

Sirahu Valai—A Passive Fishing Gear in Ceylon

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INTRODUCTION

There are many types of passive fishing gear in use in the estuarine waters and lagoons in Ceylon such as the stake seine net or *Kattudel*, the tat trap or *Jakottu* and the wing net or *Sirahu valai*. Of these *Sirahu valai* is very popular in the shallow and near shore areas of the seas in north Ceylon. *Sirahu valai* is popular since it is relatively more economical, less time consuming and more efficient than other forms of fishing gear in shallow waters. More over the fishermen do not have to remain in the fishing grounds while his gear is fishing. Pearson (1923) described this gear as a stake net having a complicated arrangement. *Sirahu valai* is also referred to as *Siraku valai* or *Kurukku valai*.

BASIC STRUCTURE, VARIATIONS AND OPERATION OF THE SIRAHU VALAI

Fig. 1 illustrates a *Sirahu valai* unit. Fig. 2 is a diagrammatic representation of the unit indicating its structure. The essential feature of the *Sirahu valai* is the fencing net constructed with the aid of wooden poles. The fencing net forms a barrier or leader; at the end of the leader are the chambers.

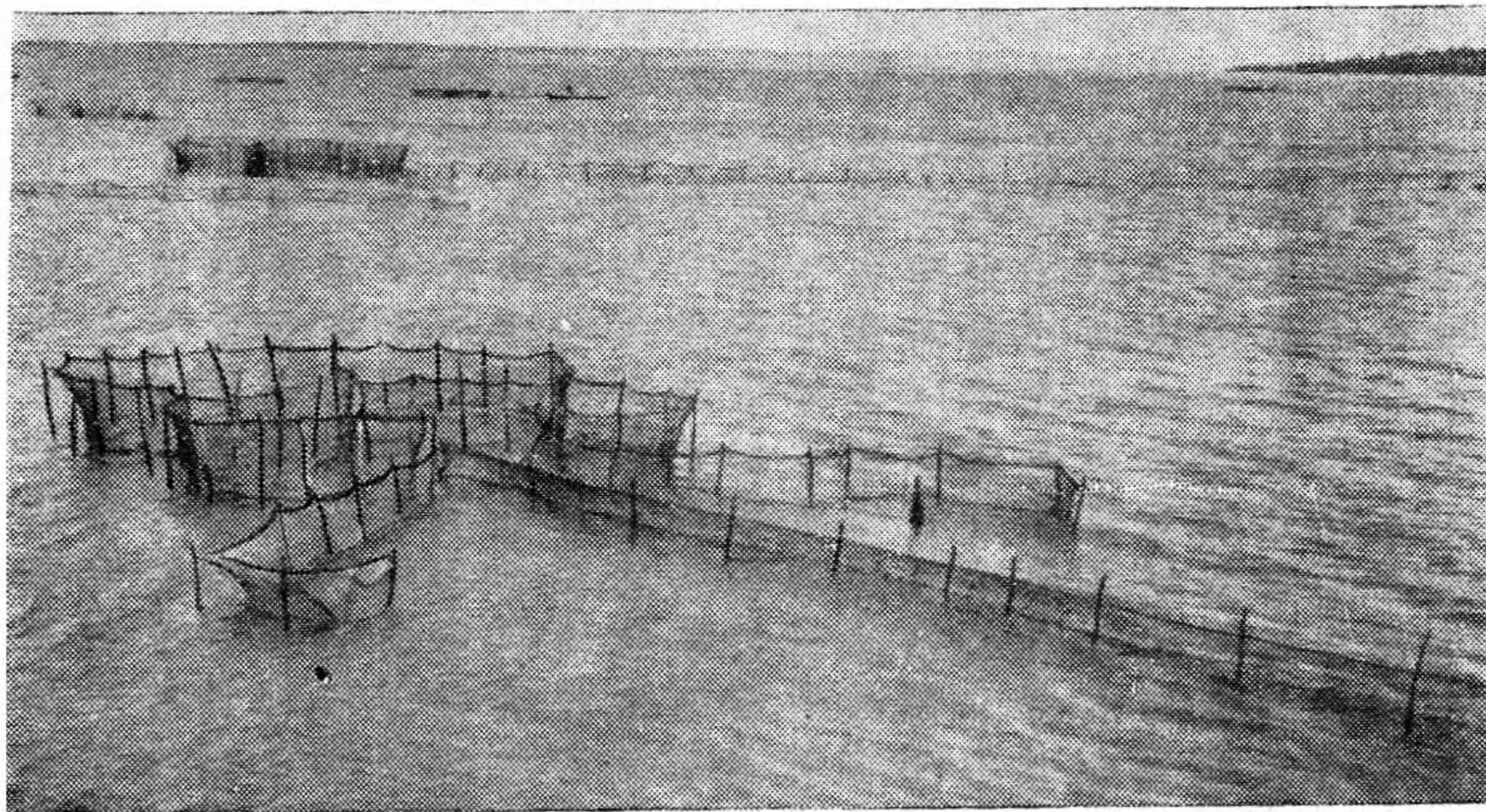


Fig. 1—A Sirahu Valai unit

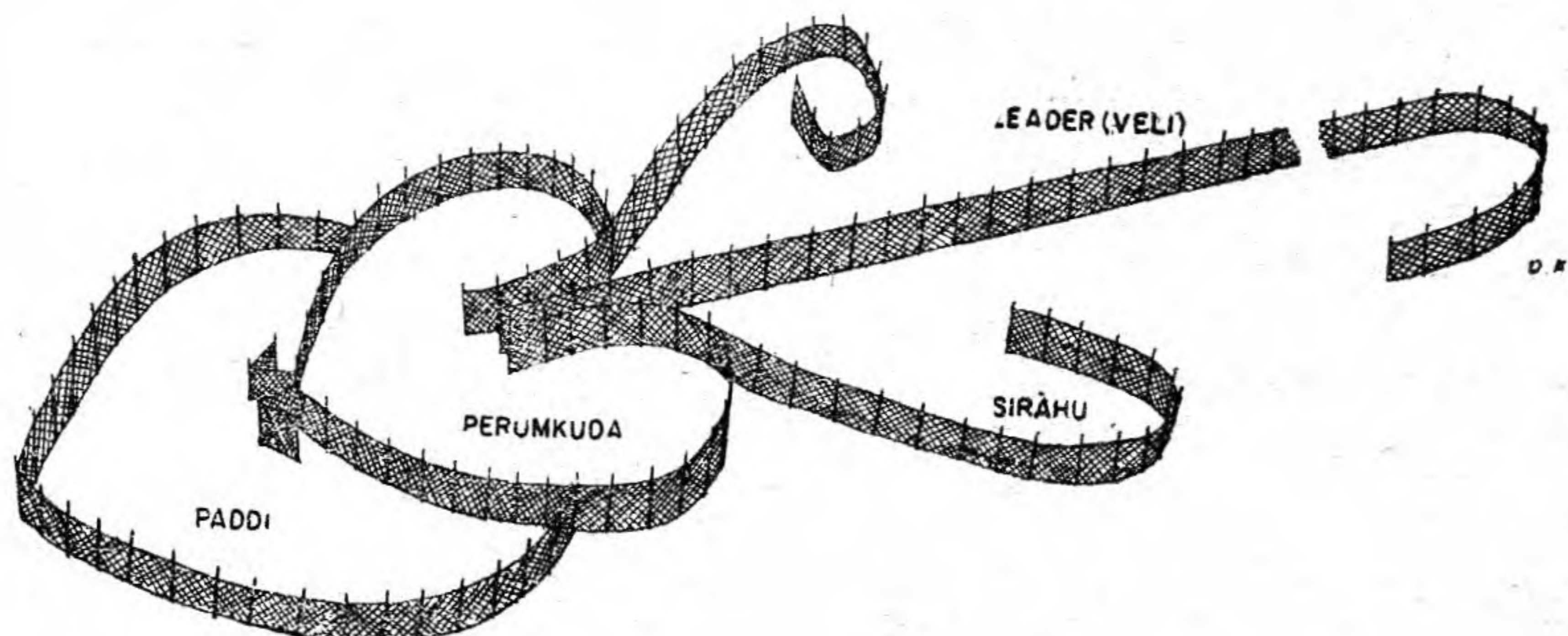


Fig. 2—Diagrammatic representation of the basic structure of a Sirahu Valai

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The leader guides fish into spacious catching chambers. There are a minimum of two chambers placed one behind the other. The complicated design of the chambers as illustrated in Fig. 1 prevents the fish from escaping. The entrances to these chambers are vertical. The leader ends at the entrance to the first chamber. At the region of the leader near the first chamber are two fence nets each of them starting at a point close to the entrance of the first chamber and diverging on both sides of the leader to form a wing-like structure. They are called the wings or *Sirahu*.

