two other types of moulds. One type is a mould that is a direct pattern for a specific boat part. I have referred to such moulds as "pattern moulds." The pattern moulds that Kolltveit uses are those which capture the shapes of each strake of the Oselvars he builds, with different sets of strake moulds for every boat of a different size.[39] He uses another type of mould he calls a "skant" (plural, "skantana").[40] Moulds of this kind are used to check that the angles of planks being installed agree with the original design, but here the similarity ends between skantana and boat-levels. Skantana consist of four separate pieces of wood that are used to check the inboard angles of the three strakes of an Oselvar. One skant checks the angle of the garboard strake (botnbord), the next checks the second strake (børe), the third is a narrow piece that is laid athwartship on top of the second strake, providing a platform for

Plate 38: Einar Kolltveit demonstrates placement of skantana

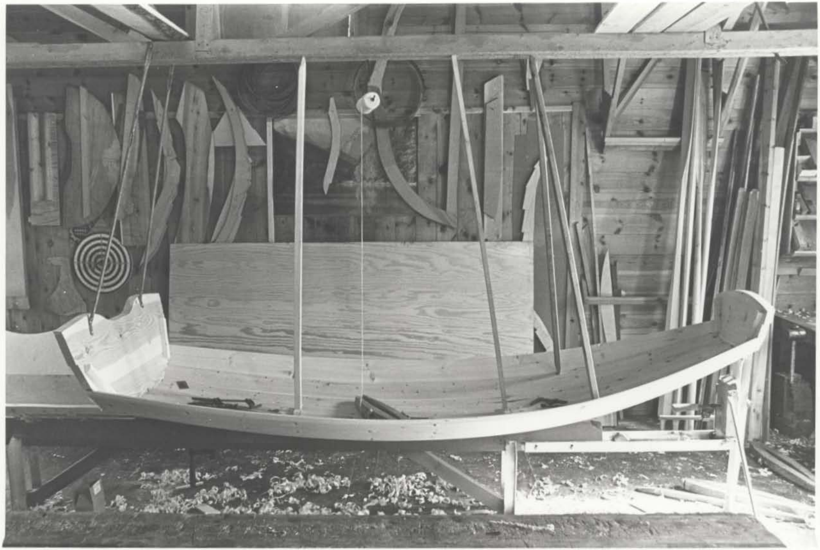


Plate 39: Assortment of moulds on the wall of Alf Sørnes's shop; <u>pram</u> under construction in foreground

the forth skant, which checks the angle of the sheer strake (ripe). The measuring point for this set of moulds is the transverse section three inches aft of the midpoint between the forward and after stems; the location generally referred to as "midt i båten" ("middle of the boat"). Kolltveit is shown arranging these moulds on the floor for his shop in Plate 38.

Pattern moulds of various kinds were used by all the builders interviewed. Often hung in large quantities from the walls of boatshops, these moulds serve as patterns for innumerable boat parts, including stems, transoms, planks, knees, and oarlocks. Plate 39, for example, shows a variety of pattern moulds on one wall of Alf Sørnes's shop. Not surprisingly, builders who, like Sørnes, adopt the business strategy of offering a large number of boat types for sale tend to have the largest number of pattern moulds. However, despite the obvious wisdom of pattern use in these and other situations, many builders tend to be somewhat apologetic about their use of moulds because the ability of a boatbuilder to build entirely by eye is still a highly-regarded (but never realized) ideal in the Hardanger region.[41]

Bevel Boards

Builders use another device to obtain the proper angle or bevel for planks in order to ensure correct fits between planks and permit the replication of a specific design. Usually called a bevel board, this simple device is generally a small, rectangular board with the angles of bevels of each plank in the hull inscribed upon it. The

Plate 40: Sigvald Selsvik's bevel boards

angles on the bevel board are "taken off" with another tool known as a bevel gauge and checked against the plank edges the builder is shaping. Builders usually hang bevel boards from nails in their shops where they are readily available for use during the planking phase of the construction process. Generally, builders will have several bevel boards; each one inscribed with the set of bevels of a specific boat type. Plate 40 shows several of Sigvald Selsvik's bevel boards.[42] Bevel boards were not observed in the shops of builders who construct clinker craft exclusively, and this finding supports Christensen's hypothesis that the bevel board is probably "a late borrowing from carvel technique."[43]

Half-Hull Models

A design-related device used by Hardanger boatbuilders that is clearly a by-product of the carvel technique is the half-hull model. Since relatively little research has been done concerning the use of half-models in Norway, ascertaining when they were first used is extremely problematic. In his book Boats of the North, Christensen writes that the earliest Norwegian half-models extant date from the eighteenth century, but observes that the use of half-models probably pre-dates this period. He notes that sixteenth and seventeenth century letters about ship construction mention "patterns" (skamplunar or skabelonar) for ships, and speculates that these were probably half-models.[44] Swedish ethnologist Olof Hasslöf has also discovered documentary evidence of half-model use in Denmark and Sweden that dates to the sixteenth century.[45]

As was probably the case in Great Britain, Newfoundland, and elsewhere, the earliest use of the half-model technique was most likely carried out in shipyards and was indicative of state-of-the-art naval architectural practice of the day. Eventually, as more and more boatbuilders learned the technique, it came to be used in small boatshops, mainly in connection with the construction of carvel-planked vessels. Since carvel craft began to be constructed in significant numbers in Hardanger around 1900, it is likely that half-models were first used in the area's boatshops at about this time.

Sverre Haugen uses half-models for the design of the carvel-built boats he constructs. He explained that his grandfather, who founded the family boatshop in 1891, "learned how to make models on the course he went to, and we have continued with that."[46] Although Sverre did not say so, it is possible that his grandfather learned about half-model use from a "state travelling teacher of carvel work" who began providing instruction in the carvel technique in western and northern Norway in 1900.[47] The only other builder contacted in the study area who uses half-models is Haugen's neighbor, Sigvald Selsvik. Selsvik learned how to use half-models during his apprenticeship at boatshop in Sørlandet.

Haugen and Selsvik use half-models for the design of carvel-built craft in exactly the same manner. After determining the length, breadth, and depth of the planned vessel, both carve the shape of the boat out of planks of soft wood that have been fastened together in the

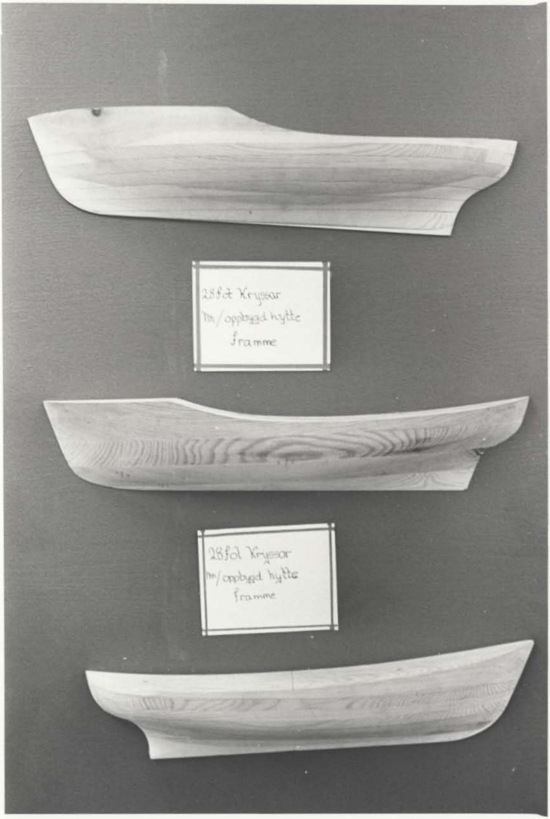


Plate 41: Half-models by Sigvald Selsvik

shape of a block. (As has been discussed in the section on Trinity Bay design techniques, the standard term for models of this type is "lift" model.) After the model has been carved into a shape that pleases the builder, it is then disassembled and the hull profile, deck outline, and key transverse sections are transferred by tracing or measurement to a sheet of paper. Next, the dimensions from these scale drawings are expanded to full-size and used for the determination of critical parts of the hull. Figure 7 is a drawing derived by Selsvik from the measurements of a half-model. As Haugen explained the process of translating the model to a drawing and then to boat parts and moulds:

> I have the model, and I draw after that model. Then I make a drawing of the ribs in full scale, and make the ribs according to that drawing. For the stem and stern part called the <u>stilk</u>, I make a mould, and make all the pieces ready before I start building the boat.[48]

Boats of different sizes can be derived from the same model through the use of different scales of proportional expansion. For example, the design of a 38 foot <u>kryssar</u> under construction in Sverre Haugen's shop during the summer of 1983 (see Plate 29) was derived from a half-model initially used for the design of a 35 foot vessel. Haugen arrived at the correct amount of expansion to produce the design for a 38 footer with the use of a pocket calculator. In the past, however, measuring sticks marked with several scales were used for this purpose.

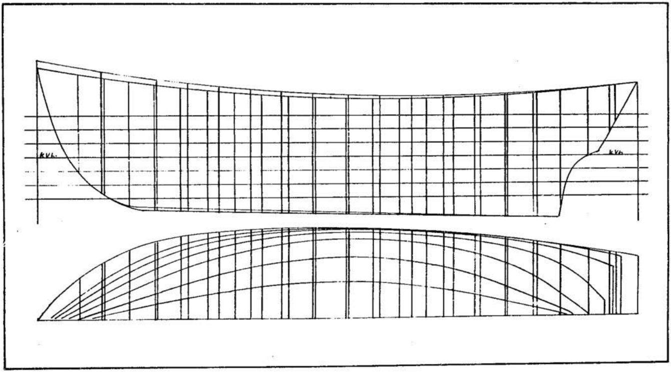


Figure 7: Drawing by Sigvald Selsvik executed with measurements taken off half-model

Today, as in the past, a common scale for half-models for boats between 20 and 40 feet in length is 1:20 (1 ft. = 15.7 mm).

New half-models are not made every time a new boat is constructed. If a boat is to be built exactly to the dimensions of a previously executed design, then measurements are taken from the scale drawing on hand (or from the half-model if the drawing is not available). If a boat of the same proportions of a previous design is desired, but either larger or smaller overall, then the design can be expanded or contracted through the use of different scales. While holding one of his half-models, Haugen explained: "This one is made in 1:20 [scale]. It's made for a 31 foot boat. But, if I want to make it 40 feet long, I just find the scale I would have to use to make it 40 feet long."[49]

In general, only when significant design change is required are new half-models carved. For example, Sverre Haugen carved half-models to replace those handed down to him by his grandfather when it became apparent that his grandfather's designs were too narrow across the stern. However, Sigvald Selsvik, who enjoys the challenge of constructing new designs and is, accordingly, much less conservative about design change than Haugen, makes new half-models more frequently.

Harald and Einar Røyrvik do not use half-models. They do use drawings, from which moulds are derived, for the largest boats they build, including the snekke type. While they did not explain the provenance of their drawings, it is possible that these were originally developed from half-models. Unfortunately, due to the limited amount of time in the field, it was not possible to explore this and other possible connections between the use of half-models, drawings, and transverse moulds.

Lines Plans

The introduction of ship's drawings, sometimes referred to as lines plans, was a seminal development in the science of naval architecture. Although it is impossible to determine when ship's drawings were first used for vessel design, documentary evidence suggests the first use of these drawings probably occurred in Europe sometime during the sixteenth century.[50] As Hasslöf points out, this period was "the dawn of modern science and technology, [and] the minds of learned men were dominated by . . . problems of arithmetic and geometry, and by debates on mathematical, scientific and technical questions."[51] However, the fragmentary and often abstruse documents of the period do not clarify the extent to which these early drawings and calculations reflect the thinking of scholars and to what extent they reflect the thoughts and actions of shipwrights.[52]

Gradually, scientific theory advanced throughout the seventeenth and eighteenth centuries, and, during the eighteenth century, greater cooperation between the fields of science and industry fostered the practical application of theory.[53] In 1746, the publication of Pierre Bouguer's Traité du Navire established the foundations of many elements of naval architecture.[54] Further refinements were made by Daniel Bernoulli, Leonhard Euler,[55] Joseph Lagrange, Jorge Juan y Santacilla,[56] and especially the great Swedish naval architect Fredrik

Henrik af Chapman (1698-1758).[57] This body of work led to William Froude's development of the experimental method of studying ship resistance, a contribution of enormous significance.[58]

In any case, these developments reflected the cutting edge of naval architecture, not the practices of small boatshops in places such as Hardanger where builders have long turned out a limited number of vernacular boat types with the use of many of the mnemotechnic aids discussed above. Until quite recently, there was little motivation for Hardanger builders to construct boats to unfamiliar designs and, consequently, little need to use lines plans to duplicate such designs. Today, only two of the builders contacted--Kristian Djupervåg and Sverre Haugen--possess the knowledge required to translate lines plans.

In essence, "reading" lines plans means the ability to translate the standard two-dimensional scale drawings of a vessel's hull shape--the profile, half-breadths, and body plan--into three dimensions. If a boat is to be built from a lines plan, then the lines of the craft are expanded to full-size with the aid of a table of offsets that provides the essential measurements of the hull form. This process of expanding the lines to full size is known in English as "lofting." The full-scale drawing or "lofting," often drawn on a shop floor or loft (hence the derivation of the term) generally contains the profile, half-breadths, and body plan superimposed on top of each other as a space saving measure. Builders obtain the exact dimensions of a boat's principal component parts which can then be used to fashion moulds, patterns, or the actual parts. A critical advantage of using a lofted

Plate 42: Kristian Djupervåg takes timber shape from lofted lines plan

lines plan (assuming, of course, that the original design is of good quality) is that it enables the builder to create boat parts that harmonize with each other as a smoothly integrated ensemble--a fair hull.[59] Another advantage is that builders can use them to translate the designs of an infinite number of hull forms, regardless of size, type, or place of origin.[60]

Sverre Haugen learned how to read lines plans by trial and error in his family's boatshop. Between 1940 and 1950, all of the large fishing vessels built in the shop were derived from lines plans supplied by the state directorate of fisheries (fiskeridirektoratet). Kristian Djupervåg, on the other hand, learned how to read lines plans and also how to execute naval architectural drawings in the formal setting of a technical school in Os where he took evening courses. In subsequent years, he has supplemented his knowledge through reading and through the practice of lofting in his own boatshop. Kristian employs the lines plans drawn by other naval architects, most notably the plans of double-ended sailing vessels executed by Colin Archer at the turn of the century.[61] Interestingly, when Kristian wants a smaller or larger version of a vessel depicted in a set of lines plans, he uses photographic reduction or enlargement to create the scale he seeks. Obviously, the original table of offsets is rendered invalid by this procedure and a new set of offsets must be derived from the lofted lines plan. Therefore, the photographic reduction or expansion of a lines plan results in a scale drawing that must be measured and expanded to full size in the same way that lines taken from a half-model must be measured and expanded.

