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Experiments to improve lobster traps.

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Experiments to Improve Lobster Traps

Lobster fishermen in the Maritime Provinces and Quebec fish about two million lobster traps valued at over six million dollars. Annual trap losses for the area as a whole are difficult to estimate but it is known that losses exceed 25% in some areas in certain years. If an efficient, more durable, reasonably priced trap could be developed greater profits could be realized from the fishery.

In an attempt to develop a more durable trap that would catch lobsters as efficiently as the conventional wooden trap, experiments were started in the summer of 1953 and continued through 1955. The results of these experiments were made known to the industry in February, 1955, at a meeting in Halifax. The outcome of this meeting was a series of experiments arranged and supervised by personnel of the Department's Fishermen's Indemnity Fund. These latter experiments are not considered in this report.

Conventional wooden traps

Although there is a great variety of wooden traps, most fall into two general types -- the three-bow and the four-bow traps.

The three-bow traps vary in overall length from 26" to 36", in outside width from 16" to 28" and in height from 11" to 15". Most of these traps have a rounded top that follows the natural curve of the wooden bows. Some, however, are built with

sloping sides and flat tops, presumably because they are easier to stack. They are usually provided with two twine fishing heads on opposite sides of the "kitchen" end of the trap. These heads are usually fitted with wooden fishing rings of 4" to 6" inside diameter. A third twine head leads from the "kitchen" to the "parlour" end of the trap. The three-bow trap is more widely used in the Maritimes than the four-bow.

The four-bow traps vary in length from 42" to 48", in width from 18" to 29" and in height from 12" to 16". They are usually provided with two side fishing heads near the centre of the trap and one end head, all of which enter the "kitchen". A fourth head leads from the "kitchen" to the "parlour". The four-bow traps are popular in southern Nova Scotia but are also fished in other areas, particularly certain sections of Northumberland Strait.

Conventional traps are made of laths and cotton or nylon netting built around a wooden frame. Even when heavily ballasted with stones or poured concrete and well soaked, such traps are relatively light in the water. Three-bow ballasted, soaked traps which weighed 58 to 67 pounds in air weighed only 16 to 32 pounds in water. Similarly, four-bow traps which weighed 109 pounds in air weighed only 29 pounds in water. Such relatively light traps with a large surface area and a high, rounded design are very subject to wave action. In certain areas such as the northern half of Northumberland Strait where lobsters are fished during August and September,

the wooden traps are subject to destruction by ship-worms.

Experimental traps

The conventional wooden traps have evolved over a long period as a result of innumerable trials by many fishermen. Undoubtedly a more durable, efficient, wooden trap could be designed. It was felt, however, that more rapid progress towards developing a more durable trap would be made by experimenting with materials other than wood. In the experimental traps built and tested by this Station, only the question of materials has been considered, the traps being patterned after the wooden traps most popular in the experimental areas. In addition to these, four traps of novel design were built at the Technological Station, Halifax, N. S., one by the Aluminum Company of Canada, and one by the LaPierre Boatworks, Belfast, Maine. Photographs (Figures 2 to 14) and specifications of these 15 experimental models are attached.

The traps built at St. Andrews (Models 1 to 9) were made with an iron framework covered with steel rods, or steel, aluminum or cotton mesh. Compared to soaked, ballasted, wooden traps, these metal traps were relatively light in air (21 to 56 pounds) and relatively heavy in water (18 to 50 pounds). They did not require ballast.

Three (Models 10 to 12) of the four traps built at the Technological Station were made almost entirely of aluminum. The fourth trap (Model 13), box-like in design, was made of galvanized sheet iron. The trap (Model 14) built by the Aluminum Company of Canada was the sturdiest of the aluminum

traps. The plastic trap (Model 15) was built by LaPierre Boatworks.

Fishing experiments

1. Miminegash, P. E. I., 1953 Experiment.

From August 18 to September 25, 1953, two iron-framed traps covered with light chicken wire (Model 1) were fished with two wooden traps off Miminegash, P. E. I. In 36 comparable trap hauls, the wooden traps caught 60 lobsters (shorts and legal-sized), the metal traps only 23 lobsters (38%), a significant difference in favour of the wooden traps. There was no obvious reason for this difference. No storms serious enough to damage either the wooden or metal traps occurred during the experimental period.

2. Port Maitland, N. S., 1953-54 Experiment.

From November 2 to 6, 1953, four iron-framed, steel-rod traps (Model 2) were fished off Port Maitland, Yarmouth County, N.S., before the season opened. On the basis of experience gained from this pre-season fishing, 11 slightly modified traps (Model 3) were built during November. The steel rods on the sides, top and one end of these traps were spaced 1½" rather than 1 5/8" to make them more comparable with the wooden traps. The spaces on the floor of the trap were narrowed to 1" to reduce damage to the lobsters' legs which protruded through wider spaces. These changes increased the weight of the traps in air about 8 pounds. The 15 traps (Models 2 and 3) were fished with 15 wooden traps from December 1, 1953, to March 29, 1954.

During February, 1954, 15 new metal traps (Models 4 and 5) were built. On a suggestion from the fishermen, each of the outside dimensions was reduced 4" to make the inside dimensions more comparable with the wooden traps. This did, of course, alter the general proportions of the trap and this may have affected its efficiency adversely. This model was strengthened with a bottom framework of 1" by $\frac{1}{4}$" angle iron. Before these traps were built, observations made in tanks indicated that wide spaces along the lower sides of the trap made it difficult for the lobsters to find the fishing heads. As they approached the trap they inserted their claws through the wide spaces and often remained there motionless for long periods. Presumably, this effect would be greatest when the water was cold and the lobsters inactive. To correct this, extra steel rods were added to the lower sides of the traps to reduce the first three spaces to about $\frac{3}{4}$". The addition of these rods and the angle-iron frame made the Model 4 trap about four pounds heavier in air that the somewhat larger Model 3 trap.

The single Model 5 trap was similar in design to the Model 4 traps but was covered with steel chain-link wire mesh. The meshes were about $1\frac{1}{2}$" inside square measure. This model weighed six pounds less than the Model 4 traps. These new traps were fished from March 24, 1954, to May 28, 1954.

The experimental traps were compared with the conventional wooden traps by setting them singly in a line, with the metal and wooden traps alternated. Each day the traps were fished, the number and condition of the traps and the

numbers of lobsters caught were recorded. These daily catches are recorded in Table I for Models 2 and 3 and in Table II for Models 4 and 5. After a few hauls certain difficulties or "bugs" were discovered in the metal traps. In many cases when the traps were hauled the doors were found sprung open. The cotton heads quickly rotted away where they came in contact with the rusty iron frame. A few of the numerous welds gave way. The metal bait spindles used in the early models did not hold the bait bags well and were later discarded. One major objective of the experiment was to find out whether metal traps in good fishing order would fish as efficiently as wooden traps. In comparing efficiency, metal traps found with doors open, heads out or bait missing were considered as not having been fished that particular day. This treatment assumes that these "bugs" can be eliminated in later models. On some days the same number of wooden and metal traps could not be fished. in these cases the larger number of trap hauls was reduced to correspond and the catch adjusted proportionately. The adjusted catches of legal-sized lobsters grouped by half-monthly periods are listed in Table III.

Table I. Number of lobsters caught in metal (Models 2 and 3) and wooden traps fished off Port Maitland, N. S., November 2, 1953, to March 29, 1954.

Date	Metal traps			Wooden traps			Comments
	No. traps	No. shorts	No. mkts.	No. traps	No. shorts	No. mkts.	
Nov. 2	8	7	27	8	16	25	Two hauls.
3	12	15	17	12	21	14	Three hauls.
6	8	7	10	8	10	16	Two hauls
Dec. 1 AM	15	53	60	15	35	60	3 metal traps not fishing (doors open).
1 PM	15	30	24	15	39	45	2 metal traps not fishing (doors open).
4 AM	15	37	34	15	32	34	2 metal traps not fishing (doors open); 2 wooden traps damaged but in fishing order.
4 PM	11	21	14	9	22	20	1 metal trap not fishing (bait missing).
5	9	13	7	9	15	6	1 metal trap not fishing (head out).
9	15	20	24	15	43	17	6 metal traps not fishing (heads out, welds broken); 11 wooden traps lost, 3 others damaged, 15 nearby traps substituted. Catches not comparable.
10	15	33	19	15	43	22	Nil.
14	15	14	24	15	17	25	6 metal traps not fishing (doors open, heads out); 7 wooden traps lost, 4 others damaged, 15 nearby traps substituted. Catches not comparable.
17	16	36	24	17	40	27	3 traps fished twice.
20	15	16	9	15	24	15	3 metal traps not fishing (heads out).
21	15	16	5	15	19	3	1 metal trap not fishing (heads cut).
23	15	..	7	15	..	6	2 metal traps not fishing (heads out).
26	15	..	8	15	..	11	2 metal traps not fishing (heads out).

Table I (continued)

Date	Metal traps No. traps	Metal traps No. shorts	Metal traps No. mkts.	Wooden traps No. traps	Wooden traps No. shorts	Wooden traps No. mkts.	Comments
Dec.28	15	..	9	15	..	8	Nil.
29	15	9	14	15	14	12	Nil.
30	14	6	17	15	12	23	2 metal traps not fishing (heads out); 1 metal trap lost.
31	14	10	8	15	13	7	2 metal traps not fishing (heads out).
Jan. 3	14	37	21	15	35	18	1 metal trap not fishing (heads out).
6	14	..	4	15	..	15	3 metal traps not fishing (heads out, welds broken).
9	13	7	5	13	18	13	3 metal traps not fishing (heads out).
11	13	13	8	13	29	12	Nil.
14	14	..	14	14	..	11	Nil.
16	14	3	2	14	14	18	Nil.
20	12	20	3	11	17	16	2 metal traps not fishing (heads out).
23	13	..	8	13	..	22	2 metal traps not fishing (heads out).
25	13	..	4	13	..	18	2 metal traps not fishing (heads out).
26	12	17	3	12	21	9	3 metal traps not fishing (heads out).
Feb.15	13	2	1	13	8	7	1 metal trap not fishing (heads out); catches not comparable, traps some distance apart.
16	13	2	0	13	6	3	1 wooden trap not fishing (head out).
19	11	8	12	11	4	16	1 wooden trap not fishing (head out).
24	13	9	15	13	17	19	Nil.
25	13	9	14	13	10	20	Nil.
26	13	9	7	13	11	16	Nil.
27	13	..	14	13	..	20	Nil.
Mar. 1	13	10	12	13	19	11	Nil.
3	13	12	9	13	8	21	Nil.
9	13	..	4	13	..	7	Nil.
19	13	9	7	13	14	15	Nil.
23	13	2	5	13	7	5	2 metal traps not fishing (door open & head out); 3 wooden traps not fishing (doors missing & head out).
24	14	8	8	14	14	19	Nil.
25	14	6	3	14	11	19	Nil.
29	14	7	10	14	17	16	Nil.
Totals	600	533	554	602	695	762	

Table II. Number of lobsters caught in metal (Models 4 and 5) and wooden traps fished off Port Maitland, N. S., March 24 to May 24, 1954.