Fencing Poles

The wooden poles used in fencing are approximately 25 cm. in diameter and are never more than 4.5 m. in height the minimum height being 2 m. The poles fencing the chambers are placed 45–80 cm. apart. The poles fencing the leader are placed 1–2 m. apart. Ends of the poles are pointed to facilitate their being driven into the bottom.

Fencing Netting

Kuralon netting is used in making the fence. Mesh size varies from 11 m. to 15 mm. Nets with smaller meshes are used for the chamber and those with large meshes are used for the leader and the wing. The height of the netting varies with the depth at which the fences are erected the netting always reaching above the level of the water. Coir netting (*Madangu*) of relatively large meshes are woven on to the edges of kuralon netting both on the top and bottom of the fence. Coir ropes run along the edges of the coir netting. Along the lower edge, the coir rope loops regularly at intervals to allow the wooden poles to pass through them. The coir rope and the coir netting along the lower edge usually lie buried in the sand.

The Leader (*Veli*)

The length of the leader varies with the area of operation and it may be of any length between 45 m. and 150 m. Depending on the movements of water in the area of operation there may be more than one leader. The mesh size of the netting varies from 12 mm. to 15 mm.

The Wing (*Sirahu*)

The wing is relatively short in length and is curved. There is always a pair of wing nets. Depending on the region of operation this number may be reduced to one wing net only. The mesh size of the netting varies from 13 mm. to 15 mm.