Design Change

Although the preceding discussions of the many devices used to permit builders to control the replication of designs might suggest otherwise, the designs of Hardanger boats have always changed, albeit very slowly. The reasons why designs change are complex and frequently quite subtle. In a previous section some of the most obvious factors impelling change were discussed, namely the influence of designs from other nations, the professionalization of commercial fishing, attempts by government, trade groups, and educational institutions to improve fishing boat design, the introduction of the carvel planking technique, and the advent of the internal combustion engine. Less obvious factors underlying design change arise from the dynamics of craftsman-client communication,[62] as well as from builders' desire to express their own individual creativity, while, at the same time, staying within the boundaries of local design conventions.

Contact with customers affects the boatbuilding activities of all the builders interviewed to some extent. Generally, customers come to a builder with a clear notion of the basic type and size of the boat they have in mind. During their initial discussions, the builder attempts to ascertain which of the boat types he builds best fits the prospective customer's needs, or, if he has never built the type of boat wanted, whether or not he is prepared to build it. In the majority of cases, a prospective customer will come to a particular builder because he wants a boat of a specific type which he knows the builder produces. Preliminary discussions between builder and customer will usually focus on the desired craft's three basic dimensions: length, breadth, and depth. Having agreed upon these critical elements of the design, the customer might then specify additional design features or construction details. The builder then must determine if he should accept the customer's requirements, try to persuade him to modify the requirements, or suggest that he take his business elsewhere.

Builders vary considerably in regard to their willingness to accede to the design and construction preferences of customers. Sigvald Selsvik, for example, tends to be quite amenable to the wishes of his clients, mainly because he enjoys exploring new problems of design and construction. Other builders are much less willing to negotiate design and construction details with prospective clients and will send them away without compunction if they are not willing to agree to accept the builder's way of doing things. In general, however, builders try to accommodate prospective customers' wishes, provided that what they want would not result in a craft that deviates appreciably from the builder's standards for integrity of design and construction. As Harald Røyrvik explained, customers get what they want as long as they do not demand things considered "too bad" or "wrong."[63] Clearly, builders have much to lose if they build sub-standard boats; the customer will probably be dissatisfied in the long run, and the builder's reputation will be tarnished. Nevertheless, since individuals engage in boatbuilding primarily to derive income, turning customers away on the basis of professional integrity is not always easy, particularly if the builder does not have other orders to fall back on. In this regard, a respected veteran builder such as Einar Kolltveit can reject any customer who does not want a boat built precisely in the manner Einar wants to build it since (1) he has all the orders he can handle, and (2) the income he derives from boatbuilding is far less important to him than it was when he was a young man. Conversely, a young builder such as Alf Sørnes, who has a family to support and a new shop to pay for, finds it much more difficult to turn a customer away and will make an effort to work out a compromise between the customer's preferences and his own professional standards. As Sørnes put it bluntly and pragmatically:

> If they're willing to pay they may influence as much as they want. If not, I have to make the shape myself and tell them 'this or nothing.' And that's the way it goes because they're all, people always want more work than they're willing to pay [for], generally.[64]

Just as a builder's experience and stature is an important factor in the outcome of craftsman-client negotiations, so too is the experience and stature of the customer. For example, the boat-related knowledge that a city-dweller shopping for his first pleasure boat possesses is on a much lower level than that of an experienced professional fisherman who has owned many boats. When dealing with an experienced boatman, most builders will probably be more inclined to meet his wishes that deviate from standard practice than those of a neophyte. Experienced boatmen, the builders sometimes reason, have a keen sense of how a boat performs under a variety of conditions, keener even than the actual builder of the boat. As Alf Sørnes remarked, "You can say that the boatbuilders are those that are using boats the least . . . . They have no time."[65] In other words, lacking time to subject their products to extensive testing, builders come to rely on their customers for information on boat performance. According to Sørnes,

> In older times, the buyers came [and] told what they wanted, and the next buyer came and told what's wrong with the other boat and told what he wanted. And you can say, out of this experience and the years, you know what a boat will do in the sea without having tried it yourself. It's strange, but it's in this way. . . . And if it's a bad boat, you get told afterwards. If it's a good boat, you hear nothing.[66]

Sometimes a builder's interactions with customers result in design changes that do not compromise his professional standards, but are merely new solutions to problems of design and construction. For example, Sverre Haugen began to build the <u>kryssar</u> type pleasure craft deeper and broader in response to clients' requests for more space for accommodations. He made similar alterations in fishing boat hull forms of the sjark type because fishermen asked for more working space on deck, and also needed more stable hulls to counterbalance the heavy hydraulic powerblocks (kraftblokk), used for hauling nets, that were coming into widespread use. In both instances, Haugen successfully responded to his customer's wishes and, as a result, reaped subsequent orders for these trend-setting designs.[67] In general, builders are quite cautious about making major design changes since they know (often from bitter experience) that they, not the customers who insist on the changes, will shoulder the blame for any failures that may result.[68]

Builders' desire to express their individuality through their boats represents another powerful influence on design change. However, as was discussed extensively in the chapter on Trinity Bay design, desire for individual expression is often restrained by a desire to operate with the conventions of local tradition. In short, desire for individual expression is often inhibited by the conservative force of tradition.

Builders choose to express their individuality in many ways. For some, it is expressed by becoming an exemplar of the tradition and executing boats that are the essence of the highest standard of the old way of doing things. Individuality is, somewhat paradoxically, the eventual outcome of years of slavish attention to the canons of the local boatbuilding tradition. In this sense, individuality is equivalent to status as a master practitioner within the tradition. This might be expressed in the form of the equation: (knowledge of traditional rules + implementation of rules) x technical skill x time =

high status/individuality. Or, to put it another way, if a builder devotes years to conforming to traditional rules and honing his skills along the lines of tradition, he may eventually achieve individual recognition as a master within the tradition. In many ways, this is the traditional ideal of craftsmanship: the craft (boatbuilding) is the individual, and the individual is the craft. In this regard, builders who have achieved high status in the eyes of their peers and, in some rare cases, the general public, seek to downplay their individual success and instead point to the fact that they are merely one more in the long line of Norwegian traditional boatbuilders who practice what has been handed down to them. This sort of humility and deference to the tradition are, in fact, traditional values.

Of all the informants for the present study, Einar Kolltveit most strongly exemplifies this model. As mentioned earlier, this elderly but still active builder has achieved considerable success and recognition in Hardanger and beyond as a master builder of the Oselvar, a type of færing that to many Norwegians is the essence of traditional Norwegian small craft. Kolltveit makes it clear that he owes his success to rigid adherence to traditional rules for the design and construction of the Oselvar. Although he has made minor changes in tools and materials, he emphatically denies that he has ever altered the design of the Oselvar, which, he believes, has achieved design perfection following hundreds of years of design evolution.[69]

Unlike Kolltveit, other builders seek to express their individuality not by conforming to traditional rules, but by operating

Plate 43: Einar Kolltveit

outside them, or, as adherents to the rules would construe such actions, by breaking the rules. Because of the great influence of traditional rules in Hardanger and, implicitly, the negative sanctions that serve to enforce the rules, boatbuilders rarely express themselves in this way.[70] However, one example of this was found in the person of Alf Sørnes, a young boatbuilder (b. 1948) struggling to establish his business in a relatively competitive environment. Although he builds many of the old boat types using knowledge passed along to him by his father, he is not above pursuing innovations that would serve to increase his margin of profit and attract more customers. Examples of this include his use of lamination for timbers, stems, and other boat parts, and the use of steaming to give shape to planks.[71] A much more striking example of innovation is his invention of a totally new boat design, one unrelated to any previous Hardanger designs.

Sørnes's new design is a broad, clinker-planked boat with a double-hull in the style of a catamaran (see Plate 45). It resembles, in miniature, the basic hull form of large (60-80 ft.), high-speed, steel-hull ferries that ply the waters of Hardangerfjord and other waterways.[72] Alf explained that he came up with the design "just for fun" because he was seeking a light, stable, small boat well-suited to local conditions. As he explained:

> The whole idea is that we are living in an area where we have to pull the boats ashore every time we use them. So we can have no large boats just in this place. And, just for fun, last

> summer we used one of the small spade boats [speilbåtar] ourselves, and I found it was too narrow with three children [aboard, and too narrow for] a little fishing and walking around. 'So,' I thought, 'I'm going to make a boat for myself and then I'll not have to sell it . . . .' And then I just wanted to have a little boat that was much larger and [for which] you can use a little engine, and was stable . . . . I just took an ordinary spade boat and drew it [and] pulled it out. It's just the same boat as we are building. I pulled it out . . . . It's the ordinary catamaran idea . . . and you have an enormous[ly] more stable thing to use. That was the idea. And when you need to push this [small] area [of hull displacement] through the sea, you can use a smaller engine. And then you get a large area up here [on deck] to work around and fish and [do] whatever you want.[73]

Although it was originally created as an experiment and "just for fun," when the presence of this unusual boat at the 1983 wooden boat festival (trebåtmessa) in Jondal generated many favorable comments from potential customers (not to mention much criticism from other builders), Sørnes began to consider taking orders for the craft. (Although he did not say so during an interview with the author, it may have been his intention to test the waters of the boat market when he decided to take the boat to the festival.)

The cognitive process involved in Sørnes's creation of a

Plate 44: Alf Sørnes stands beside his invention

revolutionary design is of interest in its own right, but of equal interest is the reactions the new design generated among other local builders. During the course of fieldwork, the fact that other builders obliquely asked if I had seen Alf's boat (which they had labeled, somewhat derisively, the "Strandemaran"[74]), called my attention to a more than passing interest in the new craft. As the sum of these and other, more explicit, comments seemed to indicate, other Hardanger boatbuilders viewed the Strandemaran as a definite and, perhaps, crazy departure from the conventions of local, traditional design. In short, they wanted me to know, by their subtle or not so subtle comments, that they wished to dissociate themselves from the design. And they wanted me--a researcher interested in traditional Hardanger boats--to know that they did not consider it to be part of <u>their</u> tradition. When asked how people had reacted to his new design, Sørnes replied with an observation that would ring true to residents of many small communities:

> Well, I think they are always curious around here. They're always suspicious about new things and new ideas. And it's a wait and see, 'let's wait and see, let's not talk.' They're always anxious of saying too much before they know what's happening.[75]

However, some builders were able to look beyond the strictures of local, traditional rules and immediately see merit in Sørnes's

Plate 45: Alf Sørnes's controversial "Strandemaran"

invention. For example, when asked to comment on Sørnes's craft, Kristian Djupervåg remarked:

> That's a very new thing with a wooden boat. I think it's very interesting . . . . I think it will be a success because it will fill a place that our traditional wooden boats--rowboat or speilbåt for outboard motor--[do not] because this is very beamy . . . . And people who have to work with something on the sea--fishing nets and so on, lobster pots--or have to take more or less heavy things out of the sea, would [find this to] be a very good boat. And also for aquaculture I think it is a very interesting boat.[76]

The case of Sørnes's Strandemaran is instructive in that it reveals a lot about local values and aesthetics concerning boat design. Because in the eyes of the more conservative builders (mainly the farmer/boatbuilders) it represents a transgression of traditional rules, it helps illuminate what the rules actually are. For example, it reveals that an individual claiming credit for an invention violates the valued attitude of subversion of individual achievement. In addition, it reveals that the new boat type possesses, in the view of many, a design that is beyond the aesthetic pale of tradition even though it is built of traditional materials by a local boatbuilder using traditional skills. Although Sørnes's invention is now seen as a glaring misfit in regard to the local design canon, if other builders begin to construct boats of this type in response to customer demand, it is likely that the door of traditional aesthetics will open to accept it, just as it swung open to accept the gavlbåt, the motorsnekke, the speglbåt and other more recently introduced types that were allowed to augment local builders' repertoire of vessels.[77] And if this expansion of the design canon were to occur following the financial enrichment of a significant number of builders, then it is probable that Alf Sørnes, like Gjert Gundersen before him (the developer of the Listabåt who must surely have had his own difficulties with the conservative attitudes of boatbuilders and boat users), would eventually be hailed as both as an innovator and as a contributor to the tradition.

If we view individual expression through boatbuilding on a continuum, then, in the Hardanger context, we would place Einar Kolltveit at one end of the scale marked "conservative." Alf Sørnes would be placed at the opposite end of the scale marked "innovator." The remaining boatbuilders interviewed would be placed on the continuum between the two poles. However, field data indicate that the majority would be much closer to the "conservative" end than the "innovator" end, and would tend to follow the model of expression through the tradition that Einar Kolltveit typifies.

Although a continuum, such as the one just proposed, appears to clarify the modes and dynamics of individual expression through boat design, in actuality individual expression is extremely complex and virtually impossible to chart accurately. For example, we must not ignore the possibility that a builder may wish to express his individuality through construction or ornamentation skills rather than through design expertise. In fact, a number of informants stated that a small decorative feature, such as thin grooves (staff) cut into the edges of planks and other boat parts, serves as a kind of signature proclaiming that a boat is their creation. Because an individual's tastes and motivations may change over time, or the aesthetics of the group to which the individual belongs may shift due to a variety of social, economic, and technological factors, the aesthetic domain is probably never completely static.

