Experimental Octopus Trap Fishing in Barkley Sound, February - March 1979

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EXPERIMENTAL OCTOPUS TRAP FISHING IN BARKLEY SOUND, FEBRUARY - MARCH 1979

by

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ABSTRACT

Adkins, B. E., P. A. Gee, and P. A. Breen. 1980. Experimental octopus trap fishing in Barkley Sound, February-March 1979. Fish. Mar. Serv. MS Rep. No. 1548: 23 p.

Experimental octopus trap fishing took place during February and March 1979. Seven types of octopus traps were tested. A long-line system was used to set and haul the traps. Only 9 octopus were taken from a total of 1432 traps set during this period. Trap design, construction and efficiency are discussed as well as possible reasons for the low catch rate shown by this study.

Key words: Octopus, trap fishing, Vancouver Island.

RÉSUMÉ

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En février et mars 1979, les auteurs ont procédé, à titre expérimental, à la mise en place de trappes à poulpe. Les essais ont porté sur sept sortes de trappes installées et remontées à l'aide d'une ligne de fond. Au cours de l'expérience, seuls neuf poulpes ont été capturés avec les 1,432 trappes. Les aspects étudiés sont la conception, la construction et l'efficacité des trappes ainsi que les raisons possibles du faible taux de prise.

Mots clés: Poulpe, trappes, Île Vancouver.

INTRODUCTION

Interest in the commercial fishing of octopus in British Columbia has increased recently, for both the halibut bait and the expanding export food markets. Approximately 75,000 pounds of octopus are landed annually in British Columbia. The largest part of this is taken in trawl nets; the remainder is taken by divers, on long-lines, and incidentally in catches from crab traps and prawn traps. Only a small number are taken in octopus traps.

On a world-wide basis, trapping is the most common method of fishing octopus (Mottet 1975). Locally, however, very little effort has been spent in this direction. It was the purpose of this study to design, or modify existing designs of, octopus traps, and test them to gain useful information for this type of fishery.

Octopus traps are simple in design: they supply a dark secluded place which the octopus will enter and use as a den. There is often no closing mechanism over the entrance and the traps are not normally baited (Mottet, 1975). The traps should be designed so that they rest solidly on the bottom with a minimum of motion. Traps that have a tendency to move around with currents are not effective (Pennington 1979). Trap size appears to be important. Hartwick et al. (1978) found that there is a relation between natural den size and octopus size. Mottet (1975) states that the size of the trap should be slightly larger than the size of the octopus to be caught, and that the best size will vary locally with the size of the octopus being fished.

Local fishermen who have trapped octopus have employed a variety of different trap designs. These include:

1. 2 gallon bait or liver tins; once used to pack dogfish livers,
2. rubber innertubes stretched over wire frames,
3. rubber tires cut in sections and laced to form a tube,
4. 5 gallon industrial oil pails,
5. crab and prawn traps,
6. wooden box traps.

In Japan, where octopus trap fishing is well established, wooden box traps, ceramic pots and plastic pots are most commonly used (Mottet 1975). The traps used in this study are similar to traps that have been used to catch octopus both locally and in Japan. We used traps of different sizes to enable us to sample a range of octopus sizes.

METHODS

We carried out experimental octopus trap fishing in Barkley Sound from February 22 to March 28, 1979. The 8 m diesel powered research vessel MELIBE, rigged with an hydraulic crab pot hauler, was used to set and haul the trapping gear during this period.

Seven trap types were tested; of these some varied in both colour and in size and shape of the entrance hole, some varied only in size and shape of the entrance and some varied in overall trap size.

Following are descriptions of the seven trap designs used:

WOODEN BOX TRAP

The box traps were similar to a trap described in Mottet (1975) which is widely used in Japan. They were simply modified wooden boxes, constructed of 1.3 cm plywood with the dimensions of 46 cm x 30 cm x 20 cm. There was an entrance hole in one end, drain holes in the opposite end and a means for attaching bait located within. A gangion line was attached on the end of the trap near the entrance so that this end faced up when the trap was hauled in. Rocks were used to sink the traps until they became water logged.

Two shapes of entrance holes were used: a diamond shape with an area of 182 cm^2 (Fig. 1) and a round hole with an area of 155 cm^2 (Fig. 2). Half the traps were painted black; the remainder were left unpainted.

The box traps were modified during the study, in an attempt to reduce escapement, by placing a 4 mm plastic mesh over the drain holes and a closeable door over the entrance hole (Fig. 3). The door was closed by tension on the gangion line but would open when the tension was released.