Date	Metal traps No. traps	Metal traps No. shorts	Metal traps No. mkts.	Wooden traps No. traps	Wooden traps No. shorts	Wooden traps No. mkts.	Comments
Mar. 24	14	9	4	14	14	19	Nil.
25	14	11	7	14	11	19	Nil.
29	14	9	12	14	17	16	Nil.
30	14	..	12	14	..	17	Nil.
31	14	4	7	14	3	8	Nil.
Apr. 1	15	7	11	15	3	8	Nil.
10	14	7	8	14	5	8	6 wooden traps not fishing (doors off, laths broken).
12	14	..	10	14	..	12	Nil.
13	15	10	12	15	15	20	Nil.
14	15	6	9	15	11	14	Nil.
15	15	..	3	15	..	21	Nil.
16	15	..	9	15	..	5	Nil.
19	13	..	9	13	..	11	2 metal traps lost.
21	13	..	4	13	..	6	Nil.
22	13	..	9	13	..	10	Nil.
24	13	..	5	13	..	8	Nil.
26	13	..	14	13	..	12	Nil.
27	13	..	5	13	..	7	Nil.
29	13	..	7	13	..	13	Nil.
30	13	..	5	13	..	5	Nil.
May 3	13	..	3	13	..	5	Nil.
4	13	..	12	13	..	11	Nil.
6	13	8	7	13	11	7	Nil.
9	13	4	3	13	2	2	New rope placed on metal traps.
11	13	3	3	13	2	5	Nil.
12	13	4	2	13	4	3	Nil.
14	13	13	9	13	18	16	Nil.
15	9	5	2	9	7	2	Nil.
18	13	..	5	13	..	7	Nil.
19	13	7	7	13	10	6	Nil.
20	13	..	6	13	..	8	Nil.
21	13	..	2	13	..	2	Nil.
22	13	..	4	13	..	3	Nil.
24	13	..	5	13	..	7	Nil.
27	13	..	6	13	..	3	Nil.
28	13	..	0	13	..	2	Nil.
Totals	481	108	237	481	133	328	

Table III. Adjusted catch of legal-sized lobsters from 15 metal traps and 15 wooden traps fished off Port Maitland, N. S., November, 1953, to May, 1954.

Period	Number of lobsters				Number of lobsters			
	No. trap hauls	Metal traps Models 2 & 3	Wooden traps	% efficiency	No. trap hauls	Metal traps Models 4 & 5	Wooden traps	% efficiency
Nov. 2-6	28	54	55	98				
Dec. 1-15	70	157	163	96				
Dec.16-31	122	101	99	102				
Jan. 1-15	61	52	60	87				
Jan.16-31	55	20	74	27				
Feb. 1-14	..	..	..	..				
Feb.15-28	74	61	94	65				
Mar. 1-15	39	25	39	64				
Mar.16-31	65	33	74	45	70	42	79	53
Apr. 1-15					82	49	83	59
Apr.16-30					119	67	77	87
May 1-15					100	41	51	80
May 16-31					104	35	38	92
Totals	514	503	658	76	475	234	328	72

During pre-season fishing and the first six weeks of the open season, the metal traps fished virtually as well as the wooden traps. The adjusted total catches during this period were 377 lobsters in the wooden traps and 364 (96.6%) in the metal. From mid-January to the end of March the metal traps caught only 139 lobsters (49.5%) as compared to 281 in the wooden traps. From mid-March to the end of May the Model 4 traps caught about 71% as many lobsters as the wooden -- 234 to 328. The seasonal variation in the efficiency of the metal traps as compared to the wooden is shown graphically in Figure 1.

The cause of the drop-off in the efficiency of the metal traps after mid-January is not at all clear. In this area the water temperature which is relatively high when the season opens December 1, continues to drop through to late February or early March. This, in turn, makes the lobsters less active and difficult to trap. If for any reason the lobsters find it more difficult to enter the metal traps, this would be reflected in the efficiency of the metal traps as the lobsters became less active. The narrower spaces on the lower sides of Models 4 and 5 may have improved their efficiency. However, it is equally possible that the improved efficiency during April and May was the result of warmer waters and more active lobsters.

The metal traps are much more open than wooden traps and admit considerably more light. To determine whether the amount of light entering the traps had an appreciable effect

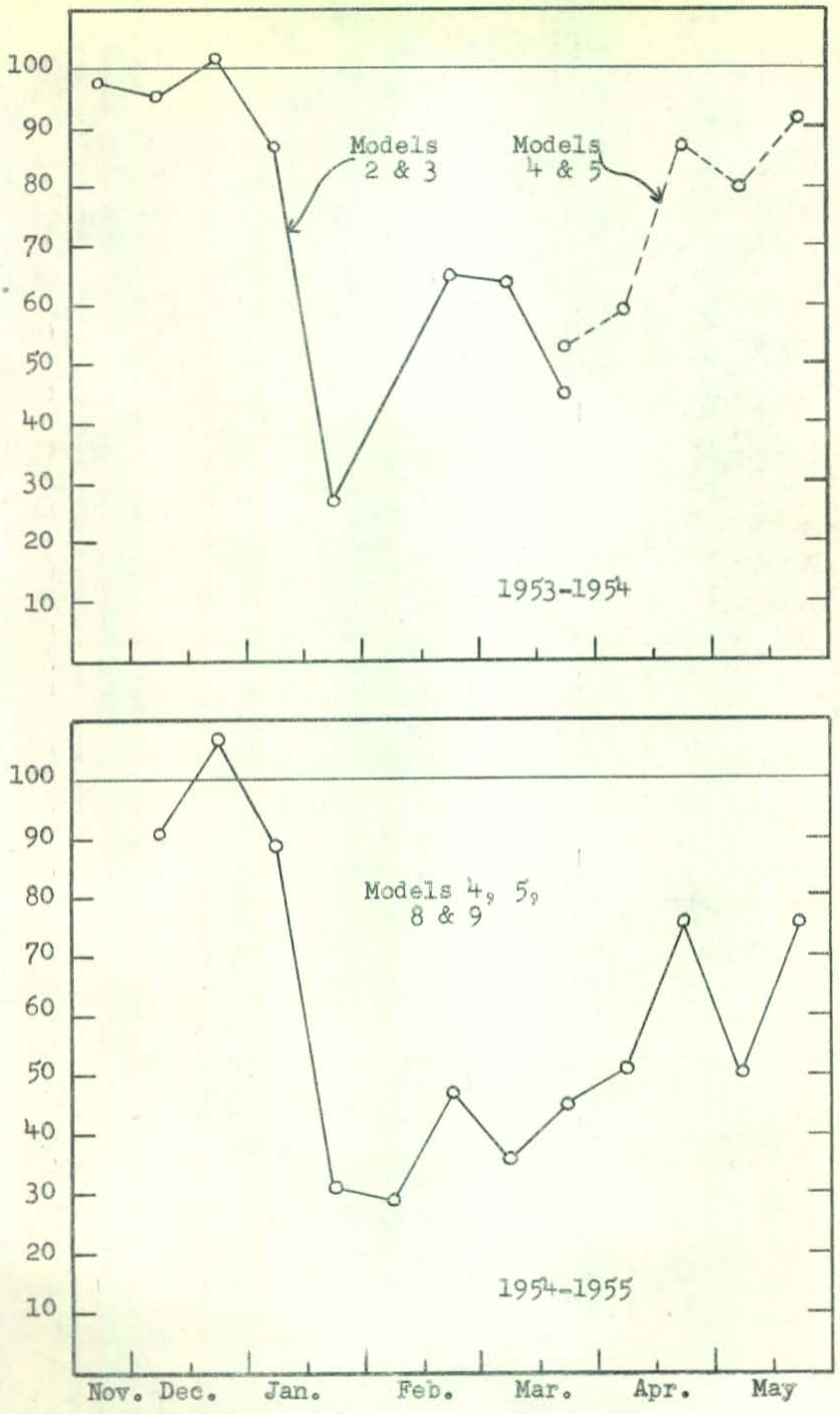

Figure 1. Seasonal variation in efficiency of metal traps fished off Port Maitland. Catch for half-monthly periods expressed as percentage of catch from conventional wooden traps.

on the catch, the tops of two of the metal traps were partially covered with about 16 inches of burlap running the full length of the trap. In 14 pre-season trap hauls the uncovered metal traps caught 43 lobsters (shorts and legal-size), the covered traps caught 40 lobsters. This suggests that under these particular fishing conditions light has no great effect on the catch. The data are, however, too few to be conclusive. Possibly a more complete cover would have produced a positive effect. It was noted that the covered traps sank much more slowly than the uncovered ones.

On December 9 a severe storm destroyed 11 of the 15 wooden traps and damaged 3 others. Those destroyed or badly damaged were replaced and on December 14 a second storm destroyed 7 of 15 and damaged 4 others. No metal traps were destroyed, seriously damaged, or shifted in either of these storms. No further storm losses of the experimental gear occurred during the remainder of the season. One metal trap was lost December 30, presumably because the rope chafed off. The buoy was found later. Two additional metal traps were lost April 19, apparently because the rope chafed off. At this time the rope on the metal traps was in poor shape and was replaced a few weeks later.