Much in the way design change occurs around Trinity Bay, design in the Hardanger region, for the most part, takes place in a slow, measured way. And, when builders do enact change it invariably involves only one sub-system of the design while the remainder are held in check. In Hardanger, design evolution tends to be very slow, especially in the case of the older boat types. To a large extent this slow pace is the product of three main factors: (1) many of the traditional uses of many of the old boat types have shifted to more contemporary vessels or other modes of conveyance, thus rendering the old boats obsolete, (2) the symbolic meaning of the old types has changed from simple tools of the common people to revered icons of the past, and (3) the notion, commonly held among the farmer/boatbuilders who construct them, that the old types (especially the færing) have achieved design perfection and any alteration would subtract from its perfect form. In regard to the third point, as much as a builder may aver that he has never changed the basic design of a boat it is highly unlikely that this is literally the case. This is unlikely because, for example, a builder's ability to translate a design to a completed boat will undoubtedly improve with experience. Moreover, different builders will exhibit varying levels of skill. When I asked Kristian Djupervåg what he thought about the attitude of builders who said certain designs should not be changed, he said:

> Perhaps it is a dangerous thing to say. Because if we say that . . . and we believe it ourself, I think it would be dangerous because then we [would be] say[ing] that we are at the end of exploration. And I don't think that's true. I think the development of boats will go farther.[78]

And when I asked if the builders who claimed that they never made changes did, in fact, make changes, he said:

> I think they have always, continually [have] been making changes. Always. Very little, very little. But I think that is a good thing and I think it will go on as long as there are boats and boatbuilders. Some changes are to the better and some are a loss. I think that is something you have to do, [make] small changes. That is the reason why we have the boats we have today.[79]

In the case of newer boat types, such as the sjark and the kryssar, that are often affected by new forms of technology, design change moves at a much more rapid pace as builders scramble to meet the changing needs of their customers.

What Makes a Good Boat?

Owing to the limited amount of time that could be spent conducting fieldwork in the Hardanger region, along with the difficulties I encountered as an English speaker not fluent in the Norwegian language trying to fathom nuances of boat form and performance richly expressed to me in Norwegian or haltingly in English, I was much less successful at eliciting the kind of suggestive data when I asked the question "What makes a good boat?" than I would have liked. In particular, I found it especially frustrating that my linguistic inadequacies often prevented me from asking the right kinds of follow-up questions that would allow me to construct the same sort of form-performance pairs as I had done with data elicited from Trinity Bay informants. These qualifications aside, I do believe that collected data permits at least a limited discussion of how Hardanger builders view what a boat should be.

As in the Trinity Bay region, responses to the query "What makes a good boat?" generated replies that addressed several qualitative domains, including aesthetics, design, performance, and construction. The positive features that most builders related to these categories may be summarized as follows:

Aesthetic elements: a fair hull exhibiting clean, flowing lines; a graceful sheerline; even spacing of nails and other fastenings; relatively clear, knot-free planks; planks which maintain a parallel width from stem to stern; sits properly in calm water and displays sheerline and other lines at correct attitudes to the waterline; understated ornamentation; clear, oil finish on hull.

Design/performance elements: fulfills intended purpose(s) adequately; seaworthy in rough water (concavity in hull aft of amidships promotes stability); proper balance between bow and stern; sufficient stability (especially if a fishing craft); moves with the sea, does not fight against it (relatively sharp bow and double-endedness, or virtual double-endedness, at the waterline promote this).

Construction elements: sound construction materials (especially straight-sawn boards from the center portion of a log); light and flexible hull; well-fitting wood-to-wood joints.

Lines plans of Hardanger boats offer ample empirical data that may be used to make very precise comparative statements about elements of design that boats of each distinctive type have in common, and about the design features, if any, that are shared by all of the types. However, a comparative study of the manner in which the builders of these vessels conceptualize design (especially the relationships between aspects of hull form and performance characteristics) can only be gleaned from the boatbuilder. As I have endeavored to demonstrate in the section on Trinity Bay design, one way this can be explored is by eliciting oral statements by asking the general question "What makes a good boat?," and then asking more specific follow-up questions addressing the linkages between form and performance.

In order to fully comprehend a message-laden artifact such a vernacular boat, the researcher must obtain empirical evidence about its form and construction as well as oral statements from the artisans that reveal their judgments. Shortcomings of the present study caused by the limited linguistic facility of the author serve to underscore the vital importance of the reflective verbal narrative in deciphering the meaning of physical artifacts.

Notes

1. Christensen discusses learning through verbal interaction, and observation and imitation in his article, "Boatbuilding Tools and the Process of Learning," In Ships and Shipyards, Sailors and Fishermen: Introduction to Maritime Ethnology, edited by Olof Hasslöf, Henning Henningsen, and Arne Emil Christensen, Jr., 235-259 (Copenhagen: Rosenkide and Bagger, 1972), 235-237.

2. Christensen, "Boatbuilding Tools and the Process of Learning," 237.

3. Christensen, "Boatbuilding Tools and the Process of Learning," 237.

4. Christensen provides a brief listing of båtalen in museum collections on page 258 of his article, "Boatbuilding Tools and the Process of Learning." Of the nine examples cited, only one has an approximate date. This båtalen is on deposit at the Hordaland Landbruksmuseum, Stend, and is believed to have been the property of Ola Andersen Indre Drange, born 1789.

5. Christensen, "Boatbuilding Tools and the Process of Learning," 252.

6. Søvik's båtalen, along with his other tools, is now part of the collection of the Hordamuseet, Stend. For photographs of Søvik's boats, see: Christensen, Inshore Craft of Norway, 31; Lee, Norse Boatbuilding in North America, 8-9; Færøyvik, Vestlandsbåtar, 32-3, 35.

7. If the 16'-7.5" measurement, which is in Norsk feet and inches (1 foot = 31.4 cm), is converted to English feet and inches (1 foot = 30.48 cm), then the length of this craft is 17.15 feet.

8. The joint between the lot and the keel (kjøl) is known as the "skaringå."

9. The typical meter stick used in Norway has the centimeters of the metric system marked on one side, and the feet and inches of the English system marked on the opposite side. Some builders employ measurements based on the Norsk fot (Norwegian foot), which is equivalent to 31.4 centimeters.

10. These measurements are based on the Norwegian foot. Therefore, if the length of this vessel is converted to English feet and inches, it becomes slightly less than 16 feet (15.97).

11. These data courtesy of Harald Røyrvik; collected by David Taylor and Erling Flem, June 18, 1983. Other builders interviewed also displayed notebooks. These included: Alf Linga, Sigvald Selsvik, and Harald and Einar Røyrvik. To say the least, these notebooks are

extremely valuable records of the types of boats constructed as well as their critical dimensions as determined by the builders themselves.

12. Unlike Newfoundland boatbuilders, who stretch such strings tight so that they are horizontal to hulls' baselines, Einar allows his string to be looser, so that it slopes downward.

13. Interview with Harald and Einar Røyrvik by Erling Flem and David Taylor, June 18, 1983. MUNFLA accession number C6694. Translation by Erling Flem.

14. Interview with Sverre Haugen by Erling Flem and David Taylor, June 18, 1983. MUNFLA accession number C6694. Translation by Erling Flem.

15. Interview with Einar Kolltveit by Erling Flem and David Taylor, June 16, 1983. MUNFLA accession number C6683. Translation by Erling Flem.

16. The locations of the timbers forward and aft of the midtband are figured in relation to the midtband. For example, for a 17 foot Oselvar, Einar places the frambandet (framrong) 31 inches in front of the midtband, and the belrong 32 inches behind the midtband.

17. The after timber of a 16 foot færing is placed 30 inches aft of the midship timber, and the forward timber is placed 30-32 inches forward.

18. Noted by Harald Røyrvik during June 18, 1983, interview with David Taylor and Erling Flem (MUNFLA acc. no. C6694).

19. Interview with Alf Linga by Erling Flem and David Taylor, June 17, 1983 (MUNFLA acc. no. C6688).

20. Christensen, "Boatbuilding Tools and the Process of Learning," 242.

21. Åke Classon Rålamb, Skeps Byggerij eller Adelig Öfnings Tionde Tom. 1691 rpt. Sjöhistoriska museets faksimileditioner, I (Stockholm: Sjöhistoriska Museets, 1943), Pl. I.

22. Christensen, "Boatbuilding Tools and the Process of Learning," 249.

23. Eilert Sundt, "Det Norske Arbeide--Nordlandsbaaden," Folkevennen (1865), 199.

24. Sundt, "Det Norske Arbeide--Nordlandsbaaden," 200. Quoted in English translation in Christensen, "Boatbuilding Tools and the Process of Learning," 242. It is worth noting that the illustration of the "passer" included in Sundt's article is printed upside-down. The same illustration is reprinted in its proper position on page 246 (fig. 4) of Christensen's article. It is interesting to note that Sundt's observation that builders who relied heavily of boat-levels were looked

down upon by those who built by eye is still accurate, according to young Norwegian boatbuilders Gunnar Eldjarn and Bjørn Skauge, who write: "With long experience, a boatbuilder acquired such skill that he would build boats by his eye alone, and it was scornfully said that those who had to rely on the batlodd [sic] were not proper boatbuilders!" See: Eldjarn and Skauge, "A Norwegian Boatbuilding School," 81.

25. Ernst Klein, "De Klinkbyggda Allmogebåtarna på Nordiskt Område," In Nordisk Kultur, vol. XVI, edited by Johs. Brøndum-Nielsen, Otto v. Friesen, and Magnus Olsen, 301-322 (Copenhagen: J. H. Schultz, 1934), 320-1.

26. Atle Thowsen, "En Studie i Nordnorske Trebåtbygging," In Sjøfartshistorisk Årbok 1966, 7-84 (Bergen: Bergens Sjøfartsmuseum, 1966); Asbjørn Klepp, Nordlandsbåtar og Båter fra Trøndelag, Norske Båter Bind IV (Oslo: Grøndahl & Søn Forlag A.S., 1983) 84-6; Knut Weibust, "Båtane i Hordaland," In Fiskarsoga for Hordaland (Bergen: n.p., 1961); Birger Törnroos, Båtar och Båtbyggeri i Ålands Ostra Skärgård, 1850-1930 (Åbo: [Åbo Akademi], 1968; Birger Törnroos, Östålandska Fiskebåtar: För och Nu, Meddellanden från Sjöhistoriska Museet vid Åbo Akademi, Nr. 13 (Jakobstad: Jakobstads Tryckeri och Tidnings Ab, 1978), 28.

27. "Loddskjeva," a compound word made up of "lodd" (lead, or weight) and "skjev" (aslant), literally means a "slanted weight." This word might also be written as "loddskiva."

28. "Vater" is a verb meaning to level.

29. These planks are listed in order from the garboard (botnabord) to the sheer strake (ripe). The angle for the ripe can also be used for the esingastø, the inwale that runs along the top, inboard edge of the sheer strake.

30. These components are: ripe I, ripe II, ripe III, børe I, børe II, børe III, and botn II. A horizontal line (vannrett) and a vertical line perpendicular to it (loddrett) are also marked on the face of the level.

31. This device is nearly identical to the "check-level" from Sogn (date unknown) that Christensen presents in his article, "Boatbuilding Tools and the Process of Learning," fig. 1, 238.

32. Interview with Sigvald Selsvik, June 17, 1983, by David Taylor and Erling Flem. MUNFLA acc. no. C6689.

33. Interview with Sverre Haugen by Erling Flem and David Taylor, June 18, 1983. MUNFLA acc. no. C6693.

34. Interview with Sverre Haugen by Erling Flem and David Taylor, June 18, 1983. MUNFLA acc. no. C6693.

35. Christensen, "Lucien Basch: Ancient Wrecks and the Archaeology of Ships--A Comment," 141.

36. Christensen, "Lucien Basch: Ancient Wrecks and the Archaeology of Ships--A Comment," 142-3.

37. Interview with Harald and Einar Røyrvik by Erling Flem and David Taylor, June 18, 1983. MUNFLA acc. no. C6694. The use of moulds in this manner is noted in Christensen, "Boatbuilding Tools and the Process of Learning," 255; and Christensen, "Lucien Basch: Ancient Wrecks and the Archaeology of Ships--A Comment," 142. An illustration of mould use is included in Christensen, Norske Båter: Et Oversyn Over de Förindustrielle Båttyper, plate 4, [70].

38. Its length is calculated in Norwegian feet (1 ft.= 31.4 cm). Therefore, its length would be equivalent to 5.97 meters, or 19.57 English feet.

39. Kolltveit has also recorded the principal dimensions of the planks in a notebook.

40. In standard Norwegian, a skant is a measuring stick.

41. Hardanger builders are exceptionally adept at "seeing" boat parts in naturally-curved pieces of wood. However, unlike many Trinity Bay builders who possess a similar acuity, they rely heavily on the use of pattern moulds to control their judgments about the shapes of stems and other boat parts.

42. Christensen discusses a similar device, called a "recipe," used by a Norwegian boatbuilder to check plank bevels in "Boatbuilding Tools and the Process of Learning," 247-8, 253-4. Contemporary boatbuilding manuals invariably discuss the use of bevel boards and other techniques for checking plank bevels. See, for example, Howard I. Chapelle, Boatbuilding, 233, 449-450; and Walter J. Simmons, Lapstrake Boatbuilding (Camden, Me.: International Marine Publishing Company, 1978), 99-100. The photograph on page 51 of Lapstrake Boatbuilding shows one of the bevel boards that Simmons uses for a type of clinker (lapstrake) boat he builds.

43. Christensen, "Boatbuilding Tools and the Process of Learning," 249.

44. The Norwegian words for patterns--skamplunar and skabelonar--are found in the Norwegian edition of Boats of the North which bears the title Frå Vikingskip til Motorsnekke (Oslo: Det Norske Samlaget, 1966), 51.

45. Hasslöf, "Main Principles in the Technology of Ship-Building," 63-4.

46. Interview with Sverre Haugen by Erling Flem and David Taylor, June 17, 1983. MUNFLA accession number C6691. Translation from Norwegian to English by Erling Flem.

47. These traveling instructors (vandrelærarar i kravellbygging) are discussed by Christensen in his publications Boats of the North (p. 91), and "Lucien Basch: Ancient Wrecks and the Archaeology of Ships--A Comment" (p. 141).