A commercially constructed variation of this trap was also used. It was constructed of a welded steel frame, covered with pieces of rubber inner tubes (Fig. 4). This trap was smaller than the wooden box trap: 40 cm x 30 cm x 15 cm high. The entrance hole was round with an area of 127 cm^2.

AMPHORA TRAPS

Amphora traps were urn shaped, glazed, black ceramic pots, designed after ceramic octopus pots used both in Japan and in the Mediterranean (Fig. 5). They were about 25 cm high and 18 cm wide at the widest point; the entrance had a diameter of 9 cm. A drain hole was located in the bottom of the trap. Mesh netting was used to cover the trap to prevent breakage.

TIRE TRAPS

Tire traps were constructed of used rubber tires cut transversely in half. Each half was stitched with heavy twine to produce a crescent shaped tube, open at one end (Fig. 6). A gangion line was attached near the opening. These traps varied in size depending on the size of the tire used to construct them. Similar traps have been used locally to trap octopus.

PAINT CAN TRAPS

Drain holes were cut in the bottom of commercially available 4.5 l paint cans and gangion lines were attached near the open ends. Openings were varied in size from 50 cm^2 to 315 cm^2 (Fig. 7). Some of the cans were crushed to reduce the size of the opening in relation to the size of the trap. All of the paint cans were immersed in sea water for several days before being used, to promote rusting.

OIL CAN TRAPS

The oil can traps were constructed of 23 l industrial oil and paint cans with the lids removed (Fig. 8). An 8 cm drain hole was cut in the bottom and a gangion line fastened near the opening of each can. Some of the open ends were crushed to reduce the size of the entrance hole. These traps were immersed in sea water for several days prior to use to promote rusting.

PARDIAC PRAWN TRAP

The pardiac prawn traps used were cylindrical traps constructed of a welded aluminum rod frame covered with 1.3 cm mesh netting (Fig. 9). These traps were 60 cm in diameter and 25 cm high. Three inverted funnel-shaped entrance holes were located in the sides of the traps and a means for attaching bait was located within.

The pardiac prawn trap is widely used in the local prawn fishery where octopus are a common incidental catch.

IGLOO CRAB TRAPS

The crab traps used were commercially available plastic dome shaped crab traps, with a diameter of 60 cm and a height of 25 cm (Fig. 10). The entrance was located in the top of the trap and a container inside enclosed the bait.

Excluding the oil can traps and the amphora traps which were never baited, and the prawn and crab traps which were always baited, the remainder of the traps were tested both baited and unbaited. We used either frozen herring or perforated tins of pet food as bait. Approximately 50% of all the traps set during the study were baited.

We used a system of long-line gear, described in Mottet (1975) and Yates (1968), to put out the traps. Each set of gear comprised two buoy lines 90 m in length and a 400 m ground line. The buoy lines ended in 50 cm floats and were anchored to the bottom by 15 kg cement block anchors. The ground line joined the buoy lines at the anchors (Fig. 11); it was marked in 10 m intervals where the traps were connected by halibut snaps and 2 m long gangion lines. Five sets of this long-line gear were used during this study. Trap number per set varied from 15 to 40.

The gear was set by paying the line out over the stern of the boat and snapping the traps to the line at the marks. Traps were picked up with the hydraulic pot hauler as the boat moved ahead on the line. Traps were taken off the ground line, drained, checked and stacked as they came up to the boat.

Octopus caught were weighed and then returned to the water. Voucher specimens were collected and preserved in 5% formaldehyde solution. Incidental species caught were noted for each trap type, then returned to the water.

Traps were set in the inshore waters of Barkley Sound (Fig. 12) on a variety of substrate from rock to mud; steeply sloping and undulating to level. The depths of the sets varied from 5 to 73 m and were recorded on a depth sounder. Trap soak time ranged from 3.6 to 192 hours. During the study diving observations were made on some of the traps. The traps were checked for octopus, to see if they had landed with their entrances exposed, and to see if they rested solidly on the bottom.

RESULTS

In a total of 1432 traps set and hauled in different areas and at varying depths and soak times, 9 octopus were caught. These ranged in weight from 32-96 g (Table 1). They were caught predominantly on rocky substrate at depths between 7 and 66 m with soak times ranging from 5 to 48 hours.

Three octopus were caught in box traps, two in tire traps, two in crab traps and two in prawn traps. All of these traps were baited.