The Chambers

The chambers are circular or oval in shape. The circumference varies between 10 m. and 30 m. The chambers are constructed to trap the guided fish and concentrate them. In most of the *Sirahu Valai* there are only two chambers viz. the receiving chamber (*Perumkuda*) and the concentrating chamber (*Paddi*). The two entrances one for the receiving chamber and the other for the concentrating chamber are generally not along the same axis as the leader. Presence of more than two chamber is not infrequent but the maximum number of chambers is four with one chamber leading into the other. These intermediate chambers are referred to as *Marichchakuda* and *Villu*. The chambers are always set on the offshore end of the leader. The mesh size of the netting varies from 11 mm. to 13 mm.

Collecting Net (*Kadippu*)

The fish in the concentrating chamber is collected by an encircling net called the *Kadippu*. Six wooden poles of equal length are kept parallel at equal distances and a piece of seine net covering the space is attached to it. The mesh size of the netting varies from 8 mm. to 11 mm. The height is

usually 2 m. but higher nets are used in deeper waters. The length varies from 2 m. to 4 m. Two men (Fig. 3) are required to operate this net. Each man holding the last pole on each side enters the concentrating chamber. The men encircle the fish in the chamber with the help of the net, which collapses vertically thus trapping all the fish encircled. This operation is carried out more than once to collect all the fish that are concentrated inside the chamber.

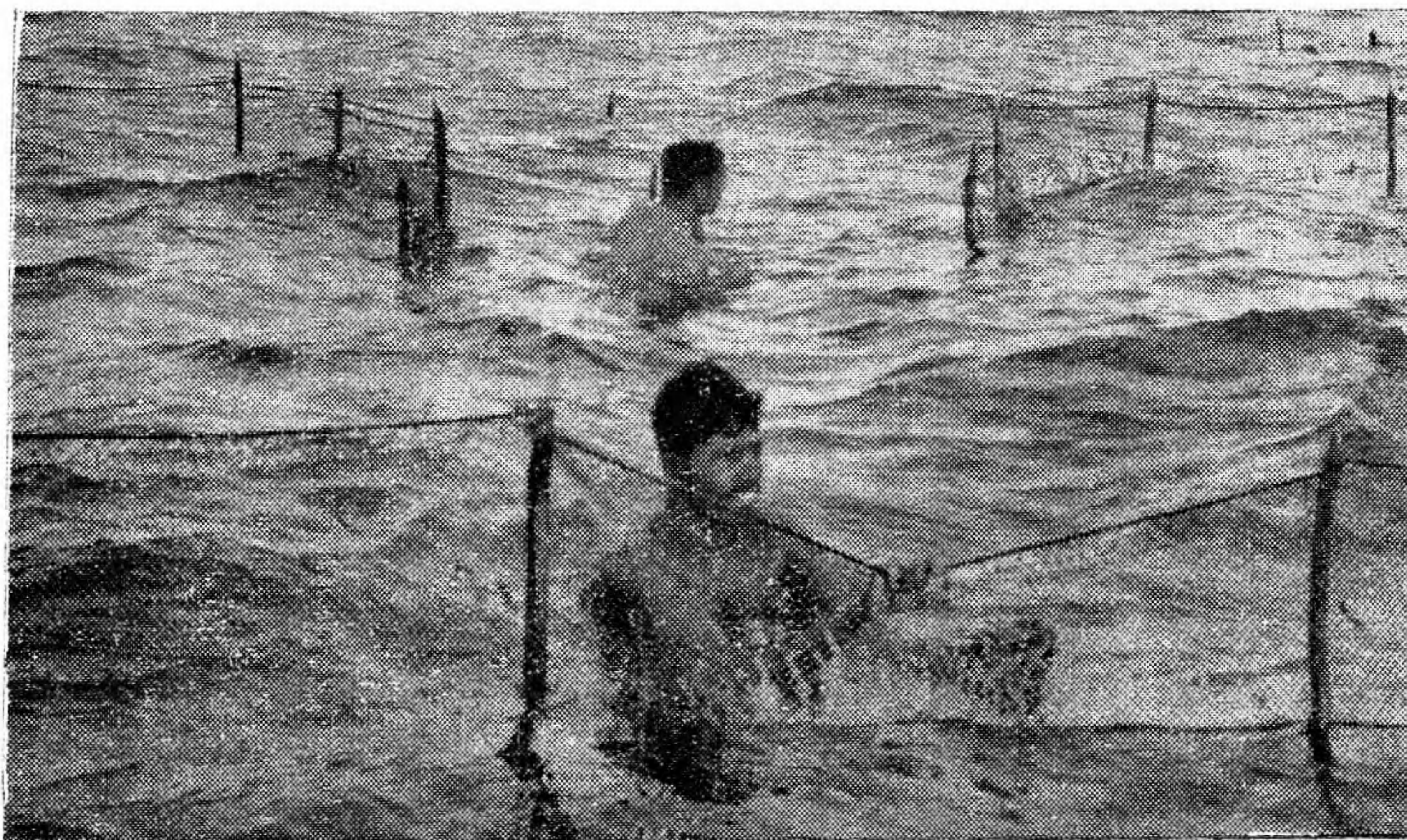


Fig. 3—Two men using the *Radippu* to collect fish, from inside the *Paddi*

Variations in the Basic Pattern

The general structure described above forms the basis on which *Sirahu Valai* is constructed. Variations in the movement and depth of water, the geographical situation of the region of operation, are factors influencing the form and structure of *Sirahu Valai*. The variations found are mostly in regard to the length of leader, the number of leaders, the shape of the leader, the position of wings in relation to the leader, the number of wings, the position of chambers in relation to one another, the position of the entrance to chambers, and the number of chambers. Eight different types are listed below and illustrated in Fig. 4.