48. Interview with Sverre Haugen by Erling Flem and David Taylor, June 17, 1989. MUNFLA accession number C6691. Translation by Erling Flem.

49. Interview with Sverre Haugen by Erling Flem and David Taylor, June 17, 1983. MUNFLA accession number C6691. Translation by Erling Flem.

50. For example, Chapelle, writing in The Search for Speed Under Sail, states that "The records of English marine drafting begin with a manuscript usually dated 1586." (p. 15)

51. Hasslöf, "The Main Principles in the Technology of Ship-Building," 66-7.

52. The definitive study of the early history of naval architecture has yet to be written. However, W. F. Stoot's article "Some Aspects of Naval Architecture in the Eighteenth Century," Transactions of the Institution of Naval Architects 101 (1959), 31-46, provides a fine account of the development of mathematics and mechanics and their influence on the nascent field of naval architecture. Another article by Stoot in the same volume--"Ideas and Personalities in the Development of Naval Architecture," (pp. 215-223)--provides illuminating biographical sketches of several of the most influential contributors to early naval architectural theory. Other publications contain helpful references to early works on naval architecture. For example, the first volume of Johann Röding's Allgemeines Wörterbuch der Marine in Allen Europæischen Seesprachen Nebst Vollstændigen Erklærungen 1794 rpt. (Amsterdam: Uitgeverij Graphic Publisher, 1969), 6-287, contains a 281-page bibliography (indexed by author, subject, and place of publication) of works on naval architecture and other maritime topics published between 1484 and 1793. Also, Chapelle provides a useful listing of early and influential books in The Search for Speed Under Sail (pp. 6-8, 16-17), and Abell's The Shipwright's Trade, while concentrating mainly on the contributions of British naval architects and shipbuilders from the fifteenth to the nineteenth century, contains much useful and clearly presented data.

Without a doubt, a comprehensive study of pre-twentieth century naval architecture would be a monumental task, since, as Hasslöf correctly points out, such an investigation would demand "a profound and wide knowledge, on the one hand of different methods of shipbuilding, their tools and other aids, and the organization of firms and their operation, and on the other hand of widely differing social, educational and tradition environments" ("Main Principles in the Technology of Ship-Building," p. 67).

53. For a comprehensive view of the convergence of science and technology during this period, see: Abraham Wolf, A History of Science, Technology, and Philosophy in the Eighteenth Century (New York: Macmillan, 1939).

54. Pierre Bouguer, Traité du navire, de sa construction, et de ses mouvemens (Paris: Jombert, 1746). The contributions of Bouguer (who is often called "the father of naval architecture") are nicely summarized by W. F. Stoot in his article "Some Aspects of Naval Architecture in the Eighteenth Century," Transactions of the Institution of Naval Architects 101 (1959), 32-34, 36, 41. For a brief biographical sketch of Bouguer, see: W. F. Stoot, "Ideas and Personalities in the Development of Naval Architecture," Transactions of the Institution of Naval Architects, 101 (1959), 217.

55. Euler's works include: Scientia Navalis, sev Tractatvs de Constrvendis ac Dirigendis Navibvs (Petropoli: Typis Academiae Imperialis Scientiarvm, 1772; and A Complete Theory of the Construction and Properties of Vessels with Practical Conclusions for the Management of Ships, Made Easy to Navigators, translated by Watson (London: printed for J. Sewell, 1790.

56. Juan y Santacilla's most influential work is: Examen Maritime, Théorique et Pratique, ou Traité de Méchanique, Appliqué, à la Construction et à Manoeuvre des Vaisseaux & Autres Bâtiments, translated by Levéque (Nantes: author, 1783).

57. Chapman's most influential work is Tractat om Skepps-Byggeriet (Stockholm: Johan Pfeiffer, 1775). An English edition was published in 1820.

58. These developments are summarized in R. Munro-Smith, Elements of Ship Design (London: Marine Media Management, Ltd., for The Institute of [illegible] Engineers, 1975), 7; and Hasslöf, "Main Principles in the Tec[illegible] of Ship-Building," 65-8. Froude's key work is The Resis[illegible] of Ships (Washington: Government Printing Office, 1888). His contributions are summarized in Abell, The Shipwright's Trade, 153-157.

59. Lofting is a subtle and complicated process that cannot be easily summarized. For detailed descriptions, see: Chapelle, Boatbuilding, 72-141; and Allan H. Vaitses, Lofting (Camden, Me.: International Marine Publishing Company, 1980). Excellent drawings that explain lofting with great clarity are found in Time-Life Books, The Classic Boat (Alexandria, Va.: Time-Life Books, 1977), 37-43.

60. Some scholars would argue that this might actually be a disadvantage. For example, Christopher Alexander asserts that the abandonment of local, vernacular designs that have evolved slowly and incrementally in favor of unique designs derived through the application of abstract principles leads to a lack of fit between an artifact and its context. See: Alexander, Notes on the Synthesis of Form (Cambridge: Harvard University Press, 1967), 55-70.

61. Copies of Archer's designs are obtainable from the Norsk Sjøfartsmuseum, Oslo.

62. Studies of traditional boatbuilding rarely investigate the interaction between builders and their customers. Notable exceptions include Louis J. Chiaramonte, Craftsman-Client Contracts: Interpersonal Relations in a Newfoundland Fishing Community, Newfoundland Social and Economic Studies No. 10 (St. John's: Institute of Social and Economic Research, 1970); C. Richard K. Lunt, "Lobsterboat Building on the Eastern Coast of Maine," 113-117; and Janet C. Gilmore, The World of the Oregon Fishboat, 181-196.

63. Interview with Harald and Einar Røyrvik by Erling Flem and David Taylor, June 18, 1983. MUNFLA accession number C6694. Translation by Erling Flem.

64. Interview with Alf Sørnes by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6686.

65. Interview with Alf Sørnes by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6685.

66. Interview with Alf Sørnes by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6685.

67. Interview with Sverre Haugen by Erling Flem and David Taylor, June 17, 1983. MUNFLA accession number C6692. Another example of a builder becoming a trend-setter as a result of his response to a customer's request for a design change was given by Harald Røyrvik. This example, which concerns the development of the square-stern speilbåt, is reported on page 270 of the present study.

68. Lunt also makes this point in his study of lobsterboat building in Maine. See: Lunt, "Lobsterboat Building on the Eastern Coast of Maine," 115.

69. Interview with Einar Kolltveit by Erling Flem and David Taylor, June 16, 1983, MUNFLA accession number C6683. It is worth noting that the Association of Oselvar Builders (Os Båtbyggjarlag), of which Kolltveit is a member, has prescribed a number of rules concerning how members should build these craft. For example, only naturally-curved pieces of wood (as opposed to steamed pieces) can be used for interior

boat parts, and steaming of garboard planks is permitted provided that they have first undergone some hewing. In essence, the association seeks to define the Oselvar and encourage members to work within that definition. These rules were discussed by association member Petter Bjørn Southall of Strandvik during a May 4, 1983, interview with David Taylor, MUNFLA accession numbers C6679, C6680.

Changes that Kolltveit has made include the use of a meter stick instead of a båtalen, the use of moulds instead of a loddskiva, the use of copper nails instead of iron nails, and the use of a commercial finishing oil instead of tar.

70. Apart from being a characteristic that is not in keeping with the values of Hardanger boatbuilders, many Nordic anthropologists, ethnologists, and sociologists would argue that intentional efforts to celebrate one's individuality is the antithesis of Nordic national character. For an example of a discussion along these lines, see the paper by Norwegian anthropologist Marianne Gullestad, titled "Peace and Quiet in Norwegian Everyday Life," read in conjunction with a session on "Nordic and Regional Stereotypes" presented at the annual meeting of the American Anthropological Association, Phoenix, Arizona, November 17, 1988.

71. Lamination decreases construction time and costs because it eliminates the need to locate naturally-curved pieces of wood for boat parts. Steaming of planks also cuts construction time and costs because it eliminates the need to hew planks (particularly the garboard planks of three-plank færingar).

72. These ferries originate from Bergen.

73. Interview with Alf Sørnes by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6685.

74. This moniker links the first and second syllables of Strandebarm, the region in which Sørnes's shop is located, with the third and fourth syllables of catamaran, the hull type that Alf's boat exemplifies.

75. Interview with Alf Sørnes by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6685.

76. Interview with Kristian Djupervåg by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6687.

77. Kristian Djupervåg's reply to my question concerning whether he thinks the outboard motor-powered speglbåt is a traditional boat appears to confirm this hypothesis. He said: "Yes, today they are. Because the outboard motor is about 75-80 years old, they are, perhaps. And the inboard motors aren't very much older . . . . Because the motor was a big thing when it came, many people, the old people then was afraid of it and said 'it goes to hell.' It was a dangerous thing,

[they thought], and perhaps it was. It was, anyway, a big help for the seamen and the fishermen and so on. They got a safer working place. They hadn't only the wind to move them from place to place. They could go on the wind, yes. So, a motor boat, I think it's a traditional boat." (June 16, 1983, interview by David Taylor and Erling Flem, MUNFLA accession number C6687)

78. Interview with Kristian Djupervåg by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6687.

79. Interview with Kristian Djupervåg by David Taylor and Erling Flem, June 16, 1983. MUNFLA accession number C6687.

CONCLUSION

This study has analyzed the systems of design used by contemporary part-time and full-time builders of vernacular watercraft residing along the shores of Trinity Bay, Newfoundland, and Hardangerfjord, Norway--two North Atlantic regions where boats and boatbuilding have always been part of the cultural landscape. The contents of this work present two case studies that apply an ethnographic approach to the study of boat design. Each case, though covering basically the same analytical terrain, offers different insights into the process of design.

Discussion of the respective historical, environmental, and social contexts provided a background for each study area. The following sections described the categories of boatbuilders and their work patterns, as well as the changes that have had the greatest impact on the boatbuilding tradition. The remainder of each case study concentrated on the process of design and investigated a wide variety of topics including design conceptualization, the translation of design from mental image to physical form, the use of devices and measurements to control form, the relationship between hull form and performance characteristics, and the dynamic interplay between builders' need for individual expression and their desire to conform to the rules of local tradition.

The present work is the first sustained analysis of the design of vernacular watercraft from a cultural perspective, and one of the few studies of any kind to examine traditional boat design systems in depth. A central premise is that design practices and the factors that influence them (subjects either ignored or given short shrift in most studies of vernacular craft) must be studied if boats are to be fully comprehensible as cultural artifacts. Thus, design should join construction and use as topics that receive systematic examination. And when undertaking this three-part study of watercraft, investigators should proceed in such a fashion that "observation is systematic and the synchronic description is complete before diachronic problems are approached."[1]

If nothing else, this study has demonstrated the richness and complexity of traditional design. The wealth of data presented in support of this claim should dispel the incorrect notion that design is a brief and simple preamble to the construction of a boat. It is unfortunate that misconceptions of this nature appear to be common. For example, in his otherwise original and penetrating study of the "total aesthetic experience" of a maritime community in North Carolina, anthropologist John Forrest dismisses the possibility that the skiffs used by local watermen may have a unifying tradition of design that fosters aesthetic judgments.[2] Based on my fieldwork in Newfoundland, Norway, and elsewhere, if this sentiment exists among the fishermen

Forrest interviewed it would be quite anomalous.

The weight of evidence presented here should also discredit the equally inaccurate view that, over the course of time, improved methods of designing boats have smoothly, inexorably displaced their predecessors with a minimum of overlap. Data from Trinity Bay and Hardangerfjord make it abundantly clear that such a view, as much as it may reflect reality in regard to the cutting edge of formal design practices, is a gross oversimplification in the context of the design of vernacular craft. Clearly, one of the great challenges (and headaches) of the study of traditional systems of design is untangling the congeries of design methodologies that influence the builders within a region.

Another premise of this study (one that is certainly not new to folkoristics) is that design should be analyzed as a process, not merely a product that is the end result of the process. That is, in order to understand <u>designing</u> one must study its component operations and the factors that impinge upon them. Many previous studies of vernacular craft ignore process altogether. Implicit in this neglect is the erroneous assumption that the artifact alone can reveal the design process that produced it. On an empirical level, careful measurements can yield data that can be used to formulate a precise mathematic definition of hull form--data that can be used to make exact comparisons between craft of the same type, and to construct an identical twin. However, as valuable as these data may be for such purposes, neither they--nor practically any aspect of the artifact in isolation--can convey, even to the most sensitive analyst, the intricacies of the designer's thought processes or, in most cases, the design techniques employed to translate a mental concept to physical reality.

Apart from the heuristic value of decoding an important cultural mechanism, the analysis of traditional systems of design has practical implications. For example, if naval architects are to successfully communicate with fishermen about the qualities these clients wish to have in a boat the architect will design, then it behooves them to learn the traditional terms and concepts that fishermen use to organize the relationship between hull form and hull performance. The study of design systems can also further the work of archaeologists. For example, if an archaeologist is attempting to decipher a boat find it may be possible to obtain a more complete interpretation of the artifact through the study of the design, construction, and use of proximate vernacular craft.[3] (Oddly, this valuable method of interpreting artifacts through ethnographic analogy is used less by maritime archaeologists than one would expect.)

Though the investigation of design is a conspicuous lacuna in previous studies of vernacular craft, I do not wish to appear smug about advocating that attention be paid to this subject. Apprehending the workings of a design system is not easy, and I humbly submit that my own attempts have been successful only within the limits of my training (a naval architect, for example, could have employed a raft of mathematical formulas for comparative purposes), time, and research funds. If a study of vernacular design is to be done to the highest standards, a multitude of skills is required--skills not often possessed by a single person. Ideally, one's expertise should include cultural theory and fieldwork experience, naval architectural theory and practice, training as a historian, boatbuilding skills, boat handling skills, drafting and photography skills, and knowledge of the local language and/or dialect. Indeed, the approach to design study I have proposed might best be accomplished by a team of researchers. In the search for the basic emic concepts that define the essence of boat form at a minimalistic level, a combination of methodologies will help triangulate the deep structure of a boat, a most elusive quarry.