Too few octopus were caught to show any trends in trap efficiency, bottom preference or optimum soak time. However, these octopus were attracted to baited traps.

The efficiency of construction and handling of the different trap types used during this study were as follows:

BOX TRAPS

Box traps are simple in design and construction but were moderately costly to build (approximately $2.50/trap). They were the most easily handled traps on deck for setting, hauling, baiting, and stacking. However, these traps were made of wood and had certain disadvantages. They had to be weighted with rocks until they became water logged and hence were difficult to lift until the rocks were removed. Their life span is likely limited to only a few seasons. The commercially constructed box trap we used eliminated these disadvantages.

The box traps that were observed while diving all landed with their entrance exposed. Those traps that were not weighted were not stable enough on the bottom to prevent rolling over. This may have been a factor in the low catch rate from these traps.

AMPHORA TRAPS

Amphora traps had to be handled carefully to prevent breakage. They were not easily handled on the boat for this reason and were therefore not practical for this type of fishing. No octopus were taken in these traps, possibly because of the smooth glaze finish. Traditional ceramic octopus pots are rough surfaced and unglazed.

TIRE TRAPS

Tire traps have all the features of a good octopus trap. They are heavy, dark, rough surfaced, easily handled on the boat and when set they were stable on the bottom. They were very inexpensive to construct and could be expected to last for many seasons of use.

PAINT CAN TRAPS

Paint cans made poor traps as they were awkward to handle on deck and too light on the bottom. The size of the entrance of many of these traps may have been too large in relation to the size of the trap, but reducing the opening size did not produce catches.

OIL CAN TRAPS

Oil can traps were easily handled on deck, inexpensive to build and could be expected to last several seasons. They made poor traps, however, because they often filled with mud or small rocks. Again the size of the opening may have been too large in relation to the size of the trap to attract octopus, but reducing the opening size did not produce catches.

PRAWN AND CRAB TRAPS

Unlike the other traps used, these attracted octopus only by bait; no dark secluded place was provided. No more octopus than would be taken incidentally by prawn or crab fishermen could be expected to be taken in these traps if they were used exclusively for octopus.

DISCUSSION

The low catch rate of the traps shown in this study was disappointing. However, it may not reflect either the effectiveness of octopus trapping or the efficiency of the traps used. It could be that larger octopus were simply not present in any of the areas we fished. Local octopus fishermen had previously reported trapping commercial quantities of octopus with traps similar to those we used in some of the areas we fished. If this is true, then it may be that we fished at the wrong time of the year. Kanamaru (1964) suggests that there are onshore-offshore migrations of octopus twice a year in Japan and Mottet (1975) states that similar migrations have been observed in Puget Sound. It may be that the low number of octopus trapped was the result of an offshore migration of octopus from the inshore areas we fished.

Finally it is possible that the traps were too light or the rate at which they were hauled in was too slow to eliminate motion of the traps on the bottom; thereby reducing their effectiveness in trapping octopus.

ACKNOWLEDGMENTS

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Table 1. Summary table of catch records.

Trap Type	Wt of Octopus (g)	Depth (m)	Substrate	Soak Time (hours)
Black/baited box trap	92	37-48	Solid	47.5
Baited crab trap	66	33	Mud	19.1
Baited prawn trap	91	29-40	Solid	27.2
Black/baited box trap	32	29-40	Rock/sand	21.0
Baited prawn trap	60	48-66	Solid	47.5
Baited tire trap	91	26.37	Solid	5.0
Baited tire trap	91	26-37	Solid	5.0
Baited crab trap	91	23-38	Solid	18.5
White/baited box trap	70	7-23	Solid	22.2