Type 1. (Fig. 4a) This type conforms to the basic structure already described. The curving of the fence net on one side at the free end region of the leader is the only variation. The entrances to the chambers are along the axis of the leader. Area of operation : Trincomalee Harbour, Muttur, Puttalam Lagoon, Jaffna Lagoon and its neighbouring areas.

Type 2. (Fig. 4b). The free end region of the leader is curved to a side. The concentrating chamber is moved towards one side. The fencing net of the wing on the right side is longer than that on the left. Area of operation : Trincomalee Harbour, Muttur, Puttalam Lagoon, Jaffna Lagoon and its neighbouring areas.

Type 3. (Fig. 4c) The free end region of the leader is curved on both sides. The concentrating chamber is moved towards one side. Area of operation : Trincomalee Harbour, Puttalam Lagoon, Jaffna Lagoon and its neighbouring seas.

Type 4. (Fig. 4d) The free end region of the leader is curved. There are three chambers viz. Receiving chamber (*Perumkuda*), Intermediate Chamber (*Villu*), Concentrating Chamber (*Raddi*). The Chambers do not have their entrances along the same axis. Area of operation : Jaffna Lagoon and its neighbouring seas.

Type 5. (Fig. 4e) There are four chambers viz. Receiving Chamber (*Perumkuda*), Second Chamber (*Marichchukuda*), Third Chamber (*Villu*), and Concentrating Chamber (*Paddi*). *Perumkuda* is the largest and the *Paddi* is the smallest of the four chambers. The Chambers are not positioned one behind the other. Area of operation : Jaffna Lagoon and its neighbouring seas.

