HYDRO-BIOLOGICAL SURVEY
OF THE
THONDAIMANNAR LAGOON

Bulletin No 9

FISHES OF THE LAGOON

M. Atputhanathan
K. Chitravadivelu

JANUARY 1969

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of
The Northern Province Science Teachers' Associati.

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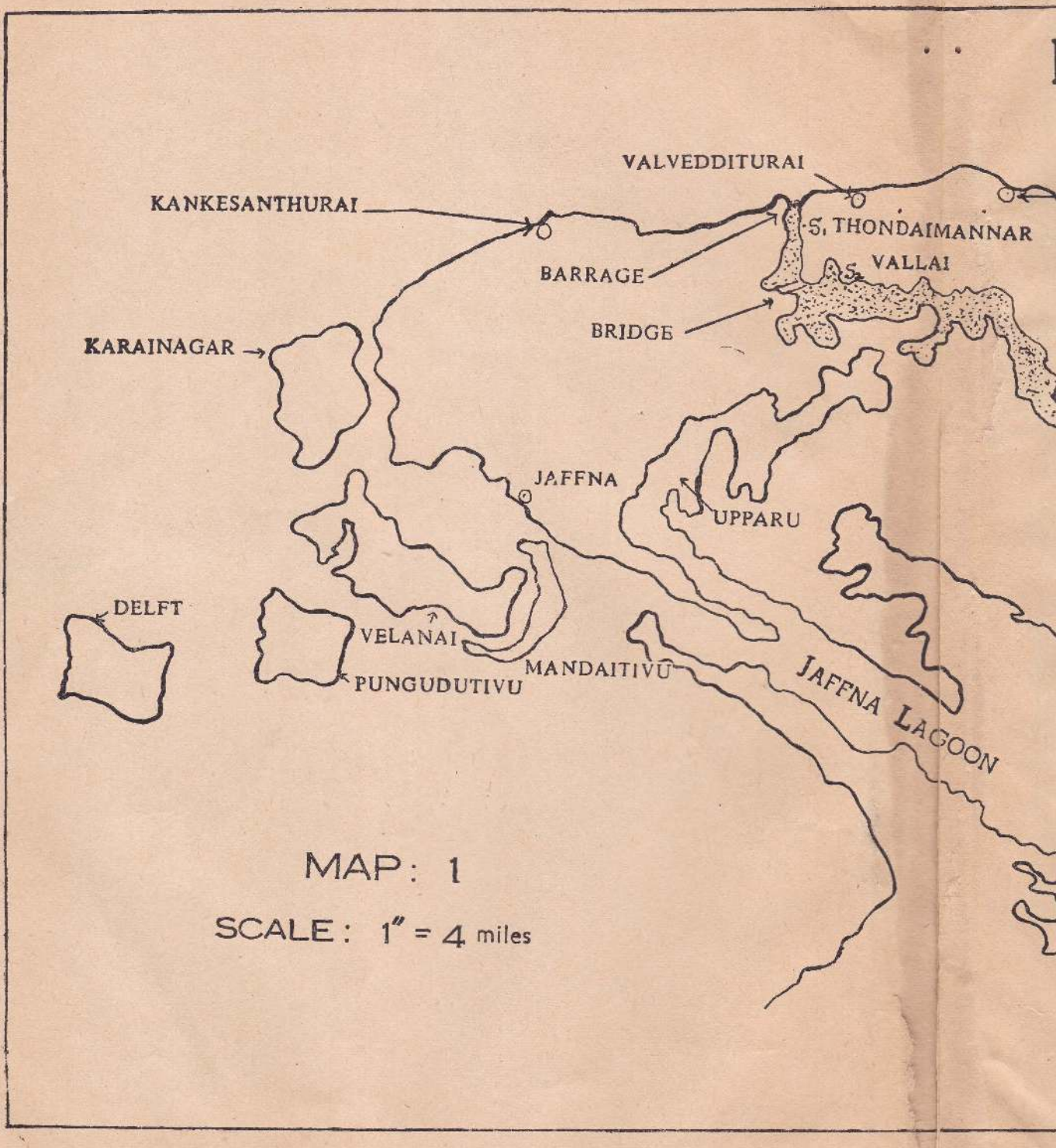
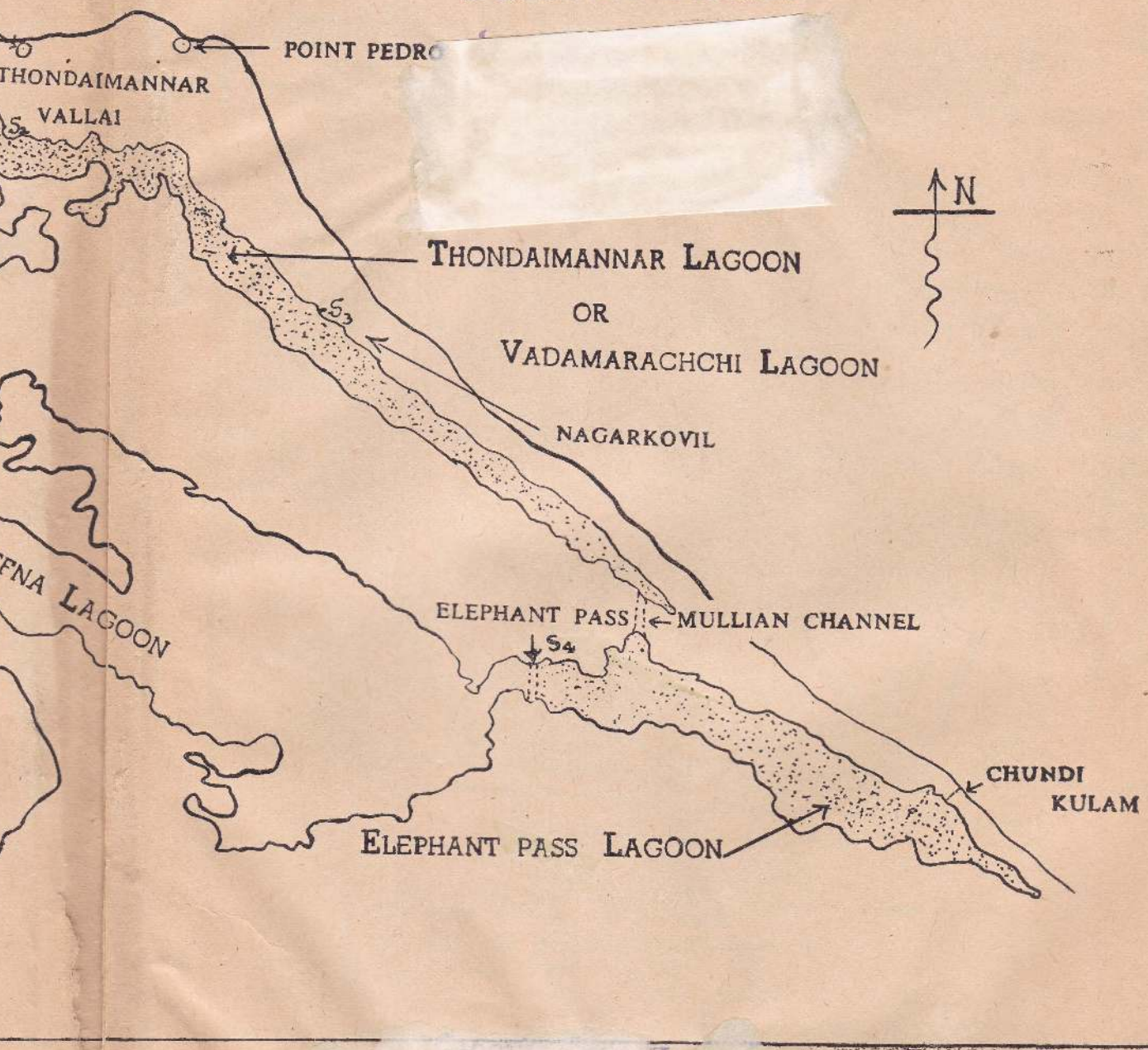


MAP: 1

SCALE: 1" = 4 miles

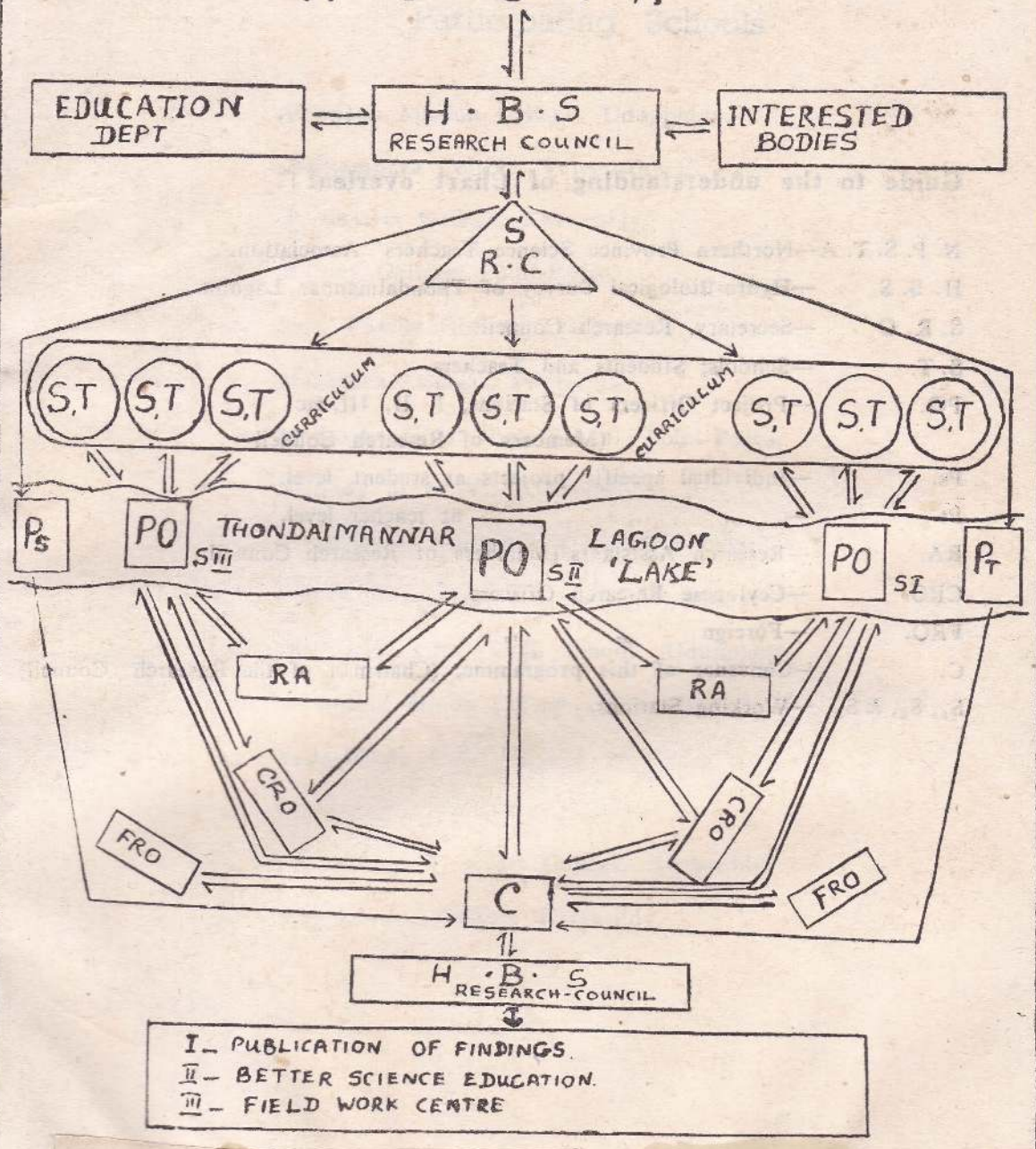
MAP OF THE HYDRO-BIOLOGICAL SURVEY AREA



DIAGRAMMATIC REPRESENTATION OF THE MANIFOLD IMPLICATIONS OF THE

HYDRO-BIOLOGICAL SURVEY PROGRAMME.

N · P · S · T · A



Guide to the understanding of Chart overleaf :

N. P. S. T. A—Northern Province Science Teachers' Association.
H. B. S —Hydro-Biological Survey of Thondaimannar Lagoon.
S. R. C —Secretary, Research Council.
S. T. —Schools; Students and Teachers.
PO. —Project Officers of Stations, I, II, III, etc.
(Members of Research Council
Ps. —Individual specific projects at student level.
Pt. — ,, ,, ,, at teacher level.
RA. —Research Assistants (Members of Research Council
CRO. —Ceylonese Research Officers,
FRO. —Foreign ,, ,,
C. —Convener of this programme, (Chairman of the Research Council)
S_1, S_2, & S_3 —Working Stations.

Bulletin No. 9

Fish population of the Thondaimannar lagoon - its distribution and economic potential

by

M. Atputhanathan
K. Chitravadivelu

As it was up to 1968, together with a description guide. A specific problem taken up for study and presented as a paper before the Ceylon Association for the Advancement of Science (section D) in Dec. 1968.

JANUARY 1969

Published by the Hydro-biological Survey Research Council of The Northern Province Science Teachers' Association.

FORWARD

The programme of work carried out by the Thondaimannar Hydro-biological Survey team was primarily to understand the physical and chemical changes in that lagoon and their effects on the biota. These basic investigations are now being developed along applied lines and one such aspect is the study of fishes in that lagoon and their economic potentialities, which is the subject of this publication.

Besides the success this team has had in their approach to the teaching of common science subjects, it appears that they are attempting to make a smooth entry into the teaching of fisheries at school level. This deserves high commendation.

Dr. K. Sivasubramaniam

Fisheries Research Station,
Colombo-3.
20-4-69

PREFACE

This bulletin is the result of five years of systematic observation and one year of intensive survey of the fishes of the Thondaimannar lagoon. One of the aims of the Hydro-biological survey is to explore the feasibitity of converting this lagoon into a large fish farm. Our biennial surveys have been carried out with this end also in view. During our surveys we had to meet with formidable challenges from fishermen especially from the Vallai area, who depend on the fishes caught in the traps for their living. They objected to our casting nets during our surveys, for they belived that this would disturb the fishes and prevent them from getting into their traps. We successfully met this resistance by educating them on the purpose of our survey. The co-operation we get from the local fishermen now, is a testimony to our efforts in educating them.

We did not realise the value of the wealth of the data we collected during our surveys until we had discussions with the Research Officers of the Fisheries Research station, who helped us in no small way in putting us on the correct track. We are especially thankful to Dr. K Sivasubramaniam for his guidance and useful criticisms

The results of our work during the last six years have enabled us to list forty-seven varities of fishes. Our knowledge of the fish population in the lagoon, their economic importance, the habitats available in the lagoon, the salinity variation of the water in the lagoon and the distribution of the fishes in the lagoon, however inadequate give a partial answer to the problem of converting the lagoon into a fish farm. We, however, cannot pursue the matter further for obvious reasons, but we certainly are prepared to place our findings at the disposal of those genuinely interested in converting this lagoon into a fish farm. The study of prawn fauna of the lagoon, its distribution and economic potential is underway. This study when completed, will place the entrepreneur in a better footing, for then he can choose either to breed fishes or prawns or both.

In the course of our study, we have developed a systematic way of recording and discribing fishes. We have tried it in the field and found it very useful. We are presenting them for what they are worth, along with a detachable chart that could be used In the field.

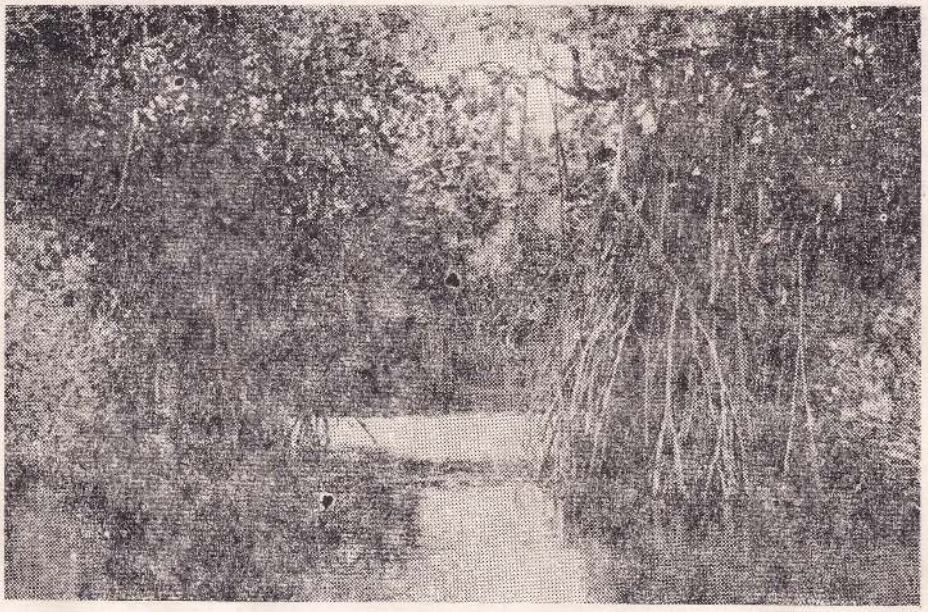
Our research on the fishes of the lagoon involved finance, equipment, man-power and technical know-how. Except finance we never ran short of the rest. This was due to the willing co-operation we got from the students and staff of J/Chithambara College, Valvettithurai. We express our gratitude to them. We owe our sincere thanks to our colleague Mr. S. Sathiyamoorthy who was ever willing to join us in our surveys and who gave us all the help needed. We extend our thanks to Professor A. C. J. Weerakone of Vidyodya University, Ceylon who made us venture in this and other research programmes in addition to pure pedogogy.

Our thanks are also due to the Asia Foundation of U S. A., for financing this publication and to all members of the Hydo-bilogical Survey Research Council for their help and useful criticisms.

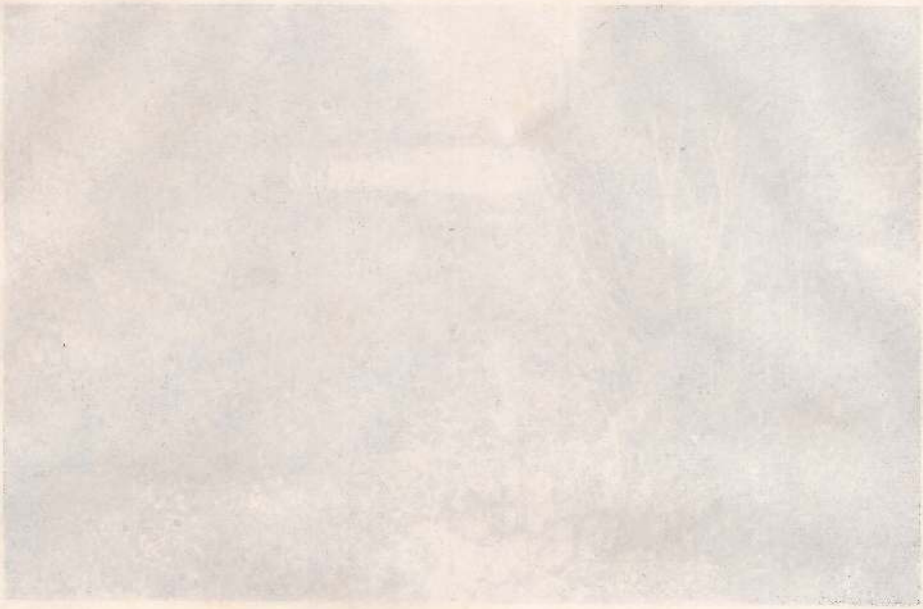
M. Atputhanathan
K. Chitravadivelu

CONTENTS

1. **Thondaimannar—Vallai**



2. **Nagarkovil**



SECTION O

Introduction

The Nekton population of this 'lake' which was at one time a lagoon showed the following type of fauna.

(i) Fishes
(ii) Prawns & Crabs
(iii) Snakes
(iv) Insects.

Preliminary studies indicated that Fishes formed the group that had the largest number of varieties. This factor and the economic importance of this fauna led to the planning of an intensive programme of work with a view to understanding the following:

(i) The Varieties of fishes that exist in the 'lake'.
(ii) The environment in the lake contributing to the distribution of Fishes.
(iii) The pattern of distribution of the Fishes.
(iv) Relative abundance of the different varieties.
(v) The economic importance of each of the varieties.

Incidentally constant observation and Field notes supplemented by Field notes by students made us evolve a more systematic way of description and labelling of parts. These are also presented.

The study of Fishes led to the devising of more than one method of fishing so that the different varieties could be caught. The methods adopted are the following:

(i) Throw net: This is the Common method adopted by the local Fishermen. This consists of a round net weighted at the ends. This is an effective way of catching most of the varieties. But the forms that hide under and among stones and plants are not easily caught by this mehotd. Very small forms also tend to escape.

(ii) 'Athanku' or sweep net. Appendix I. Fig. 1 gives an idea of this. Nets used for these are of different meshes. With mosquito nets attached to this very small forms can be caught. It is also possible to swoop among vegetation and other nook and corners.

(iii) Hook and line : Photograph I gives the method in progress. This is limitted to carnivorous forms.

(iv) Traps. (Ref. Appendix II Fig. 2) Fishes are led into this trap by blocking the path of their movement and leading them by way of blocks to the traps constructed with local date palm midribs or 'ekel'. This also has its limitations.

(v) Cutting the fishes : This method is adopted mainly at night and occasionally in the day. At night the fishes are attracted by light and cut with the sword. It is also possible to use sweep net or hook & line at this time.

(vi) Drag net : This is a net made like a seine net with meshes of varying sizes. This net was dragged by 2 persons This ensured that all varieties were caught.

(vii) In addition to this, dredging of the bottom plants and soil was also done to get at certain forms that always dwell at the bottom.

These methods were used at 3 different stations in the lake namely Thondaimannar (near the barrage), Vallai about 2½ miles interior and Nagarkovil, about 19 miles interior. At each of these stations about one mile stretch of water was surveyed for fishes and the number caught during nearly 24 hrs on a day in February (wet season) and 24 hrs on a day in July (Dry Season) is taken as an indication of the Relative abundance.

The economic importance of each of the varieties was determined by taking counts in the market and getting the opinion of fishermen, fish salesmen and consumers.

In addition to the more frequent data collected in the year 1968, the 5 year record from 1963—1968 is also made use of in the investigation.

1·0 List of Fishes

The lagoon harbours 47 varieties of fishes, belonging to 32 families. Appendix 5 depicts the relative abundance of the various types of fishes found each year as they were observed

in the 3 Stations during the last 6 years. Appendix 6 depicts. taxonomic position.

1·1 One could see from Chart I that certain fishes are found in steady abundance throughout the six years.

1·2 There are certain other fishes which appear every year but not in steady abundance.

1·3 There are still few others which have been observed occasionally like **Anguilla bicolor bicolor, Anguilla nebulosa, Eleutheronema tetradactylum, Lutianus russelli, Lutjanus chrysotaenia, and Prionobutis koilomtodon.**

1·4 Another fact revealed from this chart, is that certain fishes are found in all 3 stations, others in 2 stations and still others in one station. Eight are peculiar to Thondaimannar, 4 to Vallai and 4 to Nagarkovil. Another 6 types are found throughout the lagoon, 21 confined to Thondaimannar, Vallai area and 2 to Vallai-Nagarkovil area.

1·5 Except one (Lutjanus Chrysotaenia), all the other fishes have been observed outside Thondaimannar 'lake' in well defined habitats. 18 of these fishes are found in the sea, 13 in marine and estuarine situations and 4 mainly in estuarine habitats. Thus 35 of the total of 47 fishes are found in marine and estuarine habitats. The rest of the 12 fishes are normally seen outside the Thondaimannar 'lake' in pure fresh water and in slightly brackish water habitats.

2·0 A way of describing the fishes.

Our system of describing the fishes is of the decimal type as indicated below.

1. External shape, colour and size In general.
2. Features of head region.
3. Various fins including their specific colours (general colours would have come under 1)
4. Scales, spines (other than those on the fins) and lateral line
5. Miscellaneous information, like habitat, food, behaviour, economic potential etc.

The details are as follows:

1. **General:** shape, colour, size.

1 · 1 length and breadth
1 · 2 shape
1 · 3 colour—general
1 · 4 colour—bands
1 · 5 colour—fins
1 · 6 spot or blotches
1 · 7 colour of the eye

2. **Head**

2 · 1 sectional view, depression, ridges.
2 · 2 mouth—jaws, teeth and barbels.
2 · 3 nostrils
2 · 4 eyes—shape and position
2 · 5 gills

3. Fins

3 · 1 Dorsal and Anal fins
3 · 2 Pectoral and ventral fins.
3 · 3 Caudal fins—shape.

4. **Scales spines and lateral lines**

4 · 1 scale—type and number
4 · 2 spines (other than those on the fin)
4 3 Lateral line.

5. **Habitat, food, behaviour economic potential etc.**

5 · 1 Habitat
5 · 2 Nature of food
5 · 3 Behaviour
5 · 4 Economic potential.

In this method, one is forced to look into the fish for all the Characteristics mentioned and if they are not present, these too would have to be indicated. This **systematises observation,** in contrast to the random observation that is normally carried out. Students found this very useful and simple and they were found to make

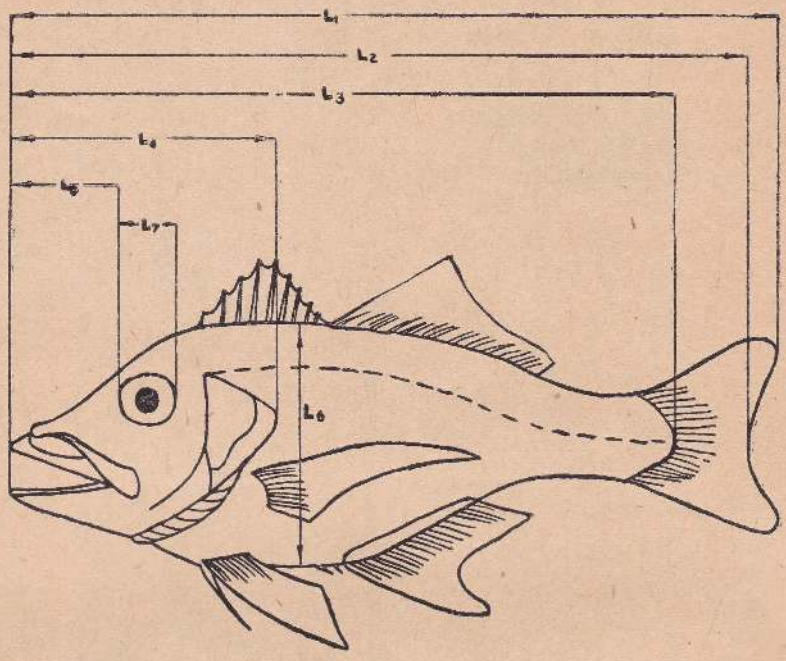
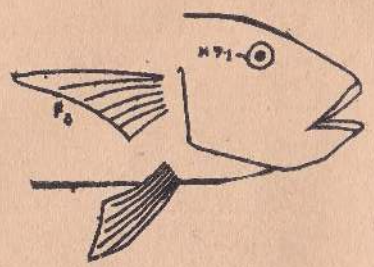


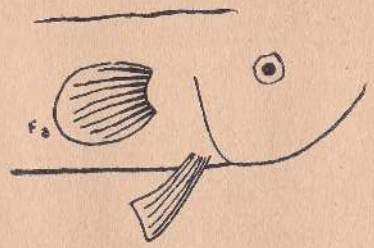
Diagram to illustrate the length measurements used.

Key :

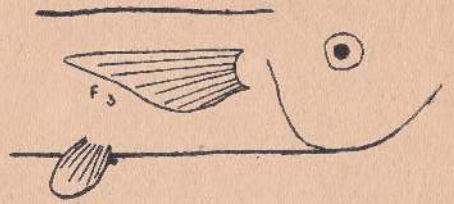
L_1 = Total length of body.
L_2 = Length of body up to caudal fork.
L_3 = Standard length of body.
L_4 = Length of head.
L_5 = Length of snout.
L_6 = Length of body.
L_7 = Diameter of eye.



F 4·1 THORACIC