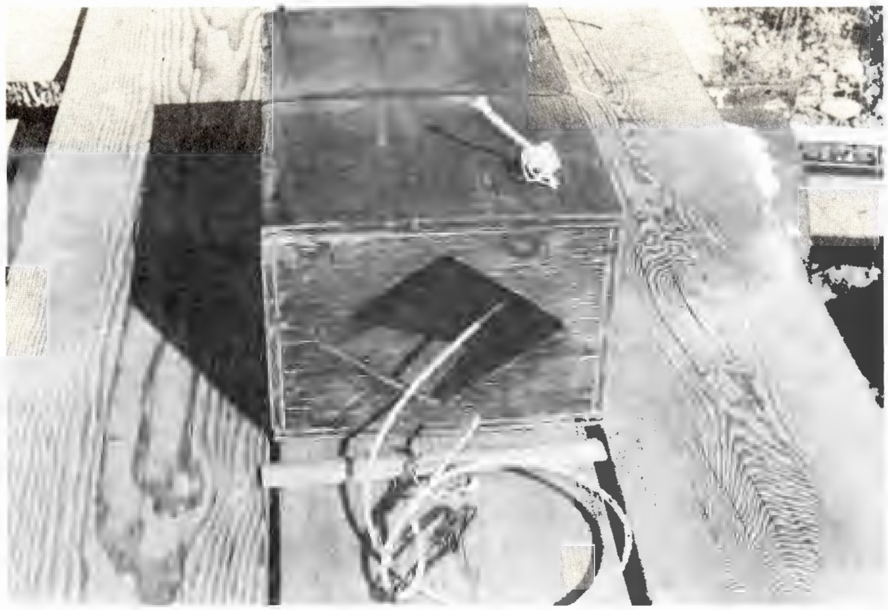

Fig. 1. Box trap with diamond shaped entrance.

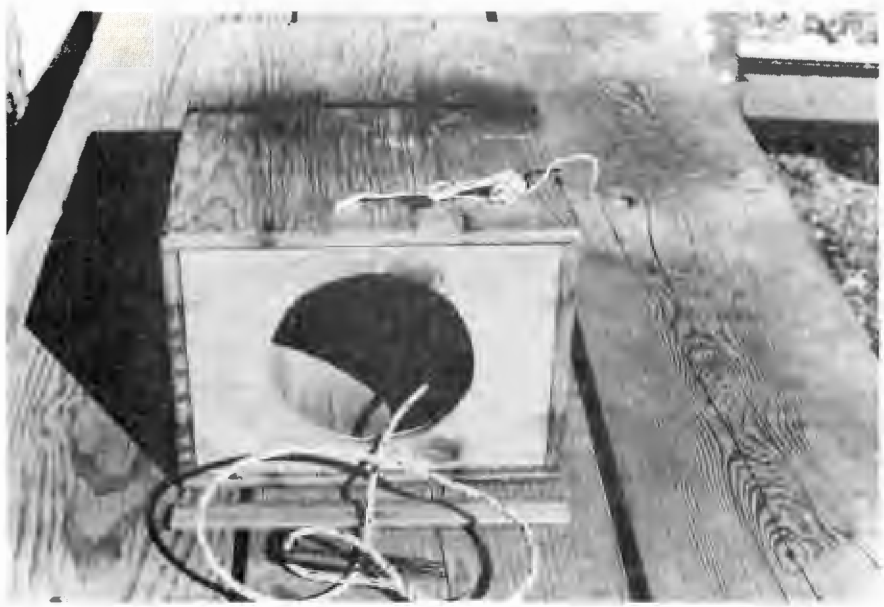

Fig. 2. Box trap with round entrance.

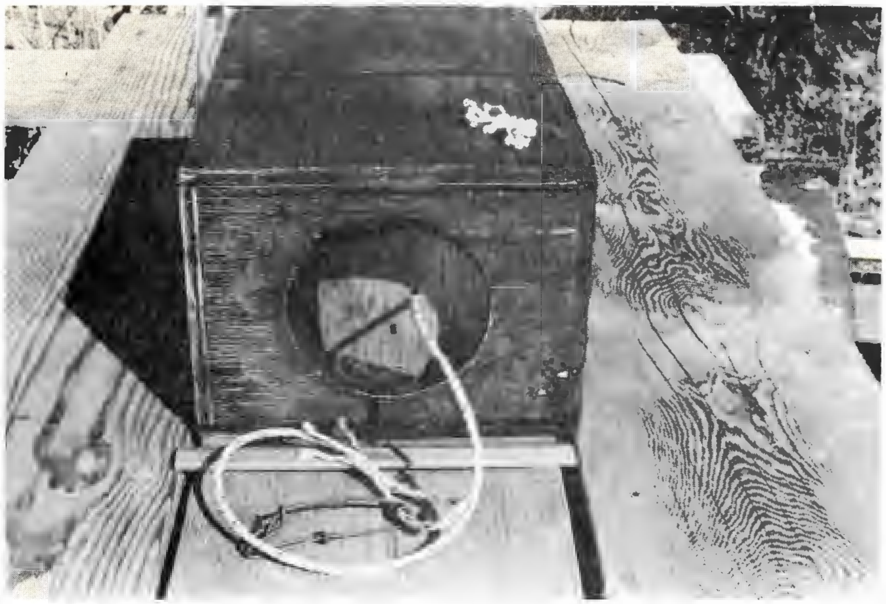

Fig. 3. Box trap with door.