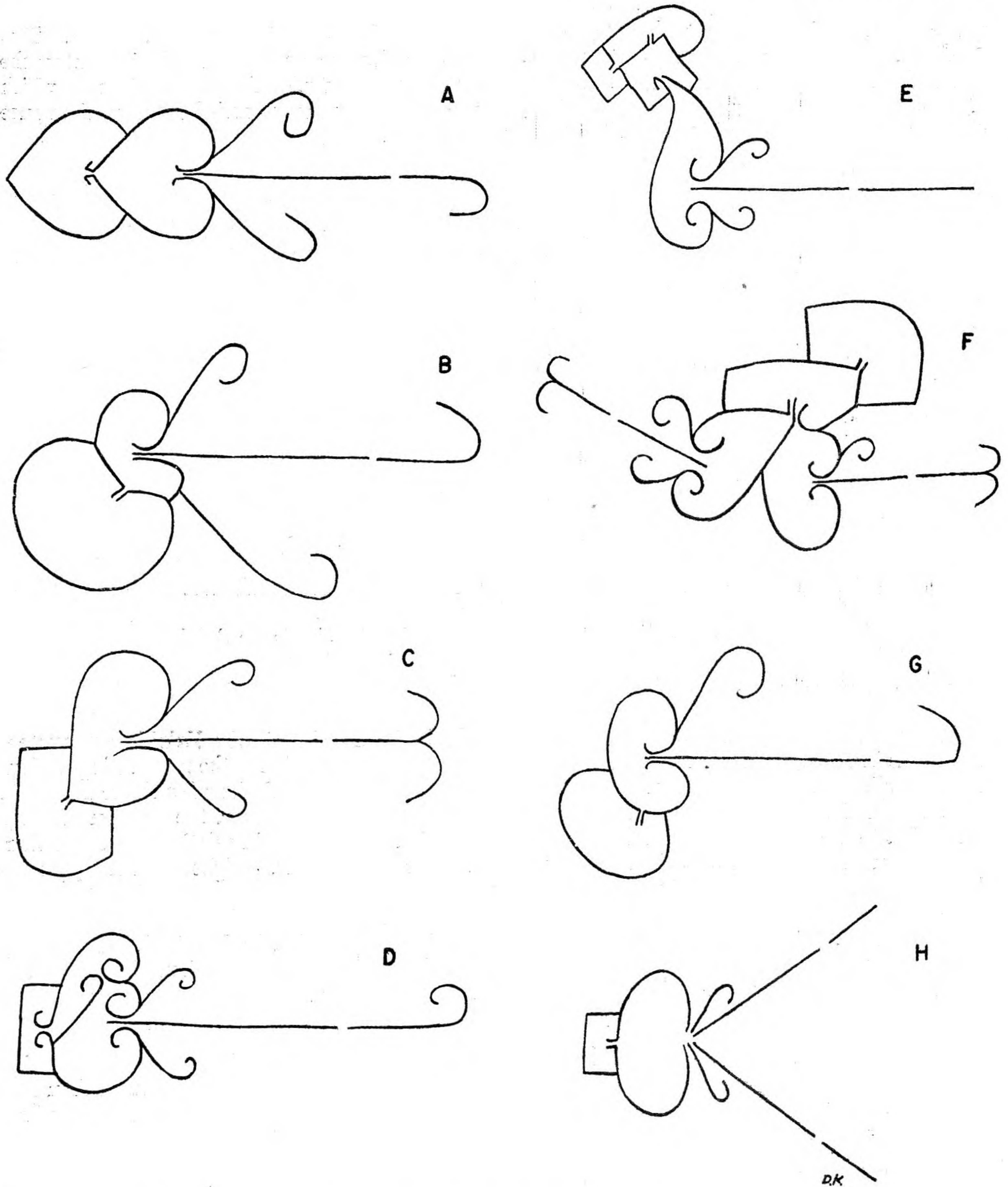


Fig. 4—Variations in the basic structure

Type 6. (Fig. 4f) Two units are joined to form a large single unit. There are two leaders running in opposite directions and their free end regions are curved on both sides. There are four chambers. Two of them are receiving chambers (*Perumkuda*) each receiving one leader. These two receiving chambers open into a common chamber (*Villu*) which opens into the concentrating chamber (*Paddi*). One of the wings is absent. Area of operation : Jaffna Lagoon.

Type 7. (Fig. 4g) Absence of one of the wings, and the curve in the free end region of the leader are the only variations. Area of operation : Trincomalee Harbour.

Type 8. (Fig. 4h) There are two leaders on the same side both of them guiding the fish into the same receiving chamber. Area of operation : Jaffna Lagoon.

Operation of the *Sirahu Valai*

Operation involves the initial fixing of the unit in the place of operation and regular collection of the trapped fish. The place where a unit is operated is called a *Padu*. Several *Sirahu Valai* units are sometimes operated in close proximity to each other (Fig 5). The choice of place of operation of a padu depends on the wind prevailing, water currents, monsoon, phase of the moon and the availability of the padu. The catch is high at certain well-located padus. There is acute competition among the fishermen to operate their units in these padus.

The unit is removed for cleaning once a fortnight. Pearson (1923) describes that it is set in one place for three days. The nets are boiled in sea water in large containers. Powdered bark of the mangoove plant *Rhizophora mucronata* (*Kandal* in Tamil) is added to the boiling water. Tannin in the powder imparts a brownish tint to the net. The threads are also stiffened. Addition of the powder was introduced during early days when cotton netting was in use. With the advent of synthetic fibres Kuralon netting replaced cotton netting. The powder is also used for preserving the Kuralon netting.



Fig. 5—A series of nets fixed alongside Pannai causeway in the Jaffna lagoon

SIRAHU VALAI FISHERY IN THE JAFFNA LAGOON

Sirahu Valai is operated in the following areas : Jaffna Lagoon and its neighbouring shallow waters, Koddiyar Bay and Trincomalee Harbour area and Puttalam Lagoon. Table I gives the approximate number of units operated in these areas.

TABLE I

Approximate Number of *Sirahu Valai* Units operated in different parts of Ceylon

Area	No. of Units
1 Jaffna Lagoon and neighbouring Waters	1,500
2 Kodiyar Bay and Trincomalee Harbour	100
3 Puttalam Lagoon	5

Jaffna Lagoon was selected for special study because of the high concentration of this fishing gear in this lagoon. The Jaffna lagoon is a semi-enclosed shallow water body located in the northern part of Ceylon (Fig. 6). The lagoon is very shallow and the depths do not exceed 4 m. The gradient

of the floor is not steep. *Sirahu Valai* is the most popular gear in use in the Jaffna lagoon. Rod and Line, Cast net, Drift net, Stake net (*Kalankaddi*), Converging net (*Arakuddian*), Tidal weirs (*Kandy*), Prawn trap (*Ral koodu*) are the other types of fishing contrivances that are used in the lagoon. These are less economical and time-consuming when compared with the *Sirahu Valai*.

Stock Analysis

Table II gives a list of the types of fishes that are usually caught in the *Sirahu Valai* in the lagoon. Of these varieties *Ctenochaetus sp.* and *Caranx sp.* are caught throughout the year. *Ctenochaetus sp.* is abundant in February, March, April and November. *Caranx sp.* is abundant during the months April–August. Cuttle fish is mainly caught during January–April. Prawns are largely caught during January–March. Table III gives the percentage composition of the annual total catch of a unit operated by a fisherman at Velichhaveedu Bay.