3. Fourchu, N. S., 1954 Experiment.

At the close of the season at Port Maitland, the 13 Model 4 and 5 metal traps were shipped to Fourchu, Cape Breton, N. S., where they arrived June 4. These traps were rigged with buoys, lines, etc., and set singly in a line alternated with 13 wooden traps. The experimental wooden traps were typical Fourchu

three-bow traps with outside dimensions of 36" long, 18½" wide, and 12" high. They were, therefore, considerably smaller than the Model 4 metal traps. They were equipped with two fishing heads, whereas the metal traps had three. The results, therefore, are not strictly comparable. It was felt, however, that no opportunity to test the metal traps under actual fishing conditions should be missed. The daily catches are recorded in Table IV. In 178 comparable trap hauls, the wooden traps caught 223 market lobsters, the metal traps 190 (85%). The daily catches were so variable that this difference is not statistically significant.

No storms severe enough to damage either the wooden or metal traps occurred during the trial period.

Table IV. Number of lobsters caught in metal (Models 4 and 5) and wooden traps fished off Fourchu, N. S., June 9 to July 13, 1954.

	Metal traps			Wooden traps		
Date	No. traps	No. shorts	No. mkts.	No. traps	No. shorts	No. mkts.
June 9	13	12	10	13	17	21
12	13	9	8	13	18	27
14	13	10	26	13	8	34
15	13	12	15	13	12	16
16	13	13	12	13	14	14
17	13	13	21	13	21	12
21	13	11	23	13	13	20
22	13	8	11	12*	7	11
24	13	10	14	13	12	9
July 1	13	9	12	13	10	11
6	13	8	9	13	9	12
9	12**	6	4	12	8	4
12	12	11	14	12	12	18
13	12	11	12	12	10	14
Totals	179	143	191	178	171	223

* 1 wooden trap missed this day.
** 1 metal trap lost (rope chafed off).

The Fourchu fisherman found the metal traps heavy to haul and expressed concern about possible damage to his hauler if such traps were used exclusively. At the close of the trial period four wooden traps had an average weight of 60.2 pounds in air, 32.0 pounds in water. Four metal traps weighed at the same time averaged 52.7 pounds in air, 46.4 pounds in water. When built, these traps weighed 56 pounds in air. The 5% decrease in weight may be ascribed to rusting and loss of the protective coating.

4. Miminegash, P. E. I., 1954 Experiment.

During July, 1954, 15 new metal traps (Models 6 and 7) were built to test at Miminegash, P. E. I. Fourteen of these three-bow, 36" traps (Model 6) were covered with $\frac{1}{4}$" steel rods, the same type of construction used in the Model 4 traps tested at Port Maitland and Fourchu. In an attempt to design a metal trap that could be built more easily by fishermen, one trap (Model 7) was built with a bolted, flat iron framework and covered with aluminum, chain-link wire mesh.

The metal traps were fished with 15 wooden traps from August 4 to 7 during pre-season fishing and from August 10 to October 4 during the regular fishing season. As is customary in this area, the traps were set in "bunches" of 10, each of the 10 traps being fastened about 8 fathoms apart to a single back-line. The metal and wooden traps were alternated within a bunch, five of each making up the bunch. The daily fishing records are recorded in Table V.

Throughout the experiment the traps were hauled 38 times to give a total of 570 trap hauls for each type. On

occasion, certain of the traps were not considered to be in fishing condition because of open doors, heads out, etc. The total trap hauls have been reduced to allow for such traps. The numbers of trap hauls of each type were then equalized and the catches adjusted proportionately. In 552 comparable trap hauls the metal traps caught 346 legal-sized lobsters, the wooden traps 347. During pre-season fishing the metal traps were not set as carefully as they were during the open season and a higher proportion may have settled improperly during the early period. If this pre-season fishing is not included, the metal traps caught 248 legal-sized lobsters, the wooden 245 in 498 comparable trap hauls. This is the first experiment in which the metal traps fished as well as the wooden traps throughout the trial period. After the season opened a special effort was made to ensure in so far as possible that the metal traps settled to the bottom in the proper position. These traps were bridled from the top centre of each end bow and set with the boat moving very slowly. The more or less continuous tension on the bridle should tend to keep the traps upright.

The catch of short lobsters was recorded only during the first five days. The adjusted catch of shorts in 54 comparable trap hauls was 32 in the metal traps, 110 in the wooden traps. Much of this difference can be accounted for by the wider spaces of the metal traps.

Table V. Number of legal-sized lobsters caught in metal (Models 6 and 7) and wooden traps fished off Miminegash, P. E. I., August 4 to October 4, 1954. Fifteen traps of each kind hauled each day.

	Metal traps		Wooden traps		
Date	No. shorts	No. legal size	No. shorts	No. legal size	Comments
Aug. 4	10	24	21	29	1 metal trap not baited; 2 metal traps upside down.
5	6	25	32	33	
6	5	26	31	33	3 metal traps appeared to be on their sides.
7	3	23	22	20	
10	8	11	14	24	
11	-	15	-	11	
12	-	9	-	7	
13	-	21	-	16	
14	-	18	-	15	
16	-	16	-	18	
19	-	14	-	17	1 metal trap not fishing (head out).
20	-	12	-	12	
23	-	14	-	12	
25	-	8	-	22	
28	-	8	-	11	
30	-	8	-	5	1 metal and 1 wooden trap not fishing (doors open).
31	-	6	-	3	1 metal trap not fishing (head out).
Sept. 2	-	3	-	2	
3	-	3	-	4	
7	-	1	-	7	3 metal traps and 1 wooden trap not fishing (heads out).
8	-	3	-	3	1 metal trap and 1 wooden trap not fishing (heads out).
9	-	3	-	2	
10	-	3	-	5	
11	-	9	-	5	
14	-	5	-	1	3 metal traps not fishing (heads out); 3 wooden traps not fishing (damaged).
16	-	2	-	3	
17	-	4	-	3	
18	-	3	-	6	
20	-	2	-	1	
21	-	2	-	5	

Table V (continued)

Date	Metal traps No. shorts	Metal traps No. legal size	Wooden traps No. shorts	Wooden traps No. legal size	Comments
Sept. 22	-	6	-	3	
25	-	8	-	6	
27	-	2	-	1	
28	-	11	-	1	1 metal trap not fishing (head out).
30	-	8	-	9	1 metal trap not fishing (upside down).
Oct. 1	-	3	-	5	
2	-	3	-	2	
4	-	4	-	0	
Totals	32	346	120	362	

The method of fishing equal numbers of metal and wooden traps in the same bunch probably provides the best measure of their relative fishing efficiency. It does not, however, give a good measure of resistance to storm damage. Judging from earlier experiments the metal traps probably tended to act as anchors and so reduce damage to the wooden traps. Alternately, the metal traps were probably shifted around more than usual because of the pull from the wooden traps. Following hurricane "Edna" three wooden traps were found so badly damaged on September 14 that they had to be replaced. No other storms serious enough to damage either type of trap occurred during the season.

Although no separate record was kept for the one wire mesh trap, it appeared to fish as well as the other metal or wooden traps.

5. Port Maitland, N. S., 1954-55 Experiment.

During November, 1954, seven new traps were built for testing off Port Maitland, N. S. The framework of these traps

Table VI. Number of lobsters caught in metal (Models 4, 5, 8 and 9) and wooden traps fished off Port Maitland, N. S., December 2, 1954, to May 30, 1955.

Date	Metal traps: Wire mesh T*	Wire mesh S**	Wire mesh M***	Steel rod T	Steel rod S	Steel rod M	Combined T	Combined S	Combined M	Wooden traps T	Wooden traps S	Wooden traps M	Comments
Dec.													
2 a.m.	7	29	7	12	26	15	19	55	22	19	48	35	1 mesh trap not baited.
2 p.m.	7	31	5	12	38	10	19	69	15	19	45	10	
3 a.m.	7	31	13	12	30	14	19	61	27	19	73	20	
3 p.m.	7	27	5	12	44	8	19	71	13	19	46	17	
4 a.m.	7	-	-	12	-	-	19	-	21	19	-	30	
4 p.m.	7	-	-	12	-	-	19	-	8	19	-	8	
6	7	49	5	12	30	9	19	79	14	19	55	8	1 rod trap not fishing (heads out).
7	7	-	-	12	-	-	19	-	8	19	-	14	
14	6	29	3	9	48	11	15	77	14	19	53	19	1 mesh trap not fishing (heads out); cotton mesh trap lost, 14 wooden traps lost, other 5 badly damaged; 19 nearby wooden traps used -- catches not comparable.
17	2	10	2	8	25	3	10	35	5	19	21	17	1 mesh trap not fishing (heads out); catches not comparable.
18	6	-	5	11	-	3	17	-	8	17	-	17	Catches not comparable.
20	6	-	0	10	-	5	16	-	5	17	-	2	
21	-	-	-	-	-	-	14	-	8	14	-	7	1 rod trap not fishing (heads out).
23	-	-	-	-	-	-	16	-	4	16	-	7	
27	-	-	-	-	-	-	16	-	9	16	-	7	
28	-	-	-	-	-	-	16	-	6	16	-	7	
Jan.													
1	-	-	-	-	-	-	14	-	7	14	-	7	
3	-	-	-	-	-	-	16	-	9	16	-	8	
5	6	-	6	9	-	3	15	-	9	16	-	8	
6	6	-	-	10	-	-	16	-	3	16	-	5	
11	6	-	4	9	-	1	15	-	5	15	-	10	
12	6	-	-	10	-	-	16	-	4	16	-	8	
13	6	-	8	10	-	3	16	-	11	16	-	8	1 rod trap not fishing (door open).
25	6	-	-	10	-	-	16	-	2	16	-	9	
29	6	-	-	10	-	-	16	-	3	16	-	7	