Fig. 4. Commercially constructed box trap.

Fig. 5. Amphora trap.

Fig. 6. Tire trap

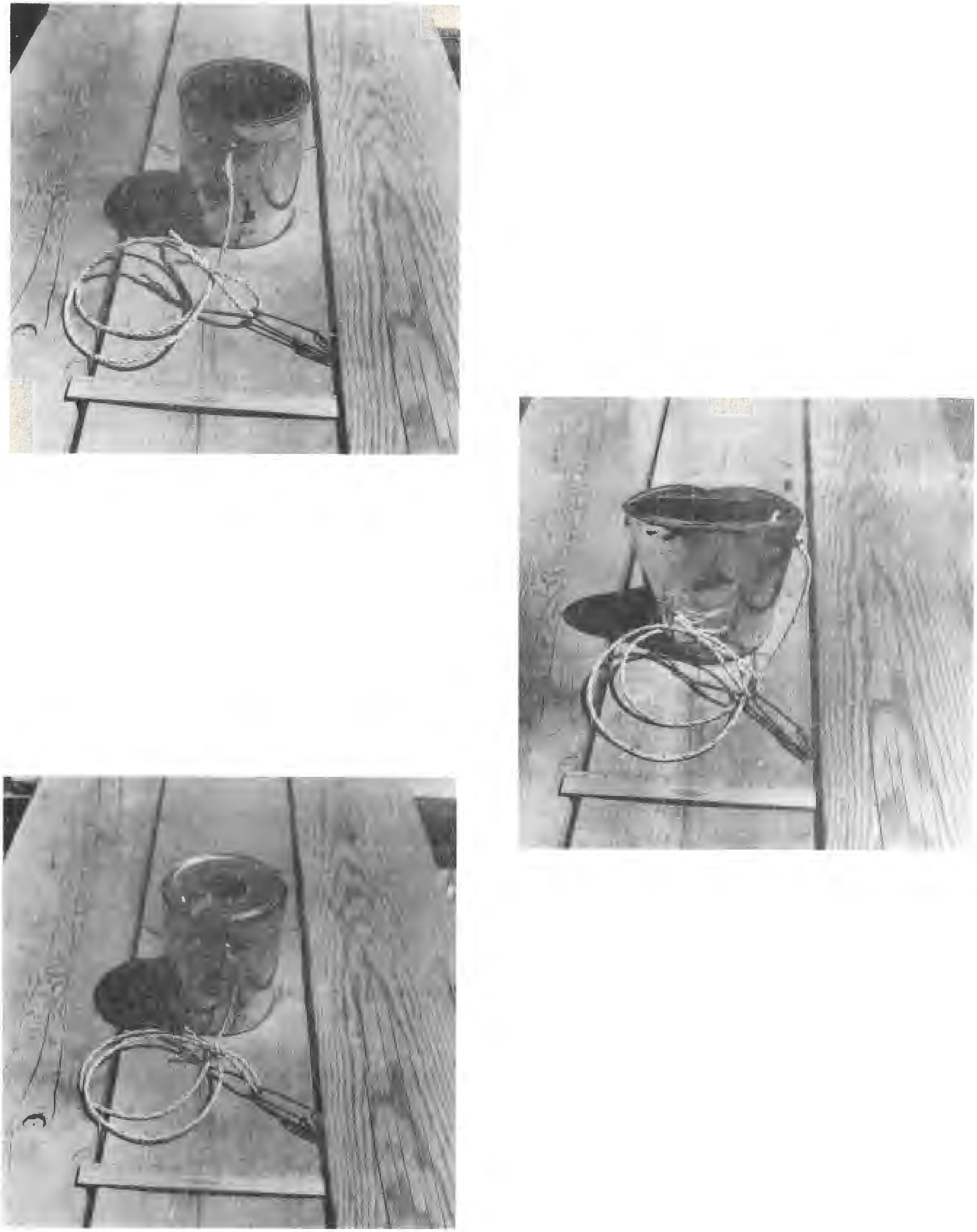

Fig. 7. Paint can traps showing differences in opening used.