TABLE II

Species of Fishes caught in the *Sirahu Valai* in the Jaffna Lagoon

Species	Common Name in Tamil
<i>Pastinachus sp.</i>	Thirukkai
<i>Himantura sp.</i>	Puli Thirukkai
<i>Aetobatus sp.</i>	Thirekkai
<i>Sardinella sp.</i>	Chudai
<i>Nematalosa sp.</i>	Koi
<i>Anodontostoma sp.</i>	Koi
<i>Chirocentrus sp.</i>	Vaalai
<i>Tachysurus sp.</i>	Kezhuru
<i>Pseudarius sp.</i>	Kezhuru
<i>Xenentodon sp.</i>	Mural
<i>Ablennes sp.</i>	do.
<i>Tylosurus sp.</i>	do.
<i>Hyporhamphus sp.</i>	do.
<i>Hemirhamphus sp.</i>	do.
<i>Hippocampus sp.</i>	Kadal Kuthirai
<i>Sphyræna sp.</i>	Seela, Ooli
<i>Mugil sp.</i>	Manalai
<i>Valamugil sp.</i>	Siraya
<i>Liza sp.</i>	Siraya
<i>Eleutheronema sp.</i>	Kaalai
<i>Enneacentrus sp.</i>	Keeli
<i>Therapon sp.</i>	Keeli
<i>Sillago sp.</i>	Killakkan
<i>Caranx sp.</i>	Paarai
<i>Chorinemus sp.</i>	Katta
<i>Dipterygonotus sp.</i>	Kadal Viral
<i>Gazza sp.</i>	Salli
<i>Leiognathus sp.</i>	Karal
<i>Lethrinus sp.</i>	Vilai
<i>Acanthopagrus sp.</i>	Karumurrail
<i>Upeneus sp.</i>	Nagarai
<i>Ephippus sp.</i>	Thirali
<i>Scatophagus sp.</i>	Ilethi
<i>Etroplus sp.</i>	Karuwa Challai
<i>Siganus sp.</i>	Oddi
<i>Ctenochaetus sp.</i>	Ora
<i>Dendrochirus sp.</i>	Thumbi
<i>Bothus sp.</i>	Athal
<i>Cynoglossus sp.</i>	Athal
<i>Triacanthus sp.</i>	Kilathi
<i>Lactoria sp.</i>	Kutteru
<i>Arothron sp.</i>	Pethai

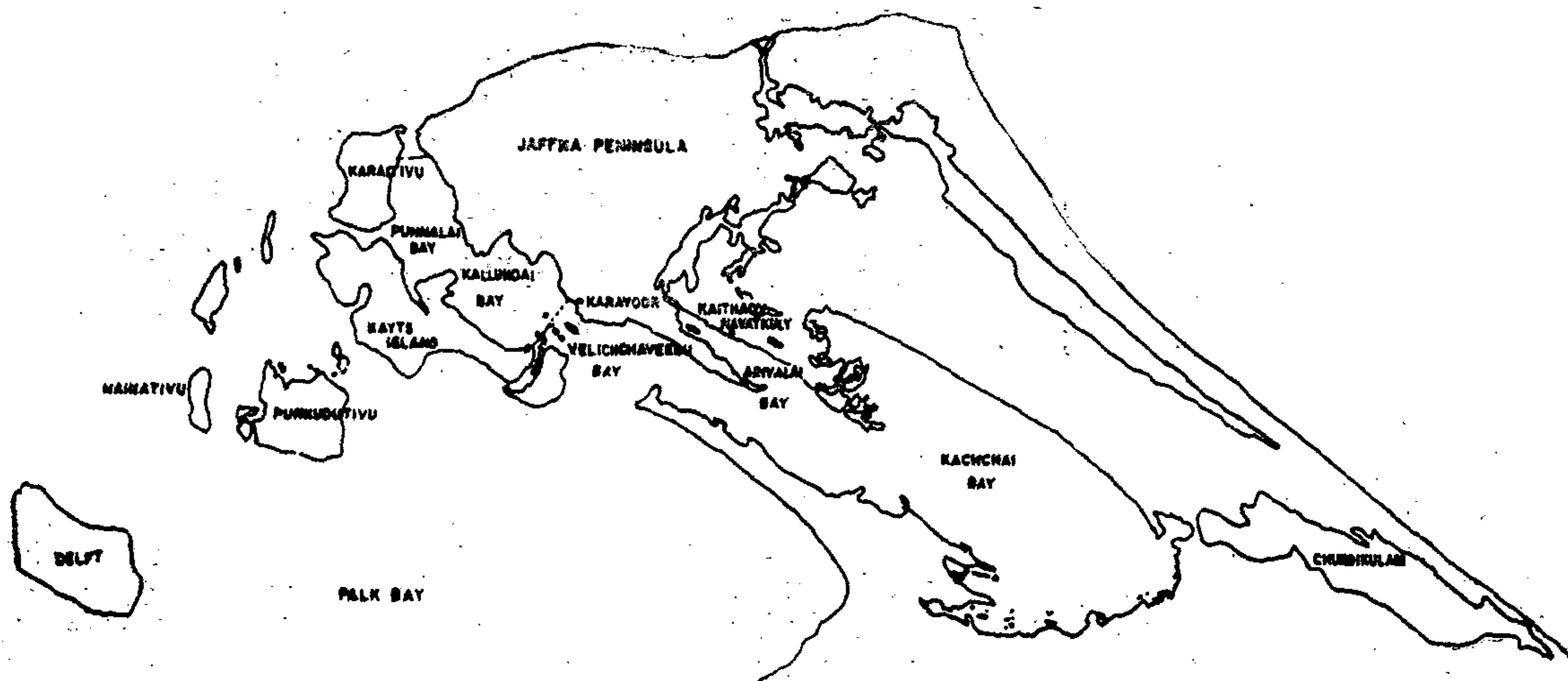


Fig. 6—Map of the Jaffna Peninsula of Ceylon showing the Jaffna Lagoon and its neighbourhood.

