

Fishery Leaflet 318 *

Washington 25, D. C.

September 1948

NOTES ON SHRIMP FISHING ALONG THE NEW ENGLAND COAST

By Lionel A. Walford, Chief, Branch of Fishery Biology

There lives along the North American coast from Cape Cod to Nova Scotia a large population of Northern shrimps. These are deep water animals, found in depths of 35 to over 400 fathoms, very different in appearance from the small shrimps of shallow brackish sloughs or from the large ones of the Gulf of Mexico. They are the largest shrimps of the New England coast, reaching a total length of about eight inches, and the most brilliantly colored, being deep pink to bright red all over the body.

They are most commonly found in water of 60 to 100 fathoms in depth, usually (though not always) on soft mud. During the late winter, however, they move inshore to spawn in depths of 20 to 50 fathoms. At that time they are often taken incidentally in lobster pots or in flounder trawls. Some time in late spring or early summer they return to their usual haunts in deeper water. They may be taken on the bottom only during the day and in greatest quantities on brightest days. They are usually found in regions where several kinds of bottom-living fishes are also abundant. Hence, catches of shrimps are nearly always associated with large quantities of rosefish (bream), whiting, hake, flounders, etc.

Although it has long been known that northern shrimps are probably commercially abundant, their habits are such that special gear and methods are needed to catch them in profitable quantities. Hence, fishermen have been acquainted with them only by occasional incidental catches on inshore grounds during the late winter. In 1927, the General Seafoods Corporation built special gear, engaged a boat, and carried on a number of fishing experiments to investigate the extent of a possible shrimp fishery. Although their work showed that the shrimps are indeed commercially abundant on the New England coast, it was discontinued owing to the fact that there was at that time no market for the large number of rosefish and whiting taken along with the shrimps.

That objection being now no longer tenable, another series of fishing experiments was carried on this year at the suggestion of Dr. Jehan Hjort, the scientist who instituted the fishery for these shrimps in Norway. The work was done on board the fishing schooner NEW DAWN, and under the auspices of the Fisherman's Relief Corporation of Portland, Maine, and the Federated Fishing Boats of New England and New York, Inc. Captain H. Hoium, a Norwegian shrimp fisherman, came to this country especially to demonstrate the gear and the methods used in Norway, and the writer was detailed by the U. S. Bureau of Fisheries to observe and report the experiments.

The principal result of this work, beside giving data on the distribution of the shrimps, was to convince fishermen who were on board the NEW DAWN that there is a potential fishery here for small boats of 30 to 60 feet. In addition to the catches made on the NEW DAWN, we have collected records from various sources of other catches, made by the research vessel ATLANTIS of the Woods Hole Oceanographic Institution, by the General Seafoods Corporation boat, and by individual fishermen interviewed along the coast from Boston to Eastport. The locations of these catches are shown in figure 1.

Catching and Marketing the Northern Shrimp Fishing Gear.

The gear which Captain Hoium had on the NEW DAWN was typical of that generally used by shrimp fishermen in Norway, where the otter trawl is the standard gear for this work. In essential respects it was not very unlike American trawls. In the net proper there was no particular feature without which shrimps could not be caught, other than a mesh size small enough to hold the shrimps (but not smaller than $1\frac{3}{4}$ inches; otherwise too many small shrimp would be caught). The type of net used in Norway is shown diagrammatically in figures 2 and 3. The cost of the twine is approximately \$50.00.

The Norwegian shrimp trawl has been designed particularly to make clean hauls free of mud; for if mud and shrimps are permitted to mix in the net, the shrimps are entirely ruined for the market. This problem has been solved by attaching a sweep-rope which hangs six inches below the foot-rope, suspended by several short pieces of heavy twine which are spaced about seven inches apart in the middle of the net to three feet apart in the wings. The sweep-rope should be made of old rope that will not kink and can be weighted with stone, lead or chain weights of one to two pounds each attached at points where the short lengths of twine connecting sweep-rope to foot-rope are fastened. The sweep-rope may be the same length as the foot-rope, or it may extend about five inches past the end of each wing. It is fastened at its end directly to the foot-rope. Head-rope and foot-rope continue past the end of the wing for about $6\frac{1}{2}$ feet to form a wing bridle. Each wing is kept spread by a spreader stick which is attached between head- and foot-ropes about 16 inches beyond the end of the wing. The head-rope is buoyed with glass floats. The balance between the floats on the head-rope and the weights on the sweep-rope is so adjusted that the weights of the sweep-rope drag on the bottom while the foot-rope remains above bottom, thus keeping the meshes of the net out of the mud.