Feb.													
3	6	-	-	10	-	-	16	-	2	16	-	6	
5	6	-	-	9	-	-	15	-	0	15	-	3	1 rod trap lost.
10	6	-	-	9	-	-	15	-	2	15	-	7	
14	-	-	-	-	-	-	9	-	1	9	-	1	1 rod and 1 mesh trap shipped to Amherst.
15	-	-	-	-	-	-	6	-	1	6	-	2	
16	-	-	-	-	-	-	8	-	1	8	-	3	
17	-	-	-	-	-	-	12	-	1	12	-	2	1 rod trap lost.
21	4	-	1	7	-	0	11	-	1	11	-	2	1 rod trap not fishing (door open); 1 mesh trap lost.
25	4	-	1	7	-	0	11	-	1	11	-	1	
28	4	-	0	7	-	2	11	-	2	11	-	5	
Mar.													
12	4	-	0	7	-	0	11	-	0	11	-	5	
15	4	-	2	6	-	2	10	-	4	10	-	7	1 mesh trap not fishing (mesh corroded); 1 rod trap not fishing (door open).
21	2	-	0	5	-	1	7	-	1	7	-	7	
22	3	-	0	6	-	3	9	-	3	9	-	4	
28	2	-	-	6	-	-	8	-	2	8	-	7	1 mesh trap lost.
30	2	-	-	6	-	-	8	-	4	8	-	5	
31	2	-	-	6	-	-	8	-	3	8	-	6	
Apr.													
1	2	-	-	6	-	-	8	-	7	8	-	5	
4	2	-	-	6	-	-	8	-	2	8	-	11	
5	2	-	-	6	-	-	8	-	0	8	-	5	
6	2	-	1	6	-	3	8	-	4	8	-	9	Brought in 1 mesh trap, took out 1 rod and 2 mesh traps.
7	3	-	0	7	-	1	10	-	1	10	-	2	
8	3	-	3	7	-	1	10	-	4	10	-	3	
11	3	-	1	7	-	2	10	-	3	10	-	10	
12	3	-	3	7	-	0	10	-	3	10	-	7	
13	3	-	2	7	-	3	10	-	5	10	-	10	
14	3	-	0	7	-	2	10	-	2	10	-	3	
15	3	-	2	7	-	2	10	-	4	10	-	4	
16	3	-	2	7	-	1	10	-	3	10	-	5	
18	3	-	0	7	-	3	10	-	3	10	-	11	
19	3	-	1	7	-	3	10	-	6	10	-	6	
20	3	-	2	7	-	2	10	-	4	10	-	5	
21	3	-	0	7	-	4	10	-	4	10	-	7	

(over)

Table VI (continued)

Apr.													
22	3	-	2	7	-	1	10	-	3	10	-	5	
23	3	-	5	7	-	6	10	-	11	10	-	7	
25	3	-	1	7	-	2	10	-	3	10	-	5	
27	3	-	2	5	-	2	8	-	4	8	-	5	
28	3	-	1	7	-	5	10	-	6	10	-	7	
29	3	-	1	7	-	6	10	-	7	10	-	6	
30	3	-	3	7	-	1	10	-	4	10	-	7	
May													
2	3	-	0	6	-	3	9	-	3	9	-	11	1 rod trap caught down.
3	3	-	2	6	-	2	9	-	4	9	-	6	
5	3	-	0	7	-	4	10	-	4	10	-	6	
7	3	-	3	7	-	0	10	-	3	10	-	4	
9	3	-	1	7	-	0	10	-	1	10	-	5	Set 1 more mesh trap.
10	4	-	1	7	-	2	11	-	3	11	-	4	
11	4	-	2	7	-	0	11	-	2	11	-	5	
12	4	-	1	7	-	0	11	-	1	11	-	5	
14	4	-	0	7	-	6	11	-	6	11	-	8	
16	4	-	1	7	-	3	11	-	4	11	-	6	
18	4	-	2	7	-	2	11	-	4	11	-	3	
20	4	-	2	7	-	2	11	-	4	11	-	7	
21	4	-	2	7	-	2	11	-	4	11	-	1	
24	4	-	0	7	-	3	11	-	3	11	-	6	1 rod trap not fishing (door open).
25	4	-	1	7	-	0	11	-	1	11	-	0	
26	4	-	1	7	-	2	11	-	3	11	-	5	
27	4	-	0	7	-	2	11	-	2	11	-	3	
28	2	-	1	3	-	0	5	-	1	5	-	4	
30	2	-	0	5	-	0	7	-	0	7	-	0	
Totals	299	206	119	573	241	178	999	447	415	1014	341	602	

*T - traps
**S - shorts
***M - markets

was made of bolted flat iron similar to the Model 7 trap. Six of these traps (Model 8) were covered with aluminum chain-link wire mesh, and one (Model 9) was covered with cotton mesh. It was realized that electrolysis between the aluminum mesh and the iron framework would occur but the rate was not known and it was thought that the process would be slowed down considerably by the protective coatings. These seven traps, together with 12 traps (Models 4 and 5) previously fished at Port Maitland and Fourchu, were fished off Port Maitland from December 2, 1954, to May 30, 1955. The daily catches are recorded in Table VI. The numbers of wire mesh and steel rod traps hauled and the catches of legal-sized lobsters in these two types were usually but not always recorded separately. The catches of short lobsters were not recorded after December 17. The catches of legal-sized lobsters, adjusted to allow for different numbers of traps fished and for traps not in fishing condition, are shown by half-monthly periods in Table VII.

Table VII. Adjusted catch of legal-sized lobsters from 19 metal traps and 19 wooden traps fished off Port Maitland, N. S., December 1954, to May, 1955.

Period	No. trap hauls	No. of lobsters		% efficiency
		Metal traps	Wooden traps	
Dec. 1-15	150	128	140	91
Dec. 16-31	77	32	30	107
Jan. 1-15	107	48	54	89
Jan. 16-31	32	5	16	31
Feb. 1-14	55	5	17	29
Feb. 15-28	58	7	15	47
Mar. 1-15	19	4	11	36
Mar. 16-31	40	13	29	45
Apr. 1-15	102	35	69	51
Apr. 16-30	118	58	76	76
May 1-15	92	27	54	50
May 16-31	99	26	34	76
Totals	949	388	545	71

In this table the combined catches for all metal traps are compared with the catches from the wooden traps. The catch from the metal traps, expressed as a percentage of the catch from the wooden traps, is shown by half-monthly periods in Figure 1. The results are very similar to those obtained in the 1953-54 experiment at Port Maitland. During the first six weeks of the season the metal traps fished about as well as the wooden traps. In 334 comparable trap hauls during this period, the wooden traps caught 224 lobsters, the metal 208 lobsters (92.8%). During the corresponding period of the previous year the metal traps caught 96.6% as many lobsters as the wooden traps. After mid-January the efficiency of the metal traps fell to less than 50% and remained low throughout the cold-water period. As in the previous experiment, there is some evidence of recovery of the efficiency during April and May. The average efficiency for the complete period was 71% as compared to 76% efficiency for the 1953-54 experiment. During the 1953-54 experiment it was thought that the low mid-winter efficiency could have been caused by the wide spaces on the lower sides of the traps. It appears, however, that this cannot be the explanation since essentially the same results were obtained in the 1954-55 experiment in which traps that did not have wide spaces along the lower sides were used.

From December 2 to 6, 1954, the wire mesh traps caught an average of 4.9 shorts per trap haul, the steel rod and wooden traps each averaged 2.8 shorts per trap haul. It seems clear that the short lobsters found it easier to escape

from the wide-spaced steel rod and wooden traps. There is no indication in the data that the mesh traps were more efficient than the rod traps in catching legal-sized lobsters.

A severe storm which lasted from December 7 to 13 destroyed 14 of the 19 wooden traps and severely damaged the other five to the point where repair was questionable. Of the 19 metal traps, 18 remained in line, undamaged throughout the storm, although the water was quite shoal (5 to 6 fathoms). One metal trap could not be found after the storm and it was thought that the line had caught down. A second storm on February 12 and 13 destroyed and damaged appreciable numbers of wooden traps. No precise records were obtained on the losses but the metal traps were undamaged. Throughout the six-month season, seven (37%) of the 19 metal traps were lost for various reasons. These traps which are heavier in water than the wooden traps, came through the severe December storm. Undoubtedly the buoy lines suffered during this storm and some of the metal traps were subsequently lost when the rope parted as the traps were being hauled. The fisherman felt that the buoy lines of shifting wooden traps sometimes snarled the lines of metal traps with the result that both buoys disappeared. There was no evidence of direct destruction of metal traps by storms.

Two metal traps were shipped to Amherst on February 14 for exhibition at the annual meeting of the United Maritime Fishermen. These traps were later examined at the meeting held in Halifax on February 24. Although on superficial examination the aluminum mesh on the wire mesh trap appeared to be sound, it was found on closer study to be badly corroded.

By mid-March, after 3½ months' fishing, the aluminum had corroded so badly that the traps were no longer fishable. The aluminum mesh was then replaced with 1" x 2" rectangular, welded, galvanized, wire mesh. There seems to be little doubt that the corrosion was the result of electrolytic action between the iron framework and the aluminum mesh.

When the seven mesh traps were built in November, 1954, they were treated with "Rust-oleum", a fish oil base paint. Six of the traps were given one or two coats of ships' bottom primer (#325). Two of these then received a dip in Ace of Spades tar base paint. One trap was given two coats of brine proof grey (#975). Four of these traps were lost before the completion of the experiment. With only three of the seven traps left, it was difficult to judge the value of "Rust-oleum". By the end of May much of the protective coating had worn off. Although the iron framework was still in good shape after six months' fishing, this may have been because the electrolytic action which destroyed the aluminum mesh actually protected the iron.

6. Stonehurst, N. S., 1954-55 Experiment.

On receipt of a request from Mr. Jessen R. Tanner, the 15 metal traps (Models 6 and 7) that had been fished off Miminegash, P. E. I., during the late summer of 1954 were shipped to Stonehurst, Lunenburg County, N. S. These traps were designed for an area where the catch is predominantly 7" to 9" canner lobsters and were not intended for use in a market lobster area. The traps were considerably smaller,

with smaller fishing rings than the wooden traps in common use at Stonehurst. The measurements and weights of the metal and wooden traps were as follows:

	Stonehurst wooden traps	Metal traps
Outside length	36"	36"
Outside width	28"	19½"
Outside height	15½"	13½"
Inside diameter of fishing ring	6"	4½"
Weight in air	69 pounds (soaked 2 months)	35 pounds
Weight in water	12 pounds (soaked 2 months)	30 pounds

Because of the rather marked differences in the traps the results do not give a true measure of the efficiency of metal traps in the Stonehurst area. The fishermen were, however, keen to test the metal traps and the Model 6 and 7 traps were the only ones available. The traps were fished from December 1 to 12, 1954, and from April 12 to May 20, 1955. The daily catches are listed in Table VIII. In 337 trap hauls the wooden traps caught 95 market lobsters and 42 shorts. In 335 trap hauls the metal traps caught 43 (45%) market lobsters and 52 (124%) shorts.