TABLE III

Percentage Composition of *Sirahu Valai* catch of a Fisherman at Karayoor for the year 1968

Type	Percentage
<i>Ctenochaetus</i> sp.	22.5
<i>Caranx</i> sp.	16.6
Cuttle Fish	14.3
<i>Sphyraena</i> sp.	12.9
Prawns and Crabs	7.6
<i>Tachysurus</i> sp.	3.5
<i>Sardinella</i> sp.	1.6
<i>Ablennes</i> sp.	1.0
<i>Lethrinus</i> sp.	1.0
<i>Epihippus</i> sp.	1.0
Rays	1.8
Other varieties	16.2

Catch & Analysis

Catch data for different units operated in four different areas was obtained for the year 1968. Ariyalai Bay, Velichchaveedu Bay, Punnalai Bay and Nainativu are the four areas in the Jaffna lagoon and its neighbourhood. The effort (based on the number of days of operation) and the total catch are known. Catch per unit effort is calculated taking an operation day as the unit effort.

Catch per unit effort is an index of the stock density (Cushing 1968). As the catchability coefficient for *Sirahu Valai* is not known a direct assessment of the stock density is not possible with the available data. As the catch per unit effort and stock density are related, the pattern of the fishery can be studied with the above data.

Fig. 7 illustrates the trends in the catch per unit effort for the year. Except for minor variations the general pattern is similar for the four areas. Availability is high during February–July and low during Oct.–Dec. Annual variation in surface salinity values of the Jaffna Lagoon (Sachithanathan 1969) closely approximates the variation in the catch per unit effort values suggesting that the monsoon and rainfall has a direct influence over the stock density in the Jaffna Lagoon are relatively high during April to August and low during October to February. Closer examination indicates that there is a general decline in the values for surface salinity and the catch per unit effort during April. This is due to the rainfall in April usually referred to as “*Chithirai Kulappam*” (April effect) by the fishermen. The total catch is generally high during the period when surface salinity is high in the Jaffna Lagoon.

Fishing Intensity

Fig. 8 illustrates the *Sirahu Valai* operations at Ariyalai Bay by a group of fishermen from Kaithady–Navatkuly. Number of days of operation in a month and the number of fishermen operating in a day in an index of the fishing intensity in that area. Fishing intensity is high during January–July and low during August–December. Average daily income of the fishermen at Kaithady Navatkuly is higher during the early half of the year than during the latter half of the year.

Summary

In Ceylon *Sirahu Valai* is operated mainly in the Jaffna Lagoon. Long leaders guide fish into spacious catching chambers. Complicated design of the chambers prevents fish from escaping. Trapped fishes are collected with a collecting net. Eight different types of *Sirahu Valai* are described and illustrated. *Clenochaetus sp.* and *Caranx sp.* are the most abundant of the many varieties of fish caught in the lagoon. Prawns, crabs, cuttle fishes and rays are also caught in this gear. *Sirahu Valai* catches in the Jaffna Lagoon are higher during the early half of the year when the surface salinity is higher, than during the latter half of the year when the surface salinity is low.