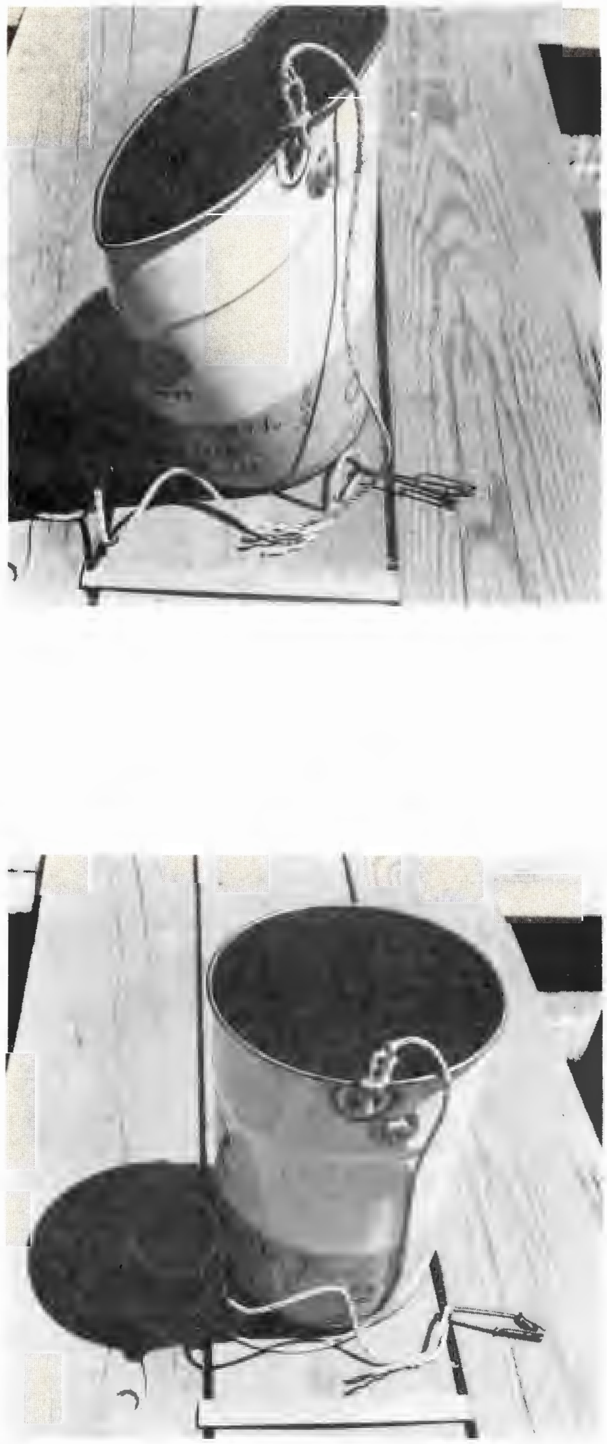

Fig. 8. Oil can traps showing differences in size of openings used.

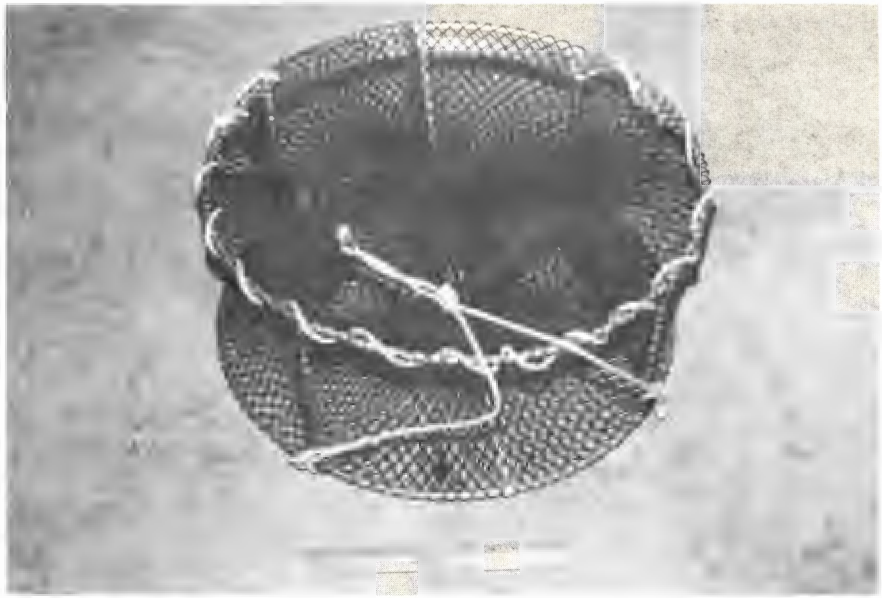

Fig. 9. Pardiac prawn trap.