The fact that the metal traps caught more short lobsters than the wooden traps suggests that the smaller fishing rings on the metal traps reduced the efficiency of these traps for market lobsters, which in the Stonehurst area are relatively large. About April 20 the rings on the metal traps were enlarged but by this time the general lobster catch was poor and no appreciable effect is apparent in the data.

When the traps were first set off Stonehurst, the fishermen were encouraged to bridle them from the top and take extra care in setting them to ensure in so far as possible that

Table VIII. Number of lobsters caught in metal (Model 6) and wooden traps fished off Stonehurst, N. S., December 1 to 12, 1954, and April 12 to May 20, 1955.

Date	Metal traps			Wooden traps		
	No. traps	No. shorts	No. mkts.	No. traps	No. shorts	No. mkts.
Dec. 1	7	3	4	7	3	4
2	15	2	5	15	3	12
3	15	2	3	15	3	5
4	11	2	3	12	2	2
5	15	5	2	15	2	6
6	14	5	5	15	6	10
8	15	5	3	15	5	11
11	7	2	0	7	0	2
12	13	7	3	13	3	11
Apr. 12	7	1	0	7	0	1
13	8	0	0	8	2	1
14	8	1	1	8	2	1
15	8	0	0	8	1	0
18	8	1	0	8	0	0
19	8	1	0	8	0	2
20	8	1	1	8	0	3
21	8	1	0	8	1	3
22	8	1	1	8	0	2
23	8	0	0	8	1	1
24	8	2	1	8	2	0
25	8	1	0	8	0	1
26	8	0	1	8	0	0
27	8	2	1	8	1	1
28	8	0	0	8	2	3
May 3	8	0	3	8	0	0
4	8	0	0	8	0	0
5	8	0	1	8	0	4
6	8	2	0	8	1	1
10	8	1	0	8	0	2
11	8	0	0	8	0	0
12	8	1	0	8	1	1
15	8	1	2	8	0	0
16	8	1	1	8	0	2
17	8	0	1	8	1	1
18	8	1	0	8	0	0
19	8	0	1	8	0	2
20	8	0	0	8	0	0
Totals	335	52	43	337	42	95

they settled to the bottom in the proper position. This may have been done during the December fishing. When the traps were re-set in April they were bridled from one end in the usual fashion. On one occasion in mid-April one fisherman noted that three of the eight traps were lying on their sides. Traps in this position almost certainly have a very low efficiency, particularly when the water is cold and the lobsters inactive.

Too small fishing rings and the failure of a considerable proportion of the metal traps to settle properly may account for the relatively poor catch of market lobsters.

Fishermen of the Stonehurst area who haul by hand complained that the metal traps, which weighed over twice as much as the wooden traps in water, were too hard to haul. Some reduction in weight may be possible but the trap must be strong enough to withstand ordinary handling and heavy enough to resist storm damage.

7. St. Andrews, N. B., 1955 Experiment.

From May 7 to June 10, 1955, a variety of experimental traps were fished off the Biological Station, St. Andrews, N. B. Four of these traps were made almost entirely of aluminum, one was made of galvanized sheet iron and one of fibre glass bonded with plastic. Models 10, 11, 12, and 13, were built at the Technological Station, Halifax, N. S. Model 14 was built in Kingston, Ontario, by the Aluminum Company of Canada and lent through the courtesy of Mr. George Shaw. Model 15 was designed and built by Mr. William G. LaPierre, Belfast, Maine. These traps were set singly and

fished along with five conventional wooden traps and two iron-framed traps (Model 1) that had been re-covered with cotton mesh. The lobster catches are summarized in Table IX.

Table IX. Numbers of lobsters caught in metal (Models 1, 10, 11, 12, 13, 14), fibre glass (Model 15) and wooden traps fished at St. Andrews, N. B., May 7 to June 10, 1955.

Model	Type	No. of trap hauls	No. of lobsters Shorts	Markets
--	Conventional wooden	110	4	28
1	Iron-frame, cotton mesh	36	3	10
10	Rectangular aluminum	22	2	0
11	Triangular aluminum	3	0	0
12	Pyramidal aluminum	12	0	0
13	Flat box galvanized iron	12	0	0
14	Aluminum frame and cover	12	0	0
15	Fibre glass	22	1	0

In the St. Andrews area lobsters are relatively large and scarce. This, together with the fact that so few traps were fished for so short a period, make it impossible to determine the relative efficiency of the various models with any degree of accuracy. It seems obvious, however, that none of the Model 10 to 15 traps fished as well as the wooden traps or the iron-framed Model 1 traps which were of conventional design. One obvious difficulty with Models 12, 13 and 15 was that the entrances to the traps were too small for the sizes of lobsters available locally.

All of the Model 10 to 15 traps were light in air (5 3/4 to 19 pounds) and in water (3½ to 15 3/4 pounds). Under normal fishing conditions most would require additional ballast. Models 10, 11 and 12 were so lightly constructed that they could not be expected to withstand normal handling in commercial fishing. The flat, box-like trap (Model 13) was

difficult to haul and tended to fill with mud. These difficulties could presumably be overcome with a more open construction.

Although the results of this small-scale experiment are not encouraging, some of the novel ideas incorporated in these models warrant further study.

8. Miminegash, P. E. I., 1955 Experiment.

From August 3 to October 6, 1955, four metal traps (Models 10, 11, 13, 14) were fished off Miminegash, P. E. I. These traps which had been fished off St. Andrews, N. B., in the spring of 1955 had given inconclusive results, partly because the lobsters were scarce and large. Too few traps (one of each model) were available for a proper test but it was thought that a trial off Miminegash where lobsters are plentiful and small might reveal major differences in the four models. The four traps were set as a unit on one line and fished among a fleet of wooden traps. The number of trap hauls and the catch of lobsters from the wooden and the metal traps are summarized by three periods in Table X. The data for the metal traps are too few to permit sound conclusions. However, the relative efficiency of each of the metal traps as compared to the wooden traps was as follows: Model 10--63%; Model 11--22%; Model 13--15%; and Model 14--59%.

Table X. Numbers of lobsters caught in metal traps (Models 10, 11, 13, 14) and wooden traps fished off Miminegash, P. E. I., August 3 to October 6, 1955.

Model	Type	Period	No. of trap hauls	No. of lobsters			No. legal-sized per trap haul
				Shorts	Canners	Markets	
..	Wooden	Aug. 3-6	400	539	876	41	2.29
		Aug. 10-Sept.10	592	769	607	36	1.09
		Sept.27-Oct.6	300	323	264	26	0.97
10	Rectangular aluminum	Aug. 3-6	4	1	3	0	0.75
		Aug.10-Sept.10	16	3	14	3	1.06
		Sept.27-Oct.6	7	3	4	0	0.57
11	Triangular aluminum	Aug. 3-6	4	1	1	1	0.50
		Aug.10-Sept.10	15	1	4	1	0.33
		Sept.27-Oct.6	7	2	1	0	0.14
13	Galvanized box	Aug. 3-6	4	0	4	0	1.00
		Aug.10-Sept.10	16	0	0	0	0
		Sept.27-Oct.6	7	0	0	0	0
14	Aluminum frame and cover	Aug. 3-6	4	0	4	0	1.00
		Aug.10-Sept.10	16	5	8	5	0.81
		Sept.27-Oct.6	lost	..	..	..	..

Trap design

Conventional wooden traps have two or three fishing heads leading into a "kitchen" compartment. From this compartment a "parlour" head leads to the "parlour" of the trap. This parlour head is usually rigged to open towards the top of the parlour. The use of this parlour head, its design and arrangement are generally considered by fishermen to be important factors in determining the efficiency of a trap, particularly when traps are not fished every day. With this conventional arrangement of the fishing and parlour heads, the traps must settle to the bottom in the proper position. This offers no difficulty with the rock-ballasted wooden traps. Even though the conventional trap has been in general use for many years, it seems probable that changes in design would improve its stability and efficiency. The high, rounded design is quite subject to wave action and the arrangement of heads seems directed more towards retaining the lobsters that enter rather than to facilitating their entrance. Some thought should be given to the development of low, escape-proof entrances.

Material

On the basis of the experiments conducted to date, it is concluded that iron or mild steel is the most suitable substitute for wood for the frame of a lobster trap. The advantages of iron are its low cost, strength, hardness (resistance to abrasion), availability, and weight (specific gravity 7.9).

Its chief disadvantage is that if unprotected, it rusts quickly in sea water. Indications are that this rusting can be reasonably well controlled at moderate cost by periodic painting with tar base or fish oil base paints. Double-dipped galvanized iron offers possibilities but is somewhat more expensive and has not been thoroughly tested in lobster traps. The rust resistance of stainless steel may offset its high initial cost. Aluminum is more expensive than iron, weaker, softer, less readily available and lighter (specific gravity 2.7). Some of the alloys are, however, quite resistant to salt water corrosion. An aluminum trap sturdy enough to withstand normal handling should probably have a minimum weight in air of about 15 pounds. Such a trap would cost more than an iron trap and would probably require additional ballast. Because of electrolysis the use of two or more metals in a trap should be avoided. Plastics offer some advantages but tend to be expensive and light. Plastic traps would usually require additional ballast.

The best covering material for metal traps has not yet been determined. The $\frac{1}{4}$" diameter steel rods add strength and weight to the trap that may or may not be necessary. They should last longer than a wire, nylon or cotton cover and with proper spacing will permit the escape of a high proportion of the short lobsters. They do, however, require 6 to 8 spot welds per rod -- a laborious, expensive process. Chain-link wire mesh was less convenient to use than welded wire mesh. The latter, if galvanized and 1/10" to 1/8" in diameter should have reasonably good lasting qualities. It is, however,

difficult to find suitable mesh sizes and the mesh-covered traps tested to date have retained more short lobsters than the wooden traps. Cotton, manilla, or nylon mesh may prove to be very satisfactory covers. Their low cost and ease of replacement may well offset their poor lasting qualities.