Notes

1. Henry Glassie, "The Nature of the New World Artifact: The Instance of the Dugout Canoe," in Festschrift für Robert Wildhaber, edited by Walter Escher, Theo Gantner, and Hans Trümpy, 153-170 (Basel: Verlag G. Krebs AG, in Kommission bei Rudolf Habelt Verlag GmbH), 168.

2. John Forrest, Lord I'm Coming Home: Everyday Aesthetics in Tidewater North Carolina (Ithaca, N.Y.: Cornell University Press, 1988), 107-9. For example, he writes: ". . . these distinguishing features--length, bow rake, draught, attitude--do not appear to contribute or detract from the aesthetic qualities a boat might have. No waterman is interested in the look of a boat inasmuch as it reflects its capacity to be employed in certain ways." (p. 108)

3. Arne Emil Christensen, Jr., among other maritime scholars, is a strong advocate of this approach. He writes: ". . . for better explanations of the past, we must go into the field and study living craftsmen, while there is still time to observe living traditions that are quickly being ousted by modern technique. I feel that in many cases this is a more important task for the archaeologist than to excavate more material." (Christensen, Viking Age Boatbuilding Tools, 336.)

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Photographs

Black and white images and color transparencies in the author's collection.

A series of black and white images taken by the author in the Trinity Bay region, 1980-82, that are on deposit at the Canadian Centre for Folk Culture Studies, National Museum of Man, Ottawa. Accession number 82-8574 to 82-9040.

Maps and Charts

Newfoundland-East Coast, Cape Bonavista to St. John's. Map #14360. 34th edition. Washington: Defense Mapping Agency Hydrographic/Topographic Center, 1985.

APPENDIX A: Vessels, 35 ft. and Under, Built by Trinity Bay Boat Builders in 1983 with Financing Provided to Clients by the Fisheries Loan Board of Newfoundland[1]

Builder	Client's Address	Boat Length	Boat Type[2]
1. Harold Barrett Old Perlican	self[3]	25'	open
2. Russell Bishop Hatchet Cove	Chapel Arm, T.B.[4]	33'	open trap- skiff
3. Russell Bishop Hatchet Cove	Fairhaven, P.B.[5]	29'	partly decked
4. Russell Bishop Hatchet Cove	Fortune, Fortune Bay	35'	fully decked
5. Herbert Carberry Burgoynes Cove	Little Heart's Ease, T.B.	26'	open
6. Herbert Carberry Burgoynes Cove	Bay de Verde, T.B.	28'	open
7. Kevin King St. Jones Within	Plate Cove West, B.B.[6]	29'	open
8. Kevin King St. Jones Within	Fairhaven, P.B.	31'	open
9. Fred Jackson Whiteway	Hant's Harbour, T.B.	35'	fully decked
10. Robert McCarthy Bellevue	self	35'	long- liner
11. Winston Tuck Hant's Harbour	self	26'	open
12. Henry Vokey Trinity	St. Johr's	35'	fully decked

13. Joe Vokey Trinity	Keels, B.B.	27'	open
14. Reg Vokey Trinity	Cape Broyle, Southern Shore	34'	open
15. Reg Vokey Trinity	Old Bonaventure, T.B.	35'	long- liner
16. Stan Vokey Trinity	New Bonaventure, T.B.	26'	open

Notes

1. Data supplied by F.G. Pike, Chairman of the Fisheries Loan Board of Newfoundland in personal communication dated June 27, 1984. Names of loan applicants (i.e., boat builders' clients) have been omitted at the request of the Fisheries Loan Board.

2. Information provided by the Fisheries Loan Board about boat types conforms to structural categories established by the Board for cost estimation and do not, in every instance, reflect regional typologies. Only three of the sixteen vessels included on this list --one "open trapskiff" and two "longliners"-- are identified by vernacular terms. It is safe to assume that all of the boats listed as "open" types are displacement hull fishing vessels of the trap skiff type that are primarily employed in the fisheries (e.g., cod, squid, caplin, salmon). Vessels that are partly or completely decked, often known as longliners, are undoubtedly all-purpose fishing vessels capable of being rigged for a variety of inshore fisheries.

3. The designation "self" indicates that the builder constructed the boat for his own use.

4. T.B.= Trinity Bay.

5. P.B.= Placentia Bay.

6. B.B.= Bonavista Bay.

APPENDIX B: Fishing Vessels, 35 ft. to 65 ft., Built by Trinity Bay Builders, 1978-1984, with Financing Provided to Clients by the Fisheries Loan Board of Newfoundland[1]

Date of Permit	Builder	Client's Address[2]	Vessel Size & Type[3]
1. 78-11-21	Carpenter's Shipyard Port Union	L'Anse au Loup, Labrador	45' longliner
2. 78-12-12	Wilson Vokey Trinity	Newtown, B.B.[4]	38' longliner
3. 79-02-06	Wilfred Meadus St. Jones Within	self[5]	45' longliner
4. 79-02-06	Sam Vokey Trinity	Carbonear, C.B.[6]	36'6" trapboat/ longliner
5. 79-01-16	Henry Vokey Trinity	Forteau, Labrador	52'6" longliner
6. 79-01-17	Howard Meadus St. Jones Within	self	37'6" Cape Island[7]
7. 79-02-16	Wilson Vokey Trinity	Mall Bay, S.M.B[8]	38' longliner
8. 79-01-17	Sam Vokey Trinity	Trepassey, Trepassey Bay	37'6" Cape Island
9. 79-02-21	Sam Vokey Trinity	S.E. Placentia, P.B.[9]	38' Cape Island
10. 79-02-06	Henry Vokey Trinity	Carbonear, C.B.	38' longliner
11. 79-03-23	Wilson Vokey Trinity	St. Lewis, Labrador	45' longliner
12. 79-03-23	Edgar Holloway St. Jones Within	self	38' Cape Island

13. 79-03-23	Sam Vokey Trintity	Little Heart's Ease, T.B.[10]	not available
14. 79-03-23	Simmons Bros. Hickman's Harbour	self	53' purse seiner
15. 79-07-11	Sam Vokey Trinity	Port de Grave, C.B.	37' longliner
16. 79-06-27	Carpenter's Shipyard Port Union	L'Anse au Clair, Labrador	37' longliner (fiberglass & wood)
17. 79-07-19	Russell Bishop Hatchet Cove	Heart's Desire,	36'trapboat/ long- liner
18. 80-02-01	Wilson Vokey Trinity	Bay de Verde, T.B.	45' longliner
19. 80-10-02	Wilson Vokey Trinity	Old Perlican, T.B.	35' longliner
20. 80-10-29	Chesley Blundell Hickman's Harbour	self	38' longliner
21. 80-11-03	Dildo Boatyard Dildo	Grate's Cove, T.B.	37' longliner
22. 80-11-12	Dildo Boatyard Dildo	New Harbour, T.B.	37' longliner
23. 80-11-18	Wilson Vokey Trinity	Old Perlican, T.B.	38' longliner
24. 80-11-21	William King St. Jones Within	Pool's Island	36' Cape Island
25. 80-12-23	Dildo Boatyard Dildo	Carbonear, C.B.	37' longliner
26. 80-12-29	Dildo Boatyard Dildo	Grate's Cove, T.B.	37' longliner
27. 81-01-06	Jerry Newhook Long Cove	self	38' longliner
28. 81-01-09	Henry Vokey Trinity	Gooseberry Cove, T.B.	39' longliner

29. 81-01-15	Dildo Boatyard Dildo	Aquaforte, Southern Shore	37' longliner
30. 81-03-17	Reg Simmons Hickman's Hbr.	self	45' longliner
31. 81-04-01	Henry Vokey Trinity	Anchor Point, St. Barbe Bay	58' dragger
32. 81-10-27	Clarenville Dockyards Clarenville	Flower's Cove, Northern Peninsula	45' longliner
33. 81-07-16	Wilson Vokey Trinity	Plate Cove East, B.B.	35' gillnetter
34. 81-08-12	Dildo Boatyard Dildo	New Harbour, T.B.	37' longliner
35. 81-08-14	Fred Jackson Whiteway	self	39' longliner
36. 81-08-31	Wilson Vokey Trinity	Black Duck Cove, Northern Peninsula	53' dragger
37. 81-10-02	Dildo Boatyard Dildo	Dildo, T.B.	37' longliner
38. 81-12-02	Wilson Vokey Trinity	Savage Cove, Northern Peninsula	53' dragger
39. 82-01-07	Wilson Vokey Trinity	Bartlett's Harbour, St. John Bay	55' dragger
40. 82-07-01	Kevin King St. Jones Within	Ramea, South Coast	38' longliner/ gillnetter
41. 83-01-20	Wilson Vokey Trinity	Port aux Basques, South Coast	65' dragger
42. 83-02-07	Fred Jackson Whiteway	Carbonear, C.B.	38' longliner
43. 83-02-28	Carpenter's Shipyard Port Union	Plate Cove West, B.B.	38' longliner
44. 84-02-28	Wilson Vokey Trinity	Anchor Point, St. Barbe Bay	35' dragger

45. 84-03-06	Henry Vokey Trinity	St. Brendan's, B.B.	35' longliner

Notes

1. Date provided by F.G. Pike, Chairman of the Fisheries Loan Board of Newfoundland contained in personal communication of May 15, 1984. The vessels listed here are a portion of the 3800 constructed in Newfoundland with Fisheries Loan Board financing between 1978 and 1984.

2. Names of boat builders' clients have been omitted at the request of the Fisheries Loan Board of Newfoundland.

3. With few exceptions, designs for vessels included on this list were developed by Fisheries Loan Board naval architects, or by independent naval architects. The Fisheries Loan Board maintains a file of approved plans from which boat builders and their clients may choose. Fisheries Loan Board design numbers, followed by the numbers of the vessels on this list that are products of them, are as follows: 101 (#28, #40, #42), 138-C (#7, #19, #23, #43), 145-C (#1, #18) 212 (#45), 265-C (#41), 291 (#4, #15), 347 (#2, #10, #27), 376 (#5), 561 (#6, #8), 574-A (#31), 594 (#17), 606 (#3, #30), 606-A (#32), 629 (#39), 653-A (#36), 654 (#38), 7825-1 (#16, 8350 (#44), and F.L.B. 36' Cape Island (#24). A design drawn by naval architect Rodger Pearson of St. John's for a 38' Cape Islander was used for vessels #9, #12, #20. Designs for the remaining vessels on the list were developed by their builders.

4. B.B.= Bonavista Bay.

5. The designation "self" indicates that the builder constructed the vessel for his own use.

6. C.B.= Conception Bay.

7. The Cape Island design, commonly known as the "Cape Islander," is derived from traditional lobster boats, 30-40' in length, used in the Cape Island area of Nova Scotia. For a discussion of attempts by the Canadian Department of Fisheries and the Fisheries Division of the Nova Scotia Department of Trade and Industry (now the Department of Fisheries) to promote fiberglass Cape Islanders, see D.A. Eisenhauer, "Reinforced Plastic Fishing Vessels - An Atlantic Provinces Assessment and Future Outlook." In Canada, Proceedings: Conference on Fishing Vessel Construction Materials. Montreal, Canada, October 1-3, 1968. Canadian Fisheries Reports no. 12. (Ottawa: Queen's Printer for Canada, 1969), 373-380.

8. S.M.B.= St. Mary's Bay.

9. P.B.= Placentia Bay.

10. T.B.= Trinity Bay.

APPENDIX C: Trinity Bay Boat Builders on List of Approved (Active) Builders Compiled by the Fisheries Loan Board of Newfoundland (1983).[1]

1. Carpenter's Shipyard Ltd., Port Union
2. Clarenville Dockyards, Clarenville
3. Dildo Boatyard, Dildo
4. Henry T. Vokey, Trinity
5. Wilson Vokey, Trinity
6. Warren Brookings, Petley
7. Fred Jackson, Whiteway[2]

Notes

1. This compilation was derived from data contained in "List of Approved (Active) Boat Builders" obtained from the Fisheries Loan Board of Newfoundland in November, 1983. The full list includes thirty-five builders from throughout the province. In addition to the Trinity Bay builders noted in Appendix C, these builders are: E.F. Barnes, Ltd., St. John's; Bay D'Espoir Enterprises, Ltd., St. Albans; Burry's Marine Division, Glovertown; Eastern Shipbuilders Ltd., Coley's Point South; Richard Gibbons, St. Vincent's; R. &. L. Grandy, Fortune; Green Bay Enterprises, King's Point; Lambert Kennedy, Port aux Choix; More Power Construction Ltd., Admiral's Beach; Pelley Enterprises, Springdale; Gordon Pittman, Rocky Harbour; Walter Power, Admiral's Beach; Rogers Enterprises, Trinity, Bonavista Bay; Sea Forest Products Ltd., Bide Arm; Gordon & Clyde Shears Ltd., Rocky Harbour; T.W.N. Ltd., Nipper's Harbour; Wright's Shipyards Ltd., King's Point; Hill Brothers, Little Burnt Bay; Gander Bay Woodcrafts, Clarke's Head; Simon Strugnell, Port Hope Simpson, Labrador; Howard Childs, Lark Harbour; Glass Fibre Plastics Ltd., St. John's; Neldo Marine Development Ltd., Argentia; Bay Ryder Boats, Lewisporte; Sea Wind Marine Ltd., Corner Brook; Sea Craft Ltd., Hermitage; Cabot Fiberglass Ltd., Stephenville.