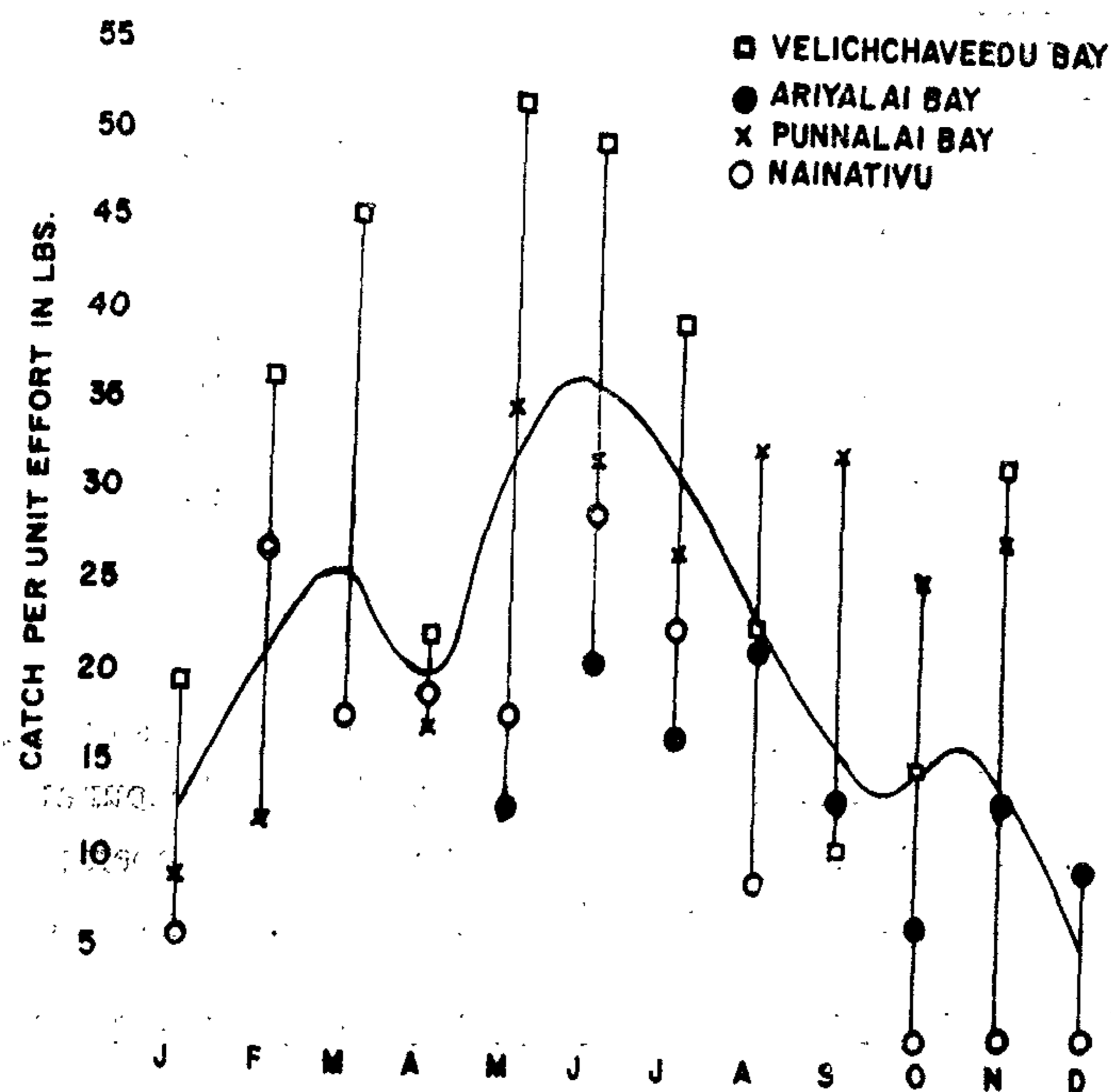


Fig. 7—Annual variations in catch per unit effort—1968

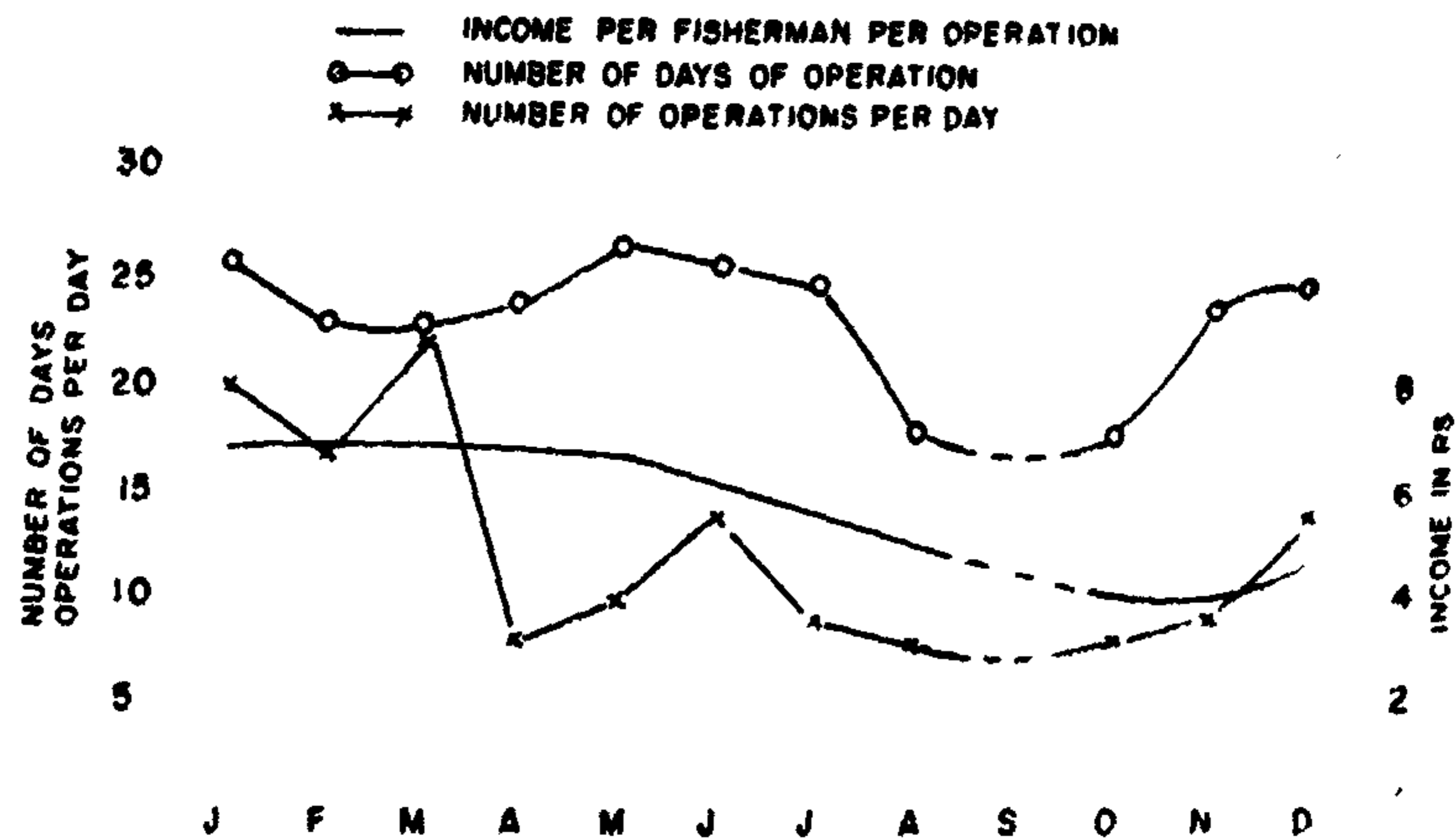


Fig. 8—*Sirahu Valai* operating at Ariyalai Bay

Acknowledgement

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