Improper settling

Unlike the rock-ballasted wooden traps, there is nothing to ensure that the metal traps will settle to the bottom in the proper position. Several fishermen have noted in clear water that a considerable number of the metal traps were lying on their sides. This appears to be the principal defect in the metal traps and is probably responsible for their poor performance, particularly when the lobsters are inactive. The addition of ballast does not appear to be the answer. This would simply increase the water resistance of the bottom of the trap and tend to turn the trap upside down. Fishermen have been encouraged to bridle the metal traps from the top and set them carefully in an effort to keep the traps upright. They have not been enthusiastic about this method of fishing and usually revert to the standard bridle and rapid setting. Some improvement seemed to result from adding four to six plastic floats (5" x $1\frac{3}{4}$") to the top of the trap. The floats reduce the weight of the trap in water and add to its water resistance and so probably make the traps more susceptible to storm damage. They are rather awkward to use and add to the cost of the trap. Another approach to the problem was to fasten 4" to 14" wide galvanized strips along the whole length of the top of the trap. When these traps were dumped

overboard, it was noted that those with the widest strips sheared off markedly to one side. Of eight traps so rigged, two settled on their sides. Vanes or fins of the proper size in the right position may solve the problem. It is also possible that the shape of the trap could be modified to ensure proper settling. The possibility of designing a trap that would fish effectively in any position is also worth considering. As a first step in this direction, rectangular traps with fishing heads at each end and two parlour heads leading to a central parlour have been built but not properly tested.

Relative cost

It is difficult at this stage to compare the cost of wooden and metal traps. Port Maitland fishermen estimate that their four-foot, four-bow, wooden traps completely rigged with heads, ballast, buoy and 35 fathom, six-thread lines for deep water fishing cost $5.00 to $6.00 not including labour. They estimate that a man can build a trap in 1½ to 2 hours. An equivalent 55-pound iron trap covered with steel rods and rigged for deep water fishing is estimated to cost $12.00 without labour. This estimate is made up as follows: Iron and steel, 55 pounds @ 10¢ = $5.50; paint = $0.30; welding rods = $1.90; heads, buoy, rope, etc. = $4.30; total = $12.00. The labour costs to build this trap are estimated at an additional $8.00 as follows: Skilled welder, 3 hours @ $2.00 = $6.00; helper, 3 hours @ $0.65 = $1.95; total = $7.95. This brings the total cost of the trap to $20.00. This cost

could certainly be reduced by mass production methods. One manufacturer estimated that a 35-pound, iron-framed, steel rod trap could be built to sell for $6.00. This smaller trap could be fully rigged for about $3.00 to bring the total cost to $9.00. On this basis, a fully rigged four-bow trap would cost about $13.50. If fishermen could build the traps and so save labour costs, the four-bow trap could be built for about $12.00. Another probable way to reduce the initial cost is to use a cheaper, more easily applied mesh cover.

Lasting qualities

It is as yet too early to assess accurately the lasting qualities of the metal traps. The Model 4 metal traps built in February, 1954, are in reasonably good shape after two years. During this period they have been in the water for something over 12 months -- the equivalent of six fishing seasons in the areas where the lobster season is open for only two months. When not actually fishing, these metal traps were usually stored outside. Between fishing periods, these traps have been given a protective coating of tar base or fish oil base paint. If built of reasonably heavy material and properly cared for, there seems to be reason to believe that an iron trap would, under ordinary fishing conditions, last a minimum of five years. Considerably longer life could be expected if the traps were made of galvanized iron.

Necessary weight

The iron-framed traps built at the Biological Station weighed from 21 to 56 pounds in air. The 21-pound

traps were fished only in Northumberland Strait and were not exposed to severe storms. They may be heavy enough to withstand storm damage but traps this light have not been adequately tested. The 35-pound, three- and four-bow traps have come through very severe storms virtually undamaged. Fishermen who haul by hand found the 35-pound, three-bow traps difficult to haul. Most fishermen, however, are now equipped with pot haulers. The 35-pound, four-bow traps (Model 8) were not quite sturdy enough to withstand normal handling. The 56-pound, four-bow traps are heavier than necessary to withstand storm damage and are too heavy to haul by hand. They do, however, have relatively good lasting qualities and stand handling well.

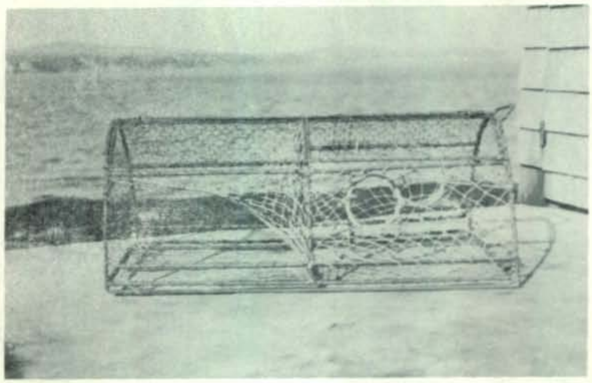

Figure 2 -- Model 1

Frame -- 5/16" diameter round iron rods.
Cover -- 1" mesh light chicken wire (1 1/8 x 1¼" tinned chicken wire).
Heads -- 2 side fishing heads and 1 "parlour" head 1¼" cotton mesh.
Fishing rings -- 4½" inside diameter offset wire rings, later replaced with wooden rings. No ring in parlour head.
"Lath" space -- 1¼" at bottom of both sides.
Runners -- 3/8" diameter iron rods along each side, ½" below floor.
Door -- hinged with wire, tied shut with twine.
Handles -- 1 at top and 1 at bottom of "kitchen" end.
Outside dimensions -- length 36", width 19½", height 14".
Weight -- in air 21 lbs., in water 18 lbs.
Where tested -- Miminegash, P.E.I.
Number built -- 2.

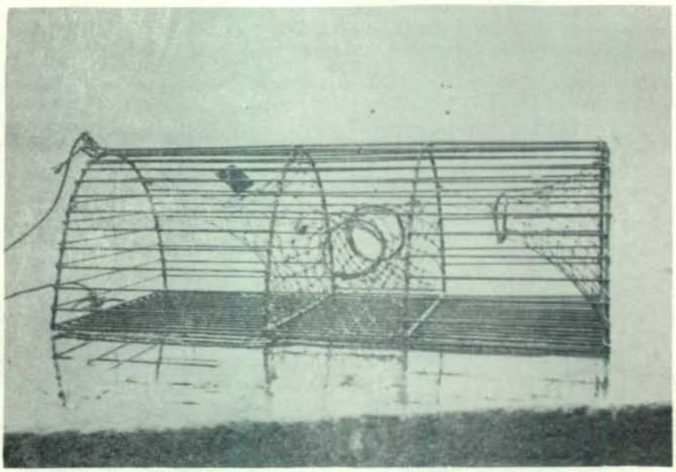

Figure 3 -- Model 2

Frame -- 4 bows of 3/8" diameter round iron rods.
Cover -- ¼" diameter mild steel rods.
Heads -- 1 end and 2 centre side fishing heads, 1 parlour head, 1½" cotton mesh.
Fishing rings -- 5" inside diameter wooden rings, no ring in parlour head.
"Lath" space -- steel rods spaced 1 5/8" apart throughout trap.
Door -- hinged with wire, tied shut with twine.
Handles -- 1 at top and 1 at bottom of "parlour" end.
Outside dimensions -- length 48", width 29", height 16".
Weight -- in air, 44 lbs., in water 37 lbs.
Protective coating -- painted with black paint.
Where tested -- Port Maitland, Yarmouth Co., N. S.
Number built -- 4.

Model 3 -- Not illustrated

Similar to Model 2 except as follows:

"Lath" space -- steel rods spaced 1½" apart on sides and top, 1" apart on floor of trap.
Lacing rods -- 2, ¼" diameter iron rods added above floor to lace heads to.
Weight -- in air, 52 lbs., in water 46 lbs.
Protective coating -- sprayed with "Ace of Spades" tar base paint.
Where tested -- Port Maitland, Yarmouth Co., N. S.
Number built -- 11.

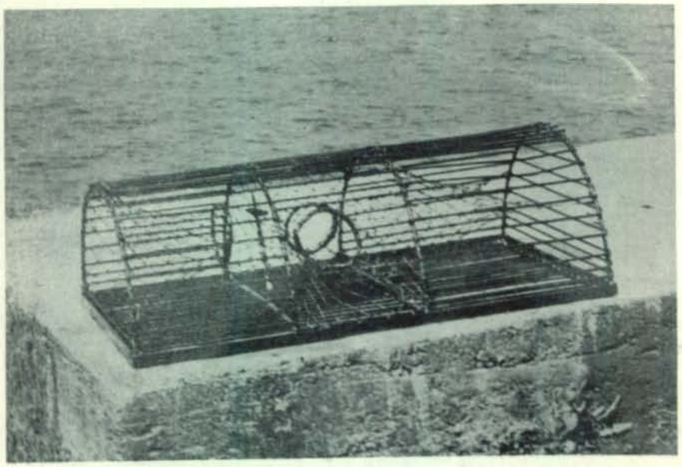

Figure 4 -- Model 4

Frame -- angle iron base 1" wide by ¼" thick; 4 bows of 3/8" diameter round iron rods.
Cover -- ½" diameter welded steel rods.
Heads -- 1 end and 2 centre side fishing heads of 1½" cotton mesh, later replaced by nylon.
Fishing rings -- 5" inside diameter wooden rings, no ring in parlour end.
"Lath" space -- steel rods spaced 1½" on sides and closed end, 1" on the floor and ¾" on lowest side spaces.
Lacing rods -- ¼" diameter steel lacing rods placed at open end, third bow and at each side head, all about ¾" above the floor.
Door -- of ¼" diameter steel rods; kept closed by two centre cross pieces of 3/8" diameter iron bevelled on one end to slip about ½" under a spring rod running full length of trap, attached at ends only.
Outside dimensions -- 44" long by 25" wide by 12½" high.
Weight -- in air, 56 lbs., in water 50 lbs.
Protective coating -- dipped in "Ace of Spades" tar base paint.
Where tested -- Port Maitland, Yarmouth Co., N. S., and Fourchu, Richmond Co., N. S.
Number built -- 14.