2. According to the Fisheries Loan Board, Jackson is approved to build "footage bounty" boats only (usually up to 35').

Appendix D: Populations of Principal Trinity Bay Towns.[1]

	Town	Population
Western Shore		
	Spiller's Cove	137
	Elliston	527
	Little Catalina	750
	Catalina	1162
	Port Union	671
	Melrose	416
	English Harbour	118
	Champneys	77
	Champneys West	141
	Port Rexton	489
	Trinity East	163
	Trinity	375
	Goose Cove	72
	Dunfield	180
	Trouty	112
	Old Bonaventure	111
	New Bonaventure	106
	Burgoyne's Cove	83
	Clifton	65
	Waterville	36
	Monroe	61
	Harcourt	245
	George's Brook	356
	Milton	258
	Shoal Harbour	1000
	Clarenville	2878
	Snook's Harbour	81
	Elliot's Cove	106
	Weybridge	148
	Lady Cove	155
	Hickman's Harbour	479
	Petley	147
	Aspey Cove	51
	Aspey Brook	55
	Britannia	112
	Lower Lance Cove	180
	Deep Bight	243
	Adeytown	47
	Ivany's Cove	32
	Hillview	295

Hatchet Cove	108
St. Jones Within	136
Queen's Cove	150
Long Beach	155
Hodges Cove	438
Little Heart's Ease	467
Gooseberry Cove	195
Southport	180
Sunnyside	703
Chance Cove	498
Bellevue	286
Thornea	202
Long Cove	268
Norman's Cove	875
Chapel Arm	689

Eastern Shore

Old Shop	253
South Dildo	291
Dildo	877
New Harbour	777
Hopeall	245
Green's Harbour	785
Whiteway	291
Cavendish	343
Islington	249
Heart's Delight	643
Heart's Desire	416
Heart's Content	625
New Perlican	350
Turk's Cove	61
Winterton	753
Hant's Harbour	542
New Chelsea	144
New Melbourne	123
Brownsdale	199
Sibley's Cove	189
Lead Cove	95
Old Perlican	709
Grate's Cove	275
Total Population:	27,315

Notes

1. Population figures are derived from census data contained in Government of Canada, 1981 Census of Canada. Place Name Reference List. Atlantic Provinces (Ottawa: Statistics Canada, 1983).

Appendix E: Registered Trinity Bay Fishermen and Vessels, 1983.[1]

Community	Fishermen		Vessels			
	full-time	part-time	under 35'	35-64'	65-99'	100+
Spiller's Cove	4	1	3	0	0	0
Elliston	11	9	8	0	0	0
Little Catalina	10	5	8	2	0	0
Catalina	95	54	22	5	0	27
Port Union	5	4	1	0	0	0
Melrose	10	5	13	0	0	0
English Harbour	6	5	9	0	0	0
Champney's East	4	3	6	0	0	0
Champney's Arm	4	4	5	0	0	0
Champney's West	9	10	13	0	0	0
Port Rexton	9	12	14	0	0	0
Trinity East	9	4	10	0	0	0
Trinity	4	4	5	0	0	0
Dunfield	4	4	6	0	0	0
Trouty	9	8	8	1	0	0
Old Bonaventure	19	23	22	1	0	0
New Bonaventure	21	24	25	0	0	0
Burgoyne's Cove	7	7	8	0	0	0
Monroe	1	1	1	0	0	0
Harcourt	1	8	4	0	0	0
Petley & Aspey Cove	23	38	28	1	0	0
Britannia	8	14	11	0	0	0
Lower Lance Cove	6	30	20	0	0	0
Hickman's Harbour	38	53	47	6	0	0
Lady Cove	1	0	2	0	0	0
Weybridge	0	1	0	0	0	0
Northwest Brook	1	4	3	0	0	0
Hillview	2	12	6	1	0	0
Hatchet Cove	0	2	1	0	0	0
St. Jones Within	8	3	6	4	0	0
Aspey Brook	1	5	3	0	0	0
Long Beach	3	4	5	0	0	0
Hodges Cove	2	9	5	1	0	0
Caplin Cove	3	6	2	1	0	0
Little Heart's Ease	41	58	45	7	0	0
Southport	37	23	22	8	0	0
Clarenville	5	23	17	1	0	0
Snook's Harbour	1	3	3	0	0	0
Deep Bight	1	2	4	0	0	0
Milton	0	5	4	0	0	0

Shoal Harbour	0	19	7	0	0	0
Gooseberry Cove	43	33	26	11	0	0
Butter Cove	14	16	16	2	0	0
Sunnyside	30	30	47	2	0	0
Chance Cove	28	11	27	0	0	0
Bellevue	24	12	21	2	0	0
Thornlea	9	2	7	1	0	0
Long Cove	19	3	12	1	0	0
Norman's Cove	19	6	11	1	0	0
Chapel Arm	5	8	6	1	0	0
Old Shop	5	12	9	0	0	0
Dildo	38	24	20	13	0	0
New Harbour	16	12	9	1	0	0
Hopeall	6	3	5	1	0	0
Green's Harbour	12	16	16	1	0	0
Whiteway	27	6	9	7	0	0
Cavendish	7	7	8	1	0	0
Islington	9	4	8	2	0	0
Heart's Delight	9	19	11	1	0	0
Heart's Desire	11	15	8	3	0	0
Heart's Content	28	14	20	7	0	0
New Perlican	8	6	10	1	0	0
Turk's Cove	5	2	4	0	0	0
Winterton	20	23	21	2	0	0
Hant's Harbour	34	16	26	4	0	0
New Chelsea	9	11	11	0	0	0
New Melbourne	2	4	3	0	0	0
Brownsdale	2	3	2	0	0	0
Lead Cove	1	3	2	0	0	0
Sibley's Cove	19	24	25	2	0	0
Old Perlican	127	52	79	32	0	0
Grate's Cove	44	17	30	0	0	0
TOTALS:	1,053	925	941	143	0	27

Notes

1. Data supplied by R. A. Russell, Statistical Officer, Statistics and Systems Branch, Fisheries and Oceans, St. John's, in personal communication to the author dated February 17, 1984.

Appendix F: Members of *Hardanger Trebåtbyggjarlag* (Hardanger Wooden Boatbuilders' Association), ca. 1983[1]

Builder/Firm	Address	Boat Types
1. Svein Kjærevik Båtservice	Varaldsøy	New construction and repairs in wood and aluminum; 30-60 ft.
2. Flakkavåg Båt og Treindustri	Onarheim	clinker-built *snekker*, 22-25 ft; carvel-built *platgatter*, 28-33 ft.
3. Julius Jensen	Tornes i Hardanger	carvel-built *kryssarar* and *platgatter*, 25-28 ft.
4. Etne Trebåtbyggeri (Kolbjørn Rønnevik)	Etne	*Færingar* and carvel boats up to 35 ft.
5. Johannes Linga	Tornes i Hardanger	*færingar* and *spegbåtar*
6. Alfred Gangdal	Kysnesstrand	*spegbåtar* 15-16 ft.; also *passbåtar* of the same size
7. Sørnes Båtbyggeri (Alf Sørnes)	Fosse	all types up to 24 ft.
8. Alf Linga	Fosse	*færingar* and *spegbåtar*, 14-18 ft.
9. H. & E. Røyrvik Båtverstad	Fosse	clinker-built *færingar*, *spegbåtar*, *snekker* and *gavlbåtar*
10. Harald Berge	Fosse	*færingar* and *spegbåtar*, 13-17 ft.

11. J.E. Vågen Båtbyggeri	Akra	carvel-built _kryssarar_, 24-30 ft.
12. Olav B. Måkestad	Tørvikbygd	_færingar_ and _spegbåtar_, 12-16 ft.
13. Olav Aase	Reksteren	carvel-built _kryssarar_ and _sjarkar_; touring and fishing boats, 25-32 ft.
14. Lorents Aase	Reksteren	28 ft. carvel-built _kryssarar_; touring and fishing boats
15. Ornes Båtbyggjeri A/S	Ornes i Sogn	new construction and repairs for clinker- and carvel-built wooden boats, 14-33 ft.
16. Kauslands Båtbyggeri	Klokkarvik	new construction and repairs for wooden and aluminum boats, 25-50 ft.
17. Håkon Vik	Herand	11-12 ft. _færingar_ and _spegbåtar_
18. Sverre S. Haugen Båtbyggeri	Herand	_gavlbåtar_, _kryssarar_, _sjarkar_, touring and fishing boats up to 40 ft.
19. Sigurd Vik	Herand	_færingar_, _spegbåtar_, and _prammar_
20. Sigvald Selsvik	Jondal	touring and fishing boats 26-33 ft.; row boats and _snekker_ up to 22 ft.
21. Djupevåg Båtbyggeri	Tørvikbygd	_Lystbåtar_ up to 45 ft.; specializing in sail boats designed by Colin Archer and L. Francis Herreshoff

22. Olav V. Kolltveit	Tørvikbygd	14 ft. færingar (spissbåt)

Notes

1. These data are taken from the handsome color brochure, titled Vinnaren (The Winners), distributed by Hardanger Trebåtbyggjarlag. I have translated the information in the third column (boat types) from the original Norwegian to English.

Appendix G: Populations of Hordaland "Kommunes" as of January 1, 1985.[1]

Kommune (Township)	Population
Bergen	207,231
Etne	4,052
Ølen	3,061
Sveio	4,549
Bømlo	9,531
Stord	13,593
Fitjar	2,994
Tysnes	2,871
Kvinnherad	13,160
JONDAL	1,300
Odda	8,730
Ullensvang	4,029
Eidfjord	1,023
Ulvik	1,297
Granvin	1,087
Voss	14,060
KVAM	8,714
Fusa	3,840
Samnanger	2,377
Os	11,505
Austevoll	4,129
Sund	4,506
Fjell	12,219
Askøy	18,057
Vaksdal	4,696
Modalen	375
Osterøy	6,875
Meland	4,123
Øygarden	2,621
Radøy	4,480
Lindås	11,060
Austrheim	2,593
Fedje	811
Masfjorden	1,932
Total Population of Hordaland:	397,480

Notes

1. A "kommune" is a municipality or township. The fylke (county) of Hordaland contains the thirty-five kommunes listed below, each of which contains a number of small communities. Fieldwork for the present study was conducted principally in communities within the kommunes of Kvam and Jondal. Data presented in this appendix are derived from Statistisk Sentralbyrå, Folketalet i Kommunane 1983-1985. Noregs Offisielle Statistikk B-523. (Oslo: Kongsvinger, 1985), 28-31. Population figures are not available for communities with less than 7,000 total population.

Appendix H: Boatyards and Shipyards in the Hardangerfjord Region.[1]

1. G.B. Gjerdes Skibsbyggeri
   Address: Hatlestrand, Hardanger
   Slip: up to 80 ft.
   Berths: 2 (80 ft; 100 ft.)
   Employees: 10

2. A/S Fjellstrand Aluminum Yachts
   Address: Omastrand, Hardanger
   Slip: 1 (200 gross tons)
   Employees: 130

3. Harding A/S
   Address: Rosendal
   Employees: 220

4. Skaalurens Skibsbyggeri A/S
   Address: Rosendal
   Vessels built: up to 250 ft. indoors
   Employees: 85

5. A/S Eidsvik Skipsbyggeri
   Address: Uskedal
   Berths: 1 (130 ft.)
   Employees: 30

Notes

1. Data in this appendix are derived from W. Mary Haugen, ed., Yearbook [of] Shipyards, Boatbuilders and Marine Engines 1982/83 (Vaterland: K/S Selvig Publishing A.S, 1982), 39, 53, 56, 63.

INFORMANT BIOGRAPHIES

I. Newfoundland

HAROLD BARRETT, Old Perlican.

Born October 14, 1916, in Old Perlican, Trinity Bay. Has worked as commercial inshore fisherman for fifty-one years. Also worked at the U. S. naval base in Argentia during World War II, and later worked as a carpenter in St. John's. Built his first boat at age twenty. Has built approximately twenty boats in all, including row boats, motor boats, flats, and longliners. Thirty-four trap boat built ca. 1958 was last boat built until 45' longliner built in 1981-82 with assistance from son, Don, and three local men. Most boats built for his own use; some sold after use. Interviewed at his home on June 16, 1982.

RUSSELL BISHOP, Hatchet Cove.[1]

Born January 23, 1946. Always made his home in Hatchet Cove, Trinity Bay. Employed as bricklayer in Gander and St. John's before beginning to build boats professionally in 1979. Has built approximately twenty-five boats, 17-40.' Most boats he has built have been trap boats and small longliners in the 33-35' range. Builds custom fishing boats full-time. Interviewed at his home on November 16, 1983.

ALEX BURRIDGE, New Perlican.

Born November 29, 1909, in New Perlican, Trinity Bay. Always lived in New Perlican. Has worked mainly as an inshore fisherman, but was also employed as a carpenter at the U. S. naval base in Argentia, and as a crewman on his uncle's coastal schooner. He participated in the Labrador summer fishery for three years. Retired from commercial fishing in the 1960s. He reckons that he has built approximately one hundred boats, including punts, speedboats, motor boats (21'), and trap skiffs up to 32'. Boats built for his own use, and also to sell (new and used) to others. Interviewed at his home on June 15, 1982.

REUBEN CARPENTER, Port Union.[2]

Born June 21, 1911, in Little Catalina, Trinity Bay. Built first boat at age 17. Worked aboard fishing and coasting schooners, 1935-43. Served as master of schooner Annie L. Johnson out of Little Catalina. Worked as boatbuilder at Clarenville Shipyard, 1943-65. Learned naval architectural drafting at Clarenville Shipyard. In 1965, started own shipyard --Carpenter's Shipyard-- at Port Union.[3] Has employed up to fifty men at his shipyard. Has built a variety of vessels including a stern dragger, a ferry, two offshore patrol boats, and many longliners. Has four stock designs for fishing boats: 38', 45', 48', and 65'. His design for 65' longliner has been used by many other boatbuilders across the province. Carpenter has built approximately two-hundred vessels during his career, the largest being the 140' coasting vessel, The Newfoundlander. Business at Carpenter's Shipyard has been slow in recent years, and, in 1983, only one boat --a 38' longliner-- had been built in the last two years. Interviewed at his home on November 24, 1983.

JOSEPH DALTON, Little Catalina.

Born February 14, 1923, in Little Catalina, Trinity Bay. Has always lived in Little Catalina. Worked as an inshore fisherman most of his life. Quit fishing in 1977 and became ranger at Lockston Provincial Park. Father was a fisherman and boatbuilder. Has built only two boats: a rodney (approx. 16'), and a 35'-9" trap skiff (launched in 1957). Both boats built for his own use. Interviewed at his home on May 29, 1982.

MARCUS FRENCH, Winterton.

Born September 24, 1917 in Winterton, Trinity Bay. Worked with father in inshore fishery until World War II. During the war, served in Overseas Forestry Unit and worked as log scaler, carpenter, and time keeper. Returned to inshore fishery after the war. Later ran a general store, which he left to work for the local fish merchant, E. J. Green & Co. In 1978, built 16' rodney for his own use. Has built a few other boats of this type since, one for his own use, others to sell to local fishermen.[4] Interviewed at his home on March 15, 1978, April 7, 1978, May 24, 1979, and March 24, 1984.

FRED JACKSON, Whiteway.

Born January 26, 1937. Always lived in Whiteway, Trinity Bay. Father was a fisherman. Worked for Canadian National Railway for thirteen years, then quit to work as commercial fisherman. Worked as heavy equipment operator at Churchill Falls, Labrador, for one year. Presently works as commercial fisherman and boatbuilder. Built first boat --a 35' longliner-- ca. 1976. Success of first boat led him to begin to build boats for other fishermen. Builds four to five boats per year, mostly longliners and trap skiffs. As of 1983, he had built 26 boats, most of which have been longliners, 35'-40'. Jackson fishes during the summer and builds boats in the off-season. Interviewed at his home on December 9, 1983.

AUSTIN KING, Hickman's Harbour.

Born November 2, 1932, in Deer Harbour (Random Island), Trinity Bay. Moved to Hickman's Harbour, Trinity Bay in 1967. Has worked as an inshore fisherman most of his life. Father was a fisherman and boatbuilder. Built first boat, a 25' trap skiff, at age 20. Has built thirty-forty boats in all, including rodneys, speedboats, and trap skiffs. Builds boats for his own use and to sell (new and used) to others. Interviewed at his home on May 25, 1982.

KEVIN KING, St. Jones Within.

Born March 13, 1953. Always lived in St. Jones Within, Trinity Bay. Worked in construction trade in various parts of Newfoundland for four to five years before starting to build boats full-time with his father, Bill, an experienced boatbuilder. Kevin's father, uncles, and grandfather are all boatbuilders. Took over family boatbuilding business from his father in 1982. Builds custom fishing boats with his younger brother, Wade. Builds mainly 30-33' open trap boats, and 35-36' small longliners. Interviewed at his home on February 25, 1983.

ARTHUR LAMBERT, Clifton.

Born Sept. 1, 1909, in Southport, Trinity Bay. Moved to Clifton, Trinity Bay, in 1945. Father was a fisherman and boatbuilder. Arthur worked as an inshore fisherman and fished "off the Labrador" for four years. Retired from fishing in 1965. Built boats steadily from 1965-79; usually built two to three boats per year. Built motor boats, trap skiffs, and longliners. Built some boats with son-in-law, Baxter Wiseman of Clifton. Interviewed at his home on April 8, 1980. Lambert died in 1981.

LLEWELLYN MEADUS, Grate's Cove.

Born May 29, 1918, in Grates Cove, Trinity Bay. Worked as inshore fisherman from age twelve until his retirement in 1983. As a young man, worked at Grate's Cove fish oil refinery for two summers. Learned boatbuilding from his father. Has built fifteen to twenty boats; most built for his own use. Has built flats (18-19'), and trap skiffs

(28'). Introduced design for flat with transom stern. Some boatbuilding done in conjunction with brothers, Clarence and Obediah. Took boatbuilding course at College of Fisheries, St. John's. Interviewed at his home on November 3, 1983.

OBEDIAH MEADUS, Grate's Cove.

Born August 2, 1924, in Grates Cove, Trinity Bay. Except for brief periods of employment in St. John's and Toronto, has always lived in Grate's Cove. Has worked mainly as an inshore fisherman. Took boatbuilding course at College of Fisheries with brother, Llewellyn. Has built boats part-time with brothers, Llewellyn and Clarence. Involved in construction of flats and trap skiffs for his own use. Interviewed at his home on June 16, 1982.

GEORGE PENNEY, Catalina.

Born September 9, 1915, in Keels, Bonavista Bay. Moved to Catalina, Trinity Bay, ca. 1968. Has worked as carpenter, sailor, and woodsman. Now mainly retired, but builds small boats occasionally and runs saw sharpening business. Learned boatbuilding from his father. Built first boat, a "hunting punt," at age thirteen. Has built about 25 boats, including dories, speedboats, sailboats, and motor boats. Interviewed at his home on May 26, 1982.

CLEMENT STONE, Lower Lance Cove.

Born 1907. Has always lived in Lower Lance Cove, Trinity Bay.

Father was a fisherman and boatbuilder. Worked mainly as a commercial inshore fisherman and built small boats on a part-time basis. Has built speedboats and motor boats for his own use and for local fishermen. At least four boats he built are currently in use by Lower Lance Cove fishermen. He is now retired from boatbuilding. Interviewed at his home on May 25, 1982. (Interview not tape recorded.)

EDWARD TOOPE, Trinity.

Born March 27, 1922, in Ireland's Eye, Trinity Bay. Father was a fisherman and boatbuilder. Father owned 63' (38 ton) fishing and coasting schooner. Family moved to Trinity in 1954. Edward fished "on the Labrador" for eight summers, and off the Southern Shore, out of Fermuse, for six summers. Has built approximately ten boats for his own use, ranging from a 17' rodney to a 30' motor boat. His used boats generally sold to local fishermen. Works as a "singlehanded" commercial fisherman, but considers himself semi-retired. Interviewed at his home on May 27, 1982.

WILSON VOKEY, Trinity.[5]

Born 1954. Family moved from Little Harbour, Trinity Bay to Trinity, Trinity Bay in 1963. Says boatbuilding goes back over 150 years in his family. His father (Joseph William Vokey) was a boatbuilder, and brothers, Henry and Sam, and cousin, Stan, were all engaged in boatbuilding at Trinity when fieldwork for the present study was conducted. Wilson began his own boatbuilding enterprise at age 17. At that time he worked alone and built speedboats. He then began to built trap skiffs. Hired crew and started own boatyard, ca. 1977. Wilson is one of the most prolific boatbuilders in the province. Built seventeen trap skiffs --most 30-32'-- in 1981. Builds mostly trap skiffs and longliners. Construction of 53' longliner commenced in 1981. His boats purchased by fishermen from throughout Newfoundland and southern Labrador. Interviewed at his boatyard on September 5, 1981. (Interview not tape recorded.)

II. Norway

KRISTIAN DJUPEVÅG, Tørvikbygd.

Born 1944 in Austevoll. Grandfather and father were fishermen there. In 1947, family moved into Hardanger and settled at Tørvikbygd where his father, after learning from a boatbuilder from Oma, started to build boats on his own. Kristian learned boatbuilding from his father. Beginning at about age eleven or twelve, he helped his father build rowing boats, particularly the Strandebarm-type færing. After finishing formal schooling, he apprenticed for two years with a boatbuilder in Os, working mainly on motor-powered craft. He learned drafting through evening classes at a technical school. Presently, operates a boatshop in Tørvikbygd with assistance from his father and his brother. The yard builds Lystbåtar up to 45 feet and specializes in gaff-rigged sailing vessels designed by Colin Archer, the famous designer and builder from Larvik. Djupervåg plays a leading role in the local boatbuilders' association, Hardanger Trebåtbyggjarlag. Interviewed aboard his boat Kristianna on June 16, 1983.

SVERRE HAUGEN, Herand.

Born July 9, 1931, in Herand, Hardangerfjord. Grandfather began a boatshop in Herand in 1891 which Sverre's father eventually took over, and subsequently passed on to Sverre. He began as a boatbuilding apprentice in 1947 and learned boatbuilding fundamentals from his father and grandfather. Today, Sverre works alone at his boatshop during the summer months, but hires a helper for the winter months. Boatbuilding is his most important source of income, but he also owns a grocery store near the boatshop which his wife manages, as well as a shipping business which handles goods sent to and from Herand. Sverre currently builds mainly carvel-planked commercial fishing boats between 30 and 38 feet in length. Fishing boat types he builds include sjarks, gavlbåtar, and større fiskebåtar. He also builds recreational cruisers called kryssar. Interviewed at his boatshop on June 17, 1983, and aboard the Jondal-Tørvikbygd ferry on June 18, 1983.

EINAR KOLLTVEIT, Røyrvik.[6]

Born 1911 at the family farm at Kolltveit, Hardangerfjord. Learned boatbuilding from his father and built first boat at age fourteen. At age eighteen moved to Os and learned how to build Oselver boats from the firm of Askvik & Sons. Moved to Strandebarm two years later. Has lived on present farm in Røyrvik since 1945. Einar has primarily been employed as a boatbuilder since 1945, but has occasionally done carpentry work between orders. He has built a type of row boat of the Strandebarm type, and a few _snekker_, but is primarily known as a builder of Oselver boats (i.e., _færingar_). Altogether, he has built approximately 800 boats during his career. Interviewed at his home on June 16, 1983.

ALF LINGA, Linga.

Born October 6, 1915, at the family farm in Linga, Hardangerfjord. Learned boatbuilding from his father who built boats part-time. Alf built his first boat when he was about fourteen years old. Like his father, he runs the small family farm and builds small boats to supplement his income. Working alone, he constructs clinker-built _færingar_ (also called _spissbåtar_) and _speglbåtar_ in the 14 to 17 foot range. In addition to boats sold directly to clients, some of his boats are sold through boat stores located in Stavanger, Haugesund, and Bergen. Alf estimates that he has built well over 500 boats. Interviewed at his home on June 17, 1983.

EINAR RØYRVIK and HARALD RØYRVIK, Røyrvik.

Harald was born in Røyrvik, Hardangerfjord, in 1911, and his son Einar was born in Røyrvik in 1946. Harald has been building boats since 1929 and running a small farm as well. After completing his military service in 1967, Einar built boats with his father until 1982 when he went to work at A/S Fjellstrand Aluminum Yachts in Oma, Hardangerfjord. Einar now builds boats mainly as a hobby when he is not at his regular job and also helps out around the family farm, particularly at harvest time. When Harald began to build boats, he mainly built færingar, and later, when outboard motors became available, small square-sterned boats. Since Einar joined Harald in the family boatbuilding business, they have built boats with motors almost exclusively. These boat types include gavlbåtar, snekker, and passbåtar. All the boats they have produced are clinker-built. Harald estimates that he has built between 800 and 900 boats during his career. Interviewed at their boatshop on June 18, 1983.

SIGVALD SELSVIK, Solesnes.

Born December 31, 1917 in Myrlid, Hardangerfjord. Later moved with his family to Solesnes, Hardangerfjord. Except for periods when he went away to learn carpentry at Gjøvik (north of Oslo), and to work as a boatbuilder in Sørlandet, he has lived in Solesnes all his life. His father was a professional boatbuilder and Sigvald started building boats with him at age fourteen or fifteen. When he worked with his father, he built mostly clinker-built snekker and row boats. Presently, Sigvald operates his own one-man shop at Solesnes and turns out two or three boats per year, including row boats, snekker, gavlbåtar, bastar båtar, and kryssarar. He builds mainly pleasure craft, 28 to 30 feet, using both carvel and clinker construction techniques. Interviewed at his boatshop on June 18, 1983.

PETTER BJØRN SOUTHALL, Strandvik.

Born 1960 in the United States (father is American, mother is Norwegian). Has been building boats since 1978. Gained first experience with boatbuilding as an apprentice at a boatshop in Sotra (west of Bergen) where 40-50' fishing boats were built. Then, attended Trebåtbyggjarskulen i Jondal (Wooden Boatbuilding School of Jondal). Following the completion of his training at the school, he found work at another boatshop and, on week-ends, learned about the construction of the Oselver from a builder who worked at Hordamuseum, Stend. He has built Oselvers in his one-man shop at Strandvik, Bjørnafjord, since 1981. He is a member of Os Båtbyggjarlag, the association of builders of the Oselver. Interviewed at his home in Strandvik on May 4, 1983.

ALF SØRNES, Fosse.

Born 1948 at Fosse, Hardangerfjord. Learned boatbuilding from his father. In 1972, after a few years of trying other kinds of employment, Alf returned to Fosse and became a professional boatbuilder. He has managed his own boatshop ever since. He builds a variety of clinker boats up to 24 feet in length, including prams, færingar, and speglbåtar. He enjoys experimenting with new designs and has created a unique design for a small double-hull vessel. Interviewed at his home on June 16, 1983.

OLAV VASSNES, Kolbeinsvik.

Born July 4, 1916. Learned boatbuilding from his father. The first boats he built were Oselver. Has also built speglbåtar, forlenga fiskebåtar, and sjarks, and modified large fishing boats by making them longer. Interviewed at his boatshop in Kolbeinsvik, in the kommune of Austevoll, on May 14, 1983.

Notes

1. For a profile of Russell Bishop, see Glen Fitzpatrick, "From Bricklayer to Boat Building," The Rounder May/June, 1982, 21.

2. A brief profile of Carpenter's boat building activities is given in a special issue of Decks Awash magazine devoted to boat building in Newfoundland. See, [Special Issue: Boat Building], Decks Awash 2, no. 2 (May, 1973), 20-21.

3. Carpenter established his shipyard on the site of the yard founded by the Fishermen's Protective Union (F.P.U.) in 1916. The founding of the yard is discussed by union president Sir W.F. Coaker in W.F. Coaker, ed., Twenty Years of the Fishermen's Protective Union of Newfoundland. 1930 rpt. (St. John's: Creative Printers and Publishers, 1984), 192.

4. French's boat building activities are described in detail in my study, Boat Building in Winterton, Trinity Bay, Newfoundland. Canadian Centre for Folk Culture Studies, Paper no. 41. Ottawa: National Museums of Canada, 1982. See, especially, pp. 137-163.

5. Information on the Vokey family is contained in John Over, "Traditional Newfoundland Schooner Launched at Trinity," The Packet [Clarenville, Nfld.] July 16, 1986, 2-3; and in [Special Issue: Boatbuilding], Decks Awash 2, no. 2 (May, 1973), 16.

6. For a concise account of methods used by Einar Kolltveit to build the Oselver, see Bjørn Skauge's article, "Bygging av Oselver: Blant de fineste battradisjoner vi har." Kysten, no. 2 (1980): 11-14.

GLOSSARY[1]

I. Hardangerfjord

Alen: unit of measurement equivalent to 24 inches (also: ell)

Archer, Colin: influential boat designer and builder born in Larvik, Norway (b. 1832, d. 1921); general name for any vessel designed by Colin Archer (i.e., "a Colin Archer")

Ask: the ash tree (*Fraxinus excelsior* L.)

Åttring: clinker-build, double-ended, eight-oared boat

År: oar

Bakrong: after-most timber of the older type of small craft, especially the færing

Bakstamn: after stem of a double-ended boat

Band: frame

Barkolt: rub rail; (also: rundeling)

Bau: bow, the forward section of a vessel

Belrong: after-most of the center-most timbers in the older type of small craft, especially the færing (also: hodlerong)

Bete: portion (along with the leist) of the upper section of a timber of the older type of small craft, especially the færing

Bile: small hand-axe used for hewing garboard planks on færing and other small traditional craft

Bonn: the garboard

Bord: a plank or a strake (literally, a board); (also: bordgang)

Bordgang: plank

Bordmal: a bevel gauge; literally, a "plank mould;" (also: bordvinkel; literally, "plank angle")

Botnaband: bottom timber

Botnabord: center-most of the three sections that make up the garboard plank of the older type of small craft, especially the færing

Byggevater: building level; a type of boat level (båtvater)

Børe: the middle plank of the older type of three-plank small craft, especially the færing

Båt: boat

Båtalen: measuring stick used for boat construction; (also: almål, båt-al, båtalne, båt-ell, båt-mål, mål)

Båtbyggeri: boat yard

Båtbygging: boatbuilding

Båthavn: boat harbor

Båtmannskap: boat crew

Båtnaust: boathouse

Båtsaum: rivet for fastening planks of clinker-built boats

Båtvater: boat level; device for checking angle of planks during construction; (also: bordmål, bordvinkel, legpasser, loddbrett, løddskjeva, pass, vater)

Dekk: deck

Eik: the oak tree; the two principal Norwegian species are sommareik (Quercus robur) and vintereik (Quercus petraea)

Ell: unit of measurement, one ell is equivalent to 24 inches

Esing: rail

Esingastø: the top-most plank on a hull; the sheer strake

Farkoster: vessel

Famn: unit of measurement equal to 6 feet; a fathom

Fembøring: the largest of open fishing boats found in Northern Norway

Fingerbreidder: unit of measure equivalent to the breadth of a finger

Fiskebåt: fishing boat

Fiskefartøy: fishing vessel

Fiskeridirektoratet: state office of fisheries

Fokk: foresail

Fot: foot, unit of measure

Frambete: forward-most of the three principal timbers set in the middle part of the older type of small craft, especially the færing (also: framband)

Framrong: forward-most set of timber in the older type of small craft, especially the færing

Fullt Spantsett: full set of timber (rib) moulds

Furu: the pine tree (Pinus silvestris, the only species of pine in Norway)

Færing: older type of clinker-built, four-oared boat

Føringsskuter: type of vessel used in Bergen, and other busy harbors, in the past for the storage of cargoes off-loaded from ships or awaiting loading aboard ships; boats had large deck houses with pitched roofs

Galeas: two-masted, ketch-rigged vessel

Gavlbåt: open, square-stern fishing boat with net roller mounted atop transom; literally: gable boat (as in gable end of a house)

Halsane: forward and after sections of garboard plank of the older type of small craft, especially the færing

Halvmodell: half-model

Hardangerbåt: a boat from Hardanger

Hekksbåt: a ship's boat; a tender

Hordalandbåt: a boat from Hordaland

Hylsa: packing box for propeller shaft in after stem

Jakt: type of sloop-rigged coasting vessel

Jekt: type of single-mast, square-rigged coasting vessel usually with open hold

Jolle: dingy

Kane: detail on the stems of traditional craft from Hordaland

Keip: boat part used to hold oar in place while rowing; a type of oar lock (tollegang); (also: kjeip)

Kiming: the turn of the bilge; (also: kjiming); (another meaning for this dialectal term is "horizon")

Kirkebåt: church boat

Kjøl: keel

Kjølbord: the garboard, the lower-most plank on a hull; (literally: the keel board)

Kjølsoster: keel batten

Klinkbygde: clinker-built (i.e., boats built with the clinker or overlapping planking technique)

Klyver: jib sail

Kontrolvater: control level, a type of boat level

Kne: knee, a naturally-grown timber with two arms at approximately right angles

Kraftblokk: hydraulic device used on fishing boats to retrieve nets; a power-block

Kravellbygde: carvel-built (i.e., boats built with the carvel, or edge-to-edge planking technique)

Kryssar: cruiser; double-ended decked vessel powered by an inboard engine and used for commercial fishing or recreational cruising

Kutter: cutter; decked commercial fishing vessel with inboard engine and elliptical counter

Leist: portion (along with the bete) of the upper section of a timber of the older type of small craft, especially the færing

Listerbåt: boat type from the Lista Peninsula of South Norway; especially heavily constructed sprit- and gaff-rigged vessels developed in the early 19th century for use as pilot boats and fishing boats

Livbåt: life boat

Lot: curved timber joining the stem and the keel

Lystbåt: pleasure boat

Lystjakt: pleasure yacht, yacht

Løddskiva: check level used for checking proper angles of planks during construction; literally, a slanted weight; (also: løddskjeva, vateren)

Mal: mould or template used in boat construction (also: skant)

Mast: mast; wooden pole set vertically on or through the deck of a vessel upon which sails are rigged

Midbete: middle rib or timber of the older type of small craft, especially the færing (also: midband)

Midt i båt: literary, the middle of the boat; generally used to identify the point of maximum beam

Midtband: midship timber

Midtmalen: middle mould

Modell: model

Motorsnekke: motorized, clinker-built, double-ended cabin cruiser (also: snekke)

Målepunkt: measuring point

Nagle: nail

Nat: seam between planks

Naust: boat house

Navarong: small knee connecting sheerstrakes at the stem

Norsk Fot: Norwegian foot; unit of measure equivalent to 31.4 centimeters

<u>Oselvar</u>: boat type from Os; an Os estuary boat; (also: <u>Oselver</u>)

<u>Owatrol</u>: brand name of popular finishing oil used on boats

<u>Passbåt</u>: speedboat

<u>Plankebitar</u>: pieces of wood or planks; boatbuilders often write key measurements down on such scraps of wood which they then tack up inside their shops for future reference

<u>Plattgatter</u>: flat-stern boat

<u>Pram</u>: small, clinker-built rowing craft with square bow and stern

<u>Rang</u>: breasthook

<u>Ripe</u>: sheer strake or plank

<u>Reisingå</u>: the height of the sheer line

<u>Reisingamål</u>: height of stem and stern

<u>Robåt</u>: row boat

<u>Rong</u>: forward-most or after-most timber in the older type of small craft, especially the <u>færing</u>

<u>Ror</u>: rudder

<u>Rorarom</u>: rowing room; area of a boat occupied by a rower

<u>Rorbeslag</u>: gudgeons; hangers for rudder

<u>Rorstang</u>: rudder

<u>Segl</u>: sail (also: <u>seil</u>)

<u>Seglbåt</u>: sail boat (also: <u>seilbåt</u>)

<u>Seil</u>: sail

<u>Seilbåt</u>: sail boat

<u>Seksæring</u>: six-oared boat

<u>Skant</u>: type of mould

Skore: narrow lengths of wood used to support hull of boat during construction process (literally: sticks)

Skrog: hull

Skøyte: smack; a double-ended, decked vessel used for fishing or transporting fish

Sisnor: string inserted between planks to insure watertightness; a type of luting

Sjark: fishing boat (approx. 30-40 ft. in length) with forward pilot house

Sjøfartsmuseum: maritime museum

Skamplun: mould or half-model; (also: skabelon)

Skant: mould

Skaring: joint between kjøl and lot

Skip: ship

Skøytebåt: a fishing smack

Sladre: device for checking the angle of planks during construction; literally, a tattle-tale; (also: båtvater, or vater)

Slipp: slip for boat

Snekke: double-ended, motorized pleasure boat with forward house and cabin, usually 20-25 feet in length; (also: motorsnekke)

Spant: side timber

Speglbåt: small, clinker-built craft with square stern to accommodate an outboard motor; (also: speilbåt)

Speilbåt: small, clinker-built craft of the færing type with squared-off stern for an outboard motor; literally "mirror boat" (the shape of the stern resembles a hand mirror); (also: speglbåt)

Speglet: square stern (also: speilen, spegelet, spegelen, speielen)

Spissbåt: double-ended craft (e.g., færing, seksæring, etc.); literally, a pointed boat

Spolinga: rabbet; (spolinga is the dialectal rendering of spunning)

Spunning: rabbet

Spri: sprit

Spring: the sheer; the line described by the top edge of a hull

Staff: decorative grooves cut into edges of planks and other boat parts

Staffing: the process of cutting decorative grooves on the outboard edges of planks (also: streking, or kroting)

Stamn: stem; (also: stavn)

Stilken: transom; (also: stilkjen)

Storseil: main sail

Storstokker: large sticks use to support hull during construction; sticks usually wedged between overhead beam running down centerline of hull and parts of the hull

Stry: cotton thread or twine placed between planks to ensure a watertight seal

Større Fiskebåt: large fishing boats built up until the 1950s

Tilje: floorboard

Tiæring: ten-oared boat

Tofte: thwart

Tolle: thole

Tollegang: oar lock

Tollepinne: thole pin

Tolværing: twelve-oared boat

Tomme: inch; literally, "width of thumb"

Tre: wood

Trebåtbyggjarlag: wooden boatbuilders' association

Trebåtbyggjarskulen: wooden boatbuilding school

Trebåtmessa: wooden boat festival

Trenagle: treenail; a wooden pin used for fastening planks or timbers

Turbåt: touring boat

Underband: lowest section of the components that make up a *bete* (timber) of the older type of small craft

Utenbordsmotor: outboard motor

Vandrelærarar i Kravellbygging: traveling instructors of carvel building

Vannfast Kryssfiner: waterproof plywood

Vannlinje: waterline

Vater: level; device for checking angle of planks during construction; (also: *båtvater* or *sladre*)

Vestlandsbåtar: boats of western Norway

Åttring: eight-oared boat

II. Trinity Bay

After Hook: the furthest aft of the three primary timber pairs

After Pitchers: timber pairs in the after end of a boat, usually those aft of the after hook

Bay Punt: round-bottom, open boat, usually 18-19 feet in length, used for seal and bird hunting; (also: hunting punt)

Bearing: resistance to being pressed downward into the water

Bulge: the area of the hull when the side meets the bottom; the turn of the bilge; (also: crop of the bulge)

Cling: amount of perpendicularity in side of boat hull; straight-sidedness

Cod Trap: a fishing device; floored pound net, approximately 60 fathoms in circumference and 10 fathoms deep, held in place with floats and anchors and connected to the shore with a leader net

Counter: the transom face

Crop of the Bulge: the turn of the bilge (see: bulge)

First Abaft: timber pair located midway between the midship bend and the after hook

First of Fore: timber pair located midway between the fore hook and the midship bend

Flare: degree of outward spread in the area of a hull between the waterline and the rail

Flat: carvel-planked open boat, 15-24 feet in length, powered by an outboard motor; used for fishing and bird and seal hunting

Fore Hook: forwardmost of the three primary timber pairs

Forward Pitchers: forwardmost timber pairs, usually those forward of the fore hook

Half Model: scale model of one-half of planned vessel used to develop design and, later, to transfer design to full-size

Half-hull Model: see Half Model

Heave Out: see List Out

Hollowing: degree of concavity, usually in the area of a hull between the turn of the bilge and the keel

Keel: the main structural member of a vessel running fore-and-aft along the centerline of the hull

Knee: a naturally-curved wooden boat part with arms forming an angle of approximately 90 degrees

List Out: to lean out; to tip outboard

Longliner: type of multi-purpose commercial fishing vessel, approximately 35-65 ft. in length

Lop: state of the sea characterized by short, choppy waves

Midship Bend: the centermost of the three primary timber pairs

[illegible] (1) a vessel design; (2) a half model; (3) to shape or design

Mo[illegible] Boat: round-bottom, carvel-planked open fishing boat, usually 20-34 feet in length, powered by an inboard engine

Mould: (1) to shape, to mould-out; (2) one of several patterns used to lay out timber shapes (pattern mould); (3) one of several transverse sections set on stations across the keel around which planks are bent to obtain the shape of the hull

Moulds: three-piece adjustable templates used to obtain timber shapes via whole moulding

Nook: a sharp or pronounced curve

Plank: one of a series of boards that make up the outer surface of a hull

Punt: general term for small, open fishing boats of the displacement hull type (for example, a rodney is a type of punt)

Rake: inclination from the perpendicular

Ribband: thin, flexible strips of wood

Rising: vertical distance between the bottom of the keel and the turn of the bilge; deadrise

Rising Board: rectangular piece of wood, corresponding to the cross-section of the keel, that is one part of a set of three-piece adjustable moulds

Rodney: carvel-planked, open fishing boat, 15-17 feet in length, usually powered by an outboard power

Schooner: fore-and-aft rigged vessel with two or more masts used for fishing or in the coasting trade

Skiff: open fishing boat, 26-34 feet in length, powered by an inboard engine; (also: trap skiff)

Sheer: the longitudinal curvature of the deck between the stem and the sternpost

Side Model: see Half Model

Sir Marks: points or stations marked on moulds

Speed Boat: see Flat

Stem: the upright post of the bow; the forwardmost part of the hull

Stern: the aftermost part of a vessel

Suttle: a timber pair

Suent: smooth; possessing a fair curve

Timber: a rib or frame; wooden transverse members assembled in pairs that are fastened to the keel and the planks

Timber Line: baseline draw on the keel used in the establishment of sheer heights

Trap Skiff: round-bottom, carvel planked open fishing boat, usually 26-34 feet in length, powered by an inboard engine

Tuck: the point where the bottom of the counter (outboard face of transom) meets the sternpost

Var: the balsam fir (Abies balsamea)

Wall-sided: large amount of verticality in the side of a vessel; straight-sided

Notes

1. The Norwegian portion of this glossary is alphabetized in accordance with the customary practice. That is, the letters æ, ø, and å follow the same twenty-six letters used in the English alphabet.