The otter boards, which weighed about 100 pounds each, were made of $1\frac{7}{8}$ inch oak planks, and were 35 inches long by $27\frac{1}{2}$ inches high, including the shoes. The shoe was a piece of iron $5\frac{1}{2}$ inches wide by $1\frac{7}{8}$ inches thick, viz., as thick as the planking, fitting edgewise along the bottom edge of the lowermost wooden plank, forming thus the bottom plank of the door. Each board was provided with a three-way chain bracket for the towing wire attachment and a two-way chain bracket for the net attachment; and was connected to the net by a line eight to 10 fathoms long. The bridle wires, 100 fathoms long, were of $\frac{3}{8}$ inch steel cable.

Captain Hoium's operation of the gear was essentially the same as for ordinary otter-trawl dragging, with one exception; and of this he made an important point: The net must not drag on the bottom faster and not much slower than

about $1\frac{1}{2}$ miles an hour. This fact, the explanation of which no theory was offered, was learned in Norway only after much experimenting with various speeds.

On reaching the surface, the wings, square and part of the belly were hauled aboard, thus concentrating the catch in the cod-end. Then Captain Hoiium stirred the catch with a long pole, in order to separate the shrimps which sank to the bottom of the bag, from the rosefish, which floated to the top. Then he divided the bag into two sections with a splitting strap and hauled aboard the lower cod-end section containing the shrimps. The cod-end was then re-tied and dropped overboard, the remaining fish collected into it, and again hauled on deck with the balance of the catch.

Preparation of Shrimps for Market.

As soon as the shrimps were landed, they were collected at once, cleaned of all invertebrate animals and of bottom debris, and cooked as soon as possible. It was Captain Hoiium's contention, and the observers on the NEW DAWN generally agreed, that the sooner the shrimps are cooked, the better their flavor. Ideally, they should be cooked like lobsters, dumped quickly into vigorously boiling water while still alive. Therefore, it is necessary to have cookers on board for this purpose.

On the NEW DAWN gasoline stoves were used on deck, protected from wind and water by iron drums in which a door had been cut, and from the danger of fire by asbestos wrappings around the gasoline container. The cooking re-torts were 15 gallon galvanized cans, which were suspended on the inside of the drum by hooks from the top. The essential feature of the cooking apparatus, however, is that the flame of the stove must be constantly strong enough to boil a large quantity of water quickly, and keep it boiling vigorously.

In Norway, 30 to 40 pounds of shrimps are dumped (not poured) into 10 gallons of boiling sea water, to which is added four quarts of coarse - ground salt. Smaller quantities may be used in similar proportions. The best results are obtained by cooking the shrimps in small lots. As soon as they are in the water, they are stirred thoroughly and the container tightly covered. They are permitted to cook about two minutes after the water again comes to a vigorous boil. They are then removed with a dip-net and spread out in a shallow layer in clean boxes to cool. When cold, they are packed in tightly covered tins and put on ice. Fresh water or ice must never come in direct contact with them during the commercial handling.

The same cooking water may be used repeatedly until about 150 pounds of shrimps have been cooked in it, after which fresh water must be prepared. After the first lot has been cooked, more salt ("a handful") must be added for each additional lot. The salt acts as a preservative. Although the quantity used by Norwegians may prove too much for American taste, it can be largely removed by soaking the shrimps in fresh water before preparing them for the table.

There are several ways of preparing shrimp for market: (1) Raw whole, (2) Raw headed, (3) Raw peeled (fresh), (4) Raw peeled (frozen), (5) Cooked whole, (6) Cooked headed, and (7) Cooked peeled. Only a long period of market experimenting will tell which method will be most successful. It must be remembered, however, that if the shrimps are sold raw, they will probably meet unfavorable competition with the southern species, of which the flesh is firmer and which keep longer. If they are sold cooked, on the other hand, it is possible they may be taken by the public as an entirely new product.

Can a Profitable Shrimp Industry Be Developed in the Gulf of Maine?

Observers on board the NEW DAWN who are professional fishermen felt convinced at the conclusion of the experimental fishing that enough shrimp live in the Gulf of Maine to support a fishery, and that this fishery would probably be most profitably carried on by boats of the 30 to 60 foot class. It thus remains only for fishermen to obtain the necessary gear and begin.

As to how much money such a boat can expect to make at shrimp fishing, that cannot be told in advance any more easily than how much money a boat can make at haddock dragging. As much depends upon the market as on the boat and fishermen. Wholesale dealers in Portland and Boston, however, have given assurance that they can absorb any quantity of shrimp taken in New England.