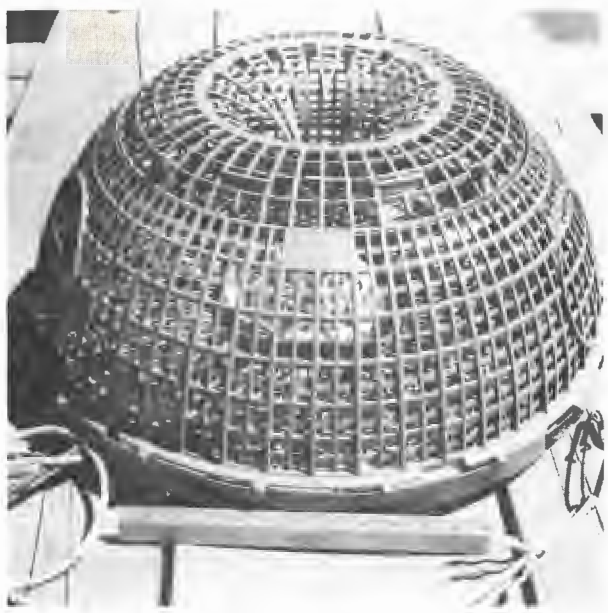

Fig. 10. Igloo crab trap.

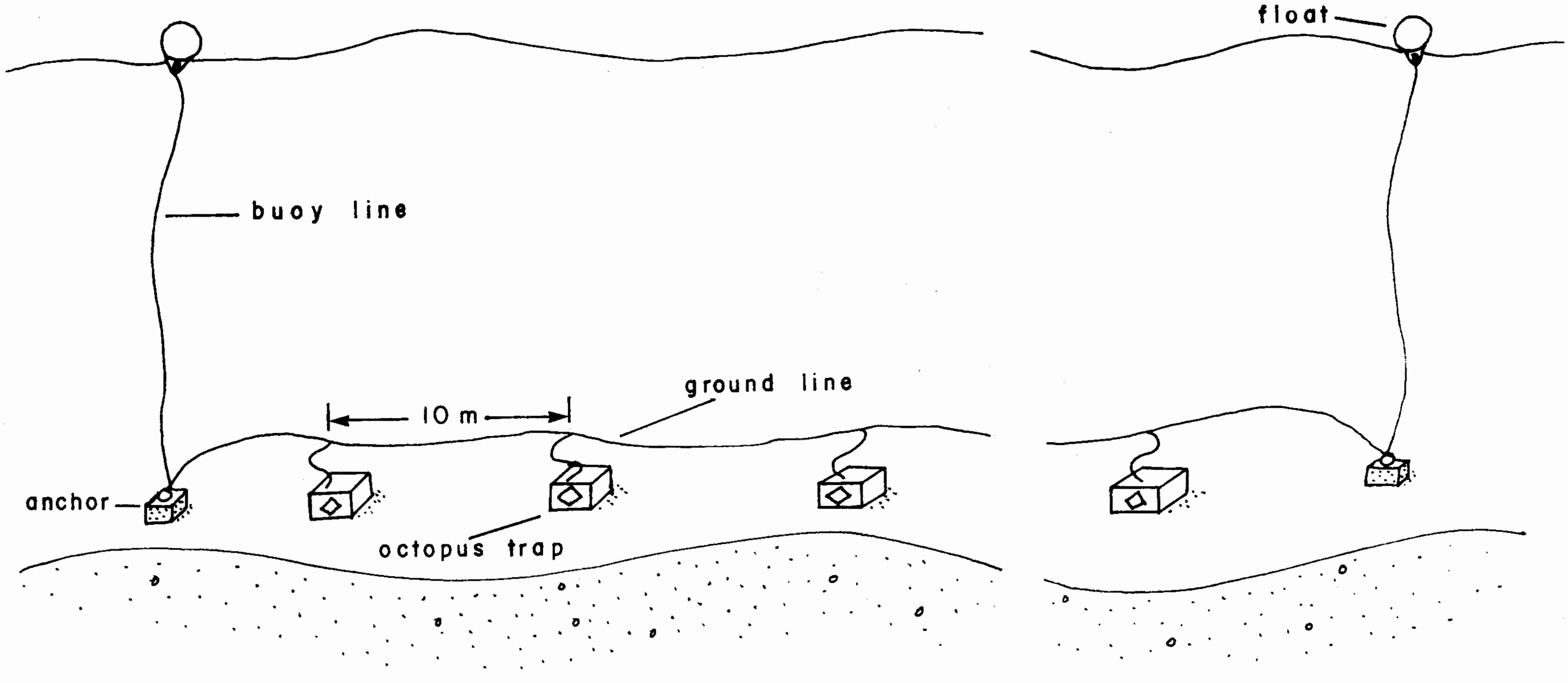

Fig. 11. Diagram showing octopus traps and long line system used.