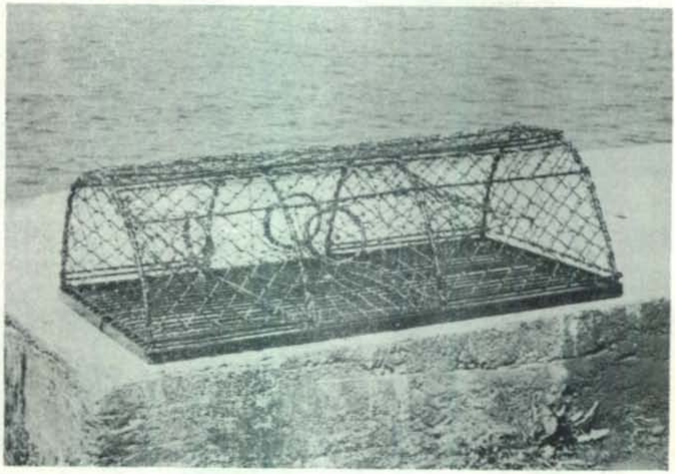

Figure 5 -- Model 5

Same general design and overall dimensions as Model 4 except that the top and closed end were covered by 1½" steel mesh.

Frame -- bottom, bows and cross pieces were the same as Model 4; 4 steel rods run lengthwise as support for mesh and door.

Lacing rods -- ¼" diameter steel rods were run through the steel mesh and then welded to the trap about ¾" above floor. On illustrated trap steel rods were placed along bottom on one side to fill up space not covered by steel mesh. This is not standard procedure.

Door -- similar to Model 4 but only two steel rods lengthwise covered with steel mesh.

Weight -- in air, 50 lbs., in water, 44 lbs. (estimated).

Protective coating -- dipped in "Ace of Spades" tar base paint.

Where tested -- Port Maitland, Yarmouth Co., N. S., and Fourchu, Richmond Co., N. S.

Number built -- 1.

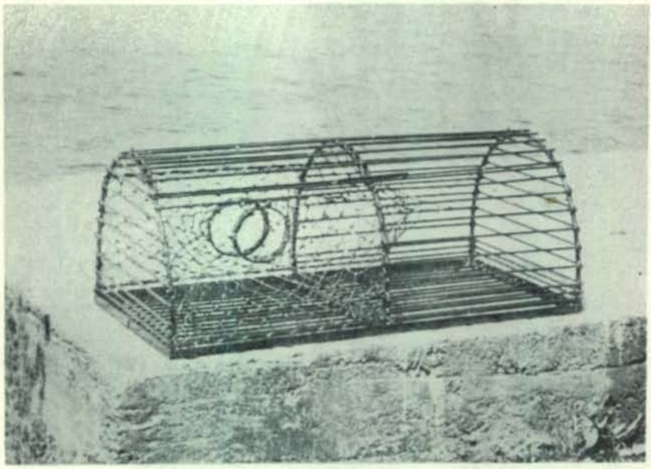

Figure 6 -- Model 6

Frame -- angle iron base ¾" wide by 1/8" thick; 3 bows of 3/8" diameter iron rods.
Cover -- ¾" diameter steel rods.
Heads -- 2 side fishing heads and one "parlour" head of 27 thread 1¼" mesh cotton.
Fishing rings -- 4½" diameter wooden rings; no ring in "parlour" head.
"Lath" space -- steel rods spaced 1¼" on sides and 1" on floor; first three spaces above floor were ¾".
Lacing rods -- ¼" diameter steel rods on both sides and at centre bow to which heads are laced.
Door -- held closed with spring rod as in Model 4.
Outside dimensions -- 36" long, 19½" wide, 13½" high.
Weight -- in air, 35 lbs., in water, 30 lbs.
Protective coating -- dipped in "Ace of Spades" tar base paint.
Where tested -- Miminegash, Prince Co., P.E.I., and Stonehurst, Lunenburg Co., N. S.
Number built -- 14.

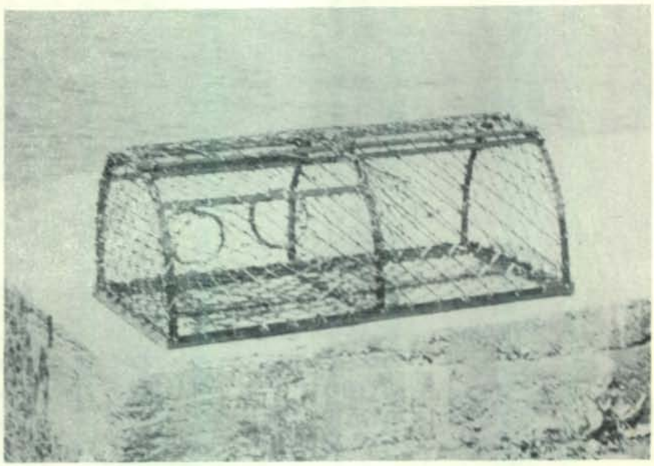

Figure 7 --- Model 7

Frame --- angle iron base ¾" wide by 1/8" thick (welded). Flat iron ¾" wide by 1/8" thick for 3 bows, cross pieces and lengthwise strips bolted together with ¼" iron stove bolts.
Cover --- closed portions of sides, ends and floor all covered with 1½" aluminum mesh laced through holes bored in the angle iron base.
Dimensions --- heads, fishing rings, protective coating and outside dimensions the same as trap Model 6.
Door --- two flat iron bars covered with aluminum mesh. Door kept closed by tying with twine.
Weight --- in air, 30 lbs., in water, 26 lbs. (estimated).
Where tested --- Miminegash, Prince Co., P.E.I., and Stonehurst, Lunenburg Co., N.S.
Number built --- 1.

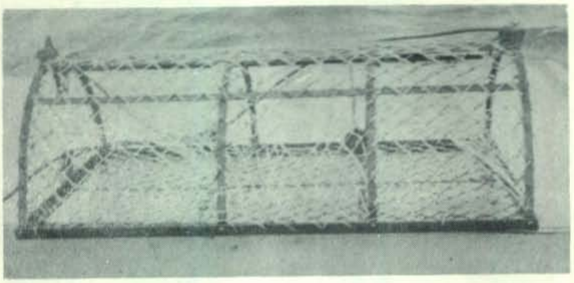

Figure 8 -- Model 8

Frame -- base of angle iron 1" by ¼" welded at four corners. Flat iron ¾" by 1/8" for four bows, cross pieces and doors; bolted together with ¼" iron stove bolts.
Cover -- covered on sides, closed end and floor with 1½" aluminum mesh attached with steel wire through holes bored in frame.
Heads -- nylon mesh (approx. 1½" mesh); two side centre heads and one end head; no fishing rings. Heads laced through holes bored in the angle iron base.
Door -- 2 flat iron bars and cross pieces; covered with aluminum mesh; kept closed with two wooden buttons.
Bridle rings -- iron rings about 1" in diameter welded to the top of each end bow. These were used to attach a rope bridle so trap would settle properly.
Outside dimensions -- 44" long by 25" wide by 12½" high.
Weight -- in air, 35 lbs., in water, 27 lbs.
Protective coating -- painted with "Rustoleum" a fish oil base paint.
Where tested -- Port Maitland, Yarmouth Co., N. S.
Number built -- 6.

Model 9 -- Not illustrated.

Similar to Model 8 except as follows:

Cover -- 1½" cotton mesh.
Weight -- in air, 37 lbs., (after being tar dipped); no weight in water available as this trap was lost.
Protective coating -- one coat of primer plus one coat of tar.
Where tested -- Port Maitland, N. S.
Number built -- 1.

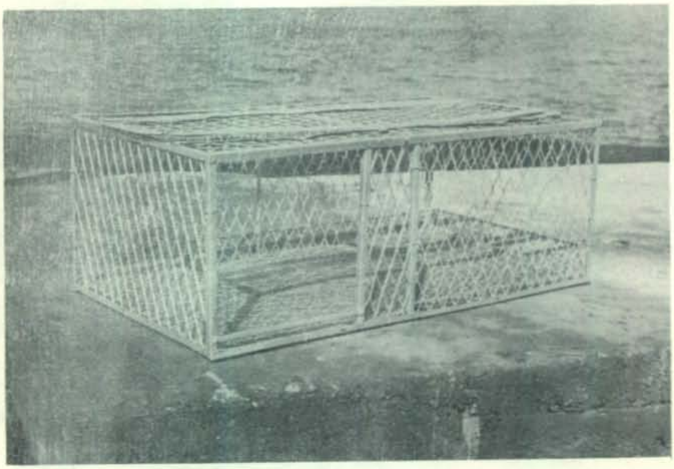

Figure 9 -- Model 10

Aluminum mesh lobster trap built at Technological Station, Halifax, N. S.

Frame -- a three-bow trap with frame of angle aluminum 5/8" wide by 1/16" thick, rivetted at the joints. Rectangular box-shaped type of trap.

Cover -- enclosed with pressed aluminum mesh (diamond-shaped mesh approximately $2\frac{3}{4}$" x $1\frac{1}{4}$"). In addition to this mesh, the floor of the trap was covered with galvanized wire mesh with $\frac{1}{4}$" square meshes. The mesh was attached to the frame of the trap with aluminum wire.

Side head openings -- two opposite side head openings were used on one end of the trap. These openings were $12\frac{1}{2}$" long by $11\frac{1}{2}$" high. A lacing rod of the same angle aluminum as was used in the frame was placed along the bottom of each side head opening about $\frac{3}{4}$" above the floor of the trap. This rod was bent in a "U" shape rather than a right angle as used in the frame of the trap. The two lacing rods were attached to the end bow and other support by aluminum screws. These were the only joints in the trap which were not rivetted.

Door -- the door of the same material as the other outer covering of the trap was bound all around with sheet aluminum giving a border of about 1" wide. This door measured 39" long by 10" wide and was placed in the centre of the top of the trap. It was held closed on the back end with three aluminum wire hinges and on the front by an aluminum button $3\frac{1}{2}$" long x $\frac{3}{4}$" wide x 1/8" thick, fixed to the centre bow of the trap.