Fortunately, in addition to the shrimps which are caught in the small-meshed trawl, a large quantity of fish are also taken, which can contribute considerably to the profits of shrimping. For every hundred pounds of shrimp caught on the NEW DAWN there were 500 pounds of rosefish (redfish or bream), 300 pounds of whiting (silver hake), and 80 pounds of miscellaneous fishes like flounders, cusk, cod, and haddock. Thus, more money was made from the fish than from the shrimps.

Conservation.

Whatever kind of gear is selected for shrimp fishing in New England, whether the Norwegian net or the General Seafoods Corporation net, or a combination of the two, or the beam trawl, or traps, small mesh must be used; and the time to decide what is the best size of mesh is now, at the beginning, not later, after people have already invested their money. If the mesh size is too small, the catch will consist of many small shrimps of unmarketable size, which must be laboriously picked out and thrown overboard. Furthermore, such wholesale destruction of young shrimp before they have had a chance to spawn will eventually result in depletion of the population and consequent ruination of any industry that may be developed. A stretched mesh size of 1 3/4 inches will take mostly the marketable and mature shrimp, and free the unsalable young ones. Mesh smaller than that size will be unnecessarily destructive to the young. The use of such a mesh from the beginning may very well obviate any later need for closed seasons, restricted fishing areas, and other desperate measures to save the population.

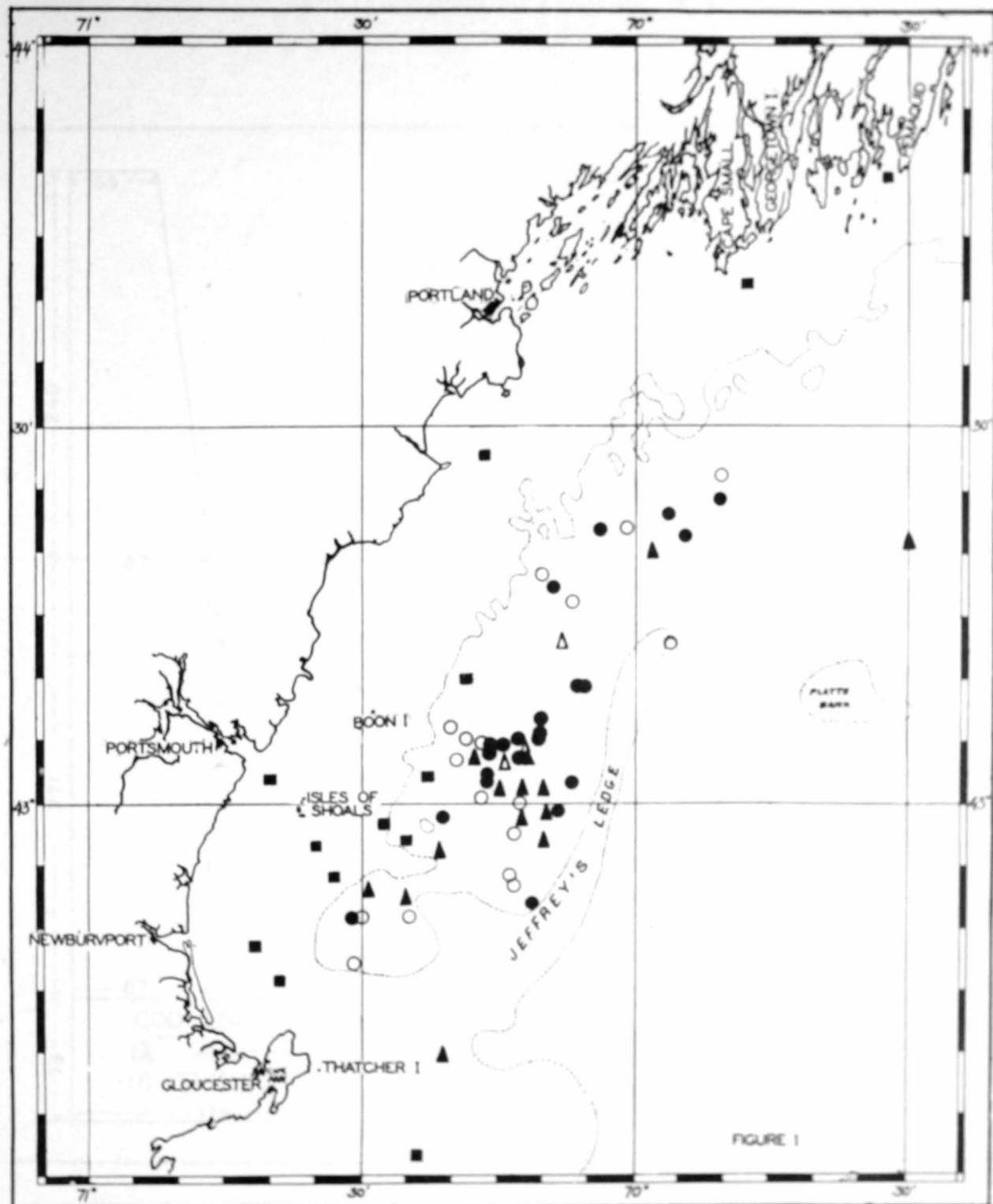
Explanation of Figures.

Figure 1. - Showing where northern shrimps have been taken along the New England coast. Triangles indicate summer catches made by the ATLANTIS, by the vessel of the General Seafoods Corporation, and others. Circles represent autumn catches, made mostly by the NEW DAWN.

Rectangles indicate winter catches made by various people. Blackened figures represent catches of more than 30 pounds; open figures catches of less than 30 pounds per hour of dragging.

Figure 2. - Plan of a shrimp trawl generally used in Norway. All dimensions are in mesh counts, unless otherwise stated. The cod-end is made of $1\frac{3}{4}$ inch mesh, 12 thread twine.

Figure 3. - Bottom view of a Norwegian shrimp trawl, showing the relation between the dimensions of foot- and head-ropes and the parts of the net.



202009

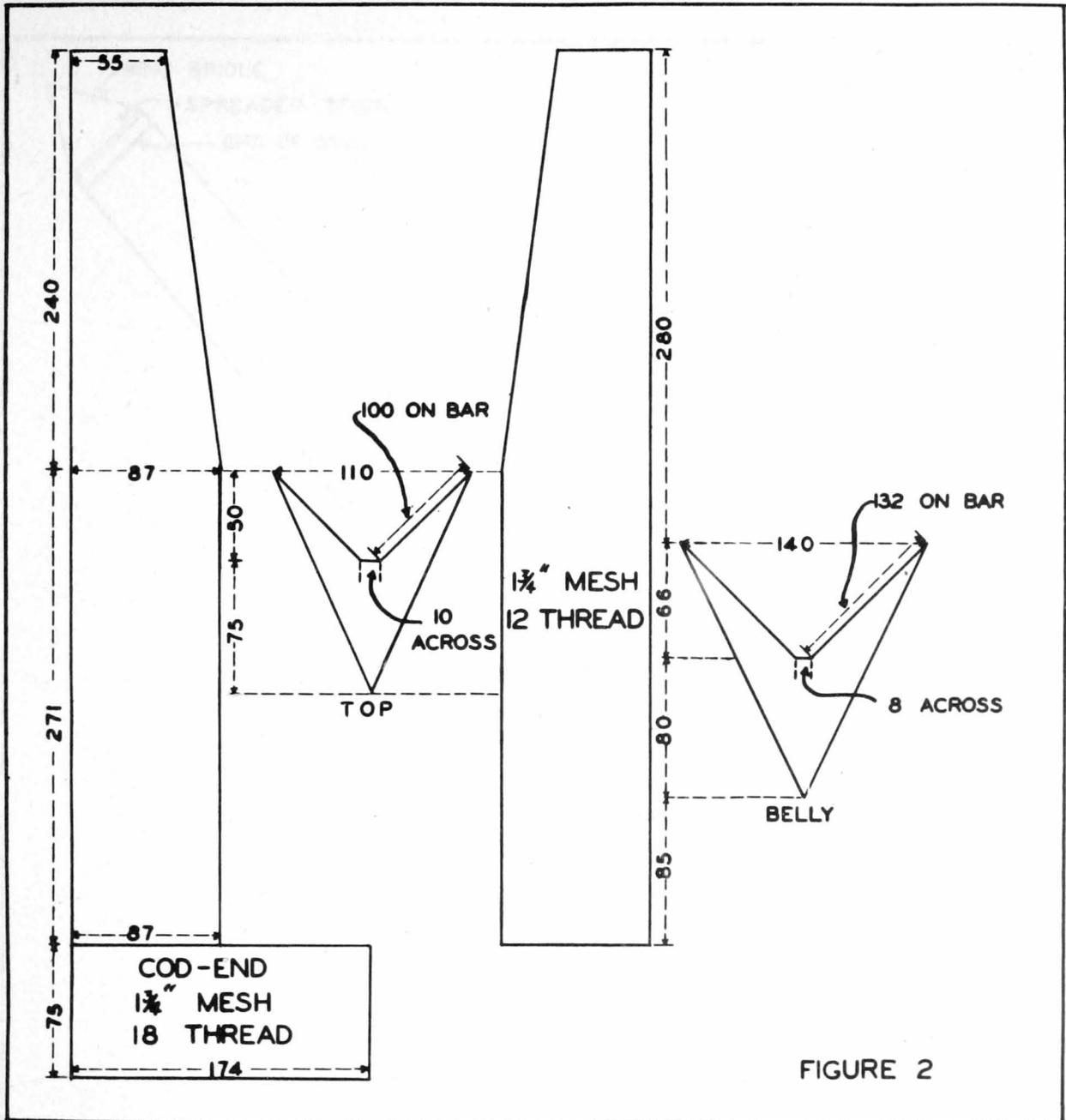


FIGURE 2

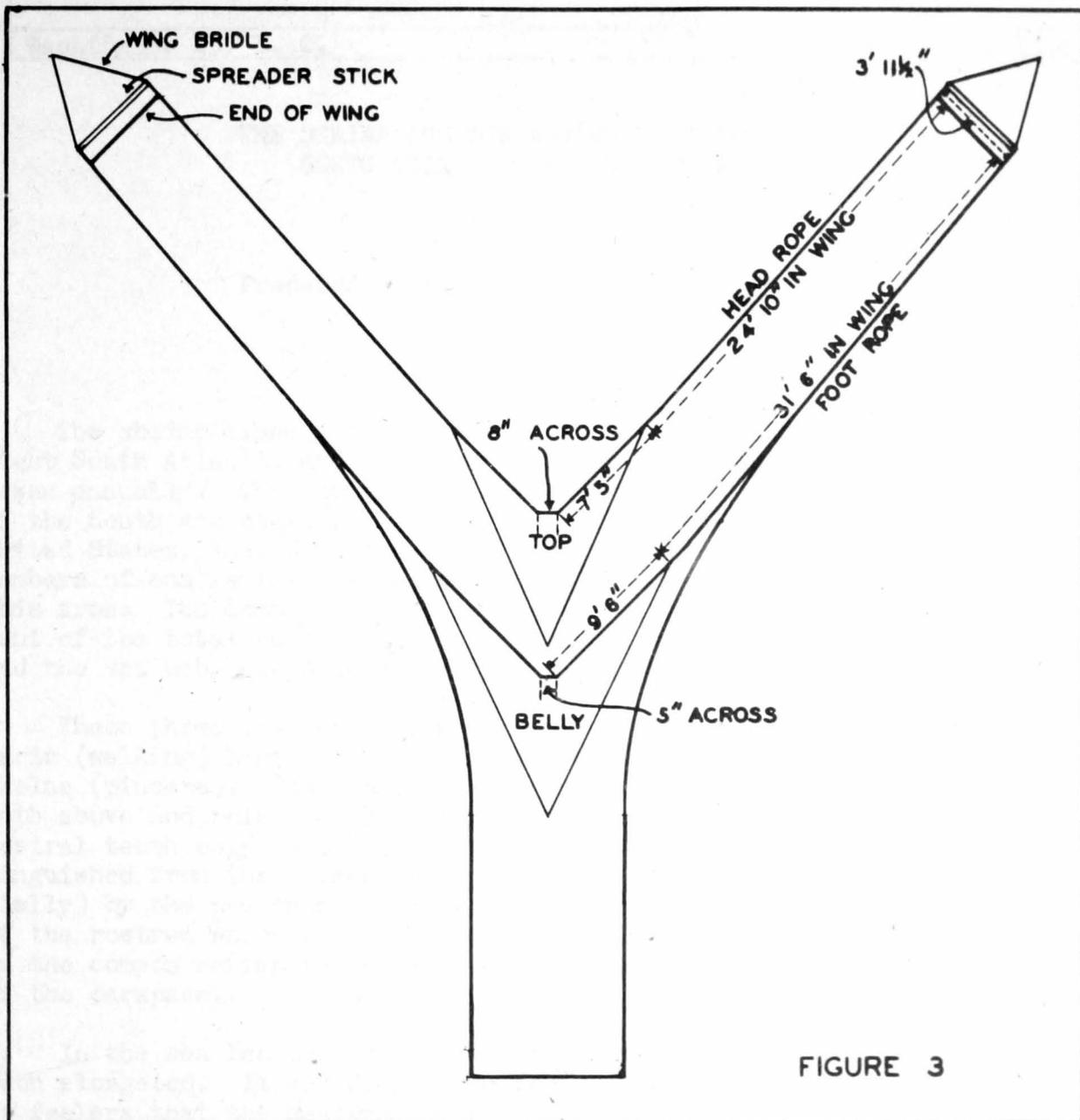


FIGURE 3