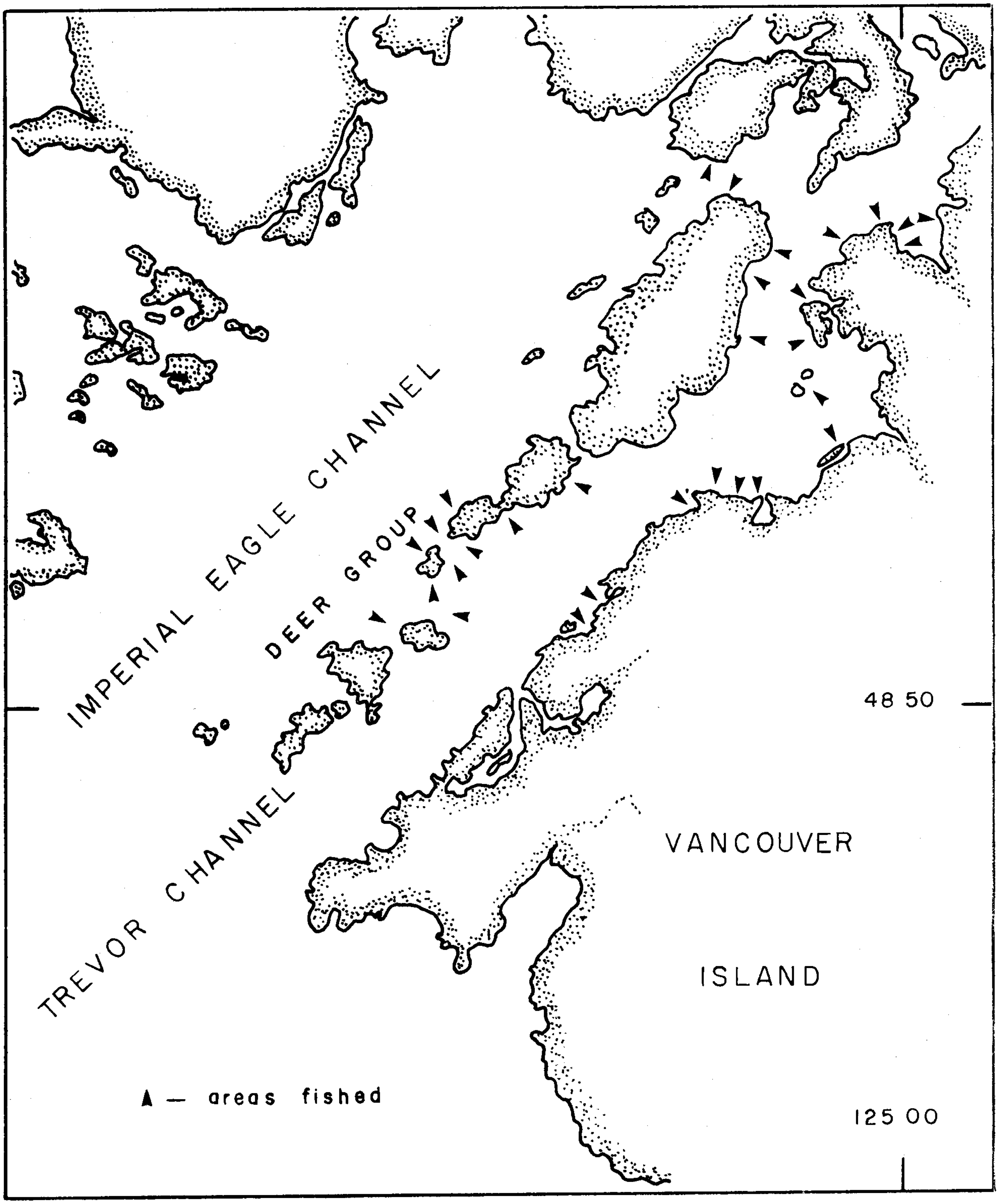

Fig. 12. Areas fished in Barkley Sound.