Outside dimensions -- 39" long x 20" wide x $13\frac{1}{2}$" high.

Weight -- in air, $8\frac{3}{4}$ lbs., in water, 6 lbs.

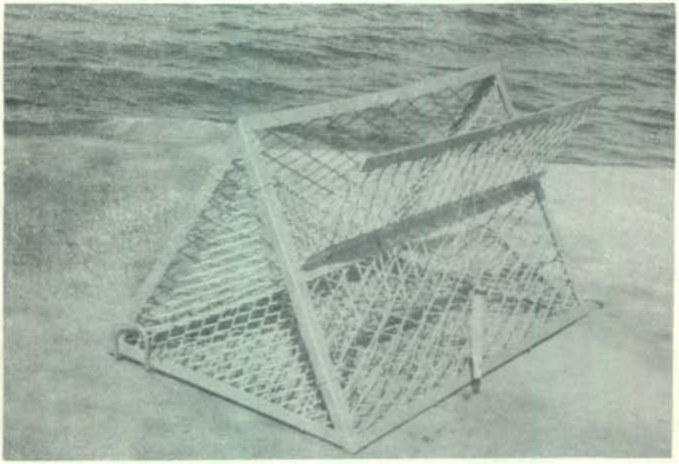

Figure 10 --- Model 11

Triangular-shaped aluminum lobster trap made at Technological Station, Halifax, N. S. Received at St. Andrews May 13, 1955.

Frame -- frame of sheet aluminum about 1" wide bent like angle iron and rivetted at the corners.
Cover -- covered on all three sides with aluminum mesh 2¾" x 1¼" wired to the frame of the trap.
Door -- one side of the trap has a horizontal bar of sheet aluminum running full length to which the door is hinged with 5 wire hinges. Door: 30" long x 8" wide and held closed with a wooden peg slipped through a metal eye at the top of the trap.
Fishing heads --- are of aluminum mesh 1¼" x ¾" tapered to a 5" triangular head at each end.
Bridle rings -- two, of bent aluminum wire about ¼" in diameter are placed one at each end of one side of the trap at the top. A rectangular aluminum mesh frame 9" x 6½" x 5" is placed in the centre of the inside of the trap probably as a maze to prevent lobsters from getting out of the trap and also to hold bait. This frame was 2½" from fishing head on each end of the trap.
Weight -- in air, 6¼ lbs., in water, 3½ lbs.
Outside dimensions --- 30" long x 18½" wide on each side x 16" vertical height.

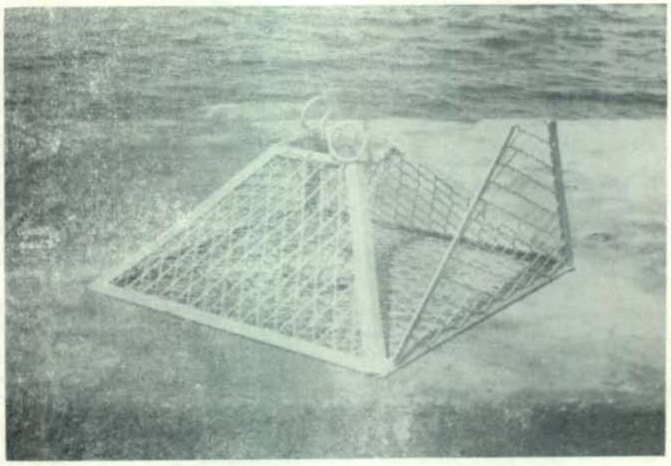

Figure 11 -- Model 12

Pyramid-shaped aluminum lobster trap made by Technological Station, Halifax, N. S. Received at St. Andrews, May 13, 1955.

Frame -- of sheet aluminum about 1" wide bent like angle iron and rivetted at the corners.

Cover -- completely covered, except on the top, with aluminum mesh $2\frac{3}{4}$" x $1\frac{1}{4}$".

Door -- one of the four sides is hinged at the base with wire and opens as a door. This door is held closed by an aluminum button at the top of the trap.

Bridle rings -- two aluminum rings, 2" diameter, are placed one at each opposite corner at the top of the trap for attaching the bridle. These rings are wired to the frame of the trap.

Fishing head -- the top of the trap which is $6\frac{1}{2}$" square has a head made of pieces of wire tapering to about 4" square and about 5" from the top of the trap.

Outside dimensions -- bottom, 24" x 24"; top, $6\frac{1}{2}$" x $6\frac{1}{2}$"; vertical height, $8\frac{1}{2}$".

Weight -- in air, $5\frac{3}{4}$ lbs., in water, $3\frac{3}{4}$ lbs.

On the floor of the trap two pieces of metal $5\frac{1}{4}$" long by 4" wide are bolted together, aluminum (?) inside the trap and iron (?) outside. These are probably to combat electrolysis and/or to act as a ballast.

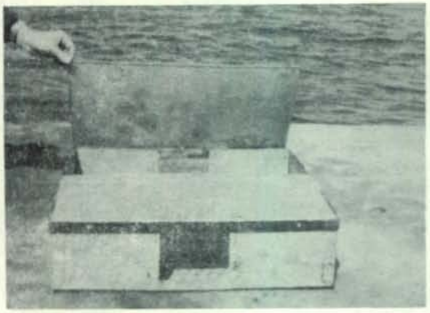

Figure 12 -- Model 13

Galvanized iron box-type lobster trap made at Technological Station, Halifax, N. S. Received at St. Andrews, May 13, 1955.

Frame -- a galvanized sheet iron box 24" long x 24" wide x 6" deep rivetted at the corners. An iron bar 1" x 1/8" runs all around the outside of the trap level with the top. Half of the top opens as a door and is held closed by a peg and eye attached to another bar of 1" x 1/8" iron running across the centre of the top of the trap. The door is attached on the other end with wire hinges.

Fishing heads -- a rectangular fishing head 6" x 4" is placed at each end of the trap. These heads have a trap door arrangement of wires hanging about 1" apart to allow the lobsters to get in and prevent them from getting out. These trap doors are attached to both the top and bottom of the trap so as to work whether the trap sits on its top or bottom. Six 1" diameter and nine 3/8" diameter holes are bored in each side of the trap to allow water to get in and out.

Bridle rings -- a 2" diameter aluminum ring is attached at the centre of each side of the trap for the bridle.

Weight -- in air, 18½ lbs., in water, 15¾ lbs.

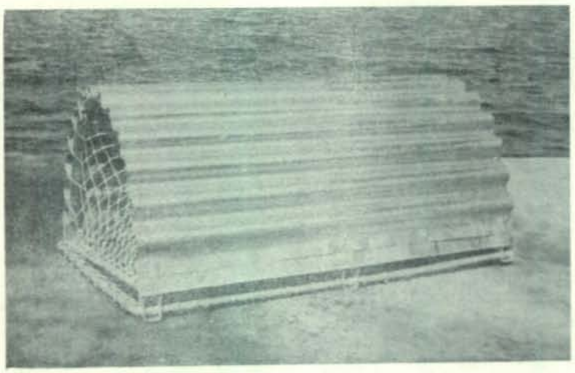

Figure 13 -- Model 14

Aluminum lobster trap made by Aluminum Co. of Canada, Kingston, Ontario. Received at St. Andrews May 9, 1955.

Frame -- base of $\frac{1}{2}$" diameter aluminum rod bent in rectangular shape and welded at two corners. Three bows of flat aluminum 1" wide by $\frac{1}{4}$" thick bent to act as hinges on one side of the aluminum rod base.

Cover -- trap completely covered on sides and top by corrugated sheet aluminum rivetted to the three bows. The entire top of the trap hinges on one side at the three bows and is kept closed on the other side by three clamps, one at each bow held closed with cotter pins. Floor of aluminum alloy (?) mesh, $1\frac{1}{2}$" square, laced to the aluminum rod base with wire.

Ends -- both ends are open, presumably for cotton or nylon heads and fishing rings.

Outside dimensions -- $36\frac{3}{4}$" long x 22" wide x $15\frac{1}{4}$" high.

Inside dimensions -- 34" x 20" x 14".

Weight -- in air, 14 lbs., in water, $8\frac{1}{4}$ lbs.

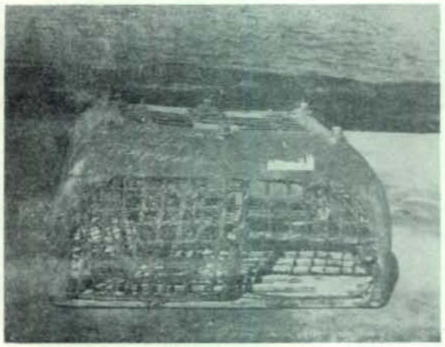

Figure 14 -- Model 15

Plastic lobster trap built by LaPierre Boatworks, Belfast, Maine, U. S. A.

Frame -- plastic frame with top portion of trap of solid plastic except for the door. No centre bow used.

Cover -- covered with mesh of wound fibre glass coated with plastic. Mesh of varying sizes but approximately 1½" square. Part of the lowest space on one end was spaced at 1½" and the opposite end at ¾". The floor of the trap was made of plastic mesh 1 3/8" wide and of varying lengths (6 to 8").

Side head openings -- two opposite side head openings were used on one end of the trap. These measured 12" long by 6" wide, with plastic coated fibre glass on the bottom and one end of each opening for lacing the heads.

Door -- a plastic mesh door 18" long x 8" wide was placed in the centre of the top of the trap. The mesh in the door was about 3¾-4" long by 1" wide. The door was held on one side by two aluminum wire hinges and had a plastic "lug" which slipped under the top of the trap on the other side to hold the doors closed.

Stacking facilities -- this trap had six plastic plugs, 1 1/8" diameter, three on either side of the top, designed to fit into six holes 1¼" diameter similarly spaced on a corresponding trap. This was done so that traps could be more or less affixed to each other for convenient stacking.

Bridle holes -- four holes about 1 1/16" in diameter, one at each corner of the floor of the trap were so spaced for attaching the bridle at either end.

Outside dimensions -- 30" long x 20" wide x 15" high.

Weight -- in air, 19 lbs., in water, 4 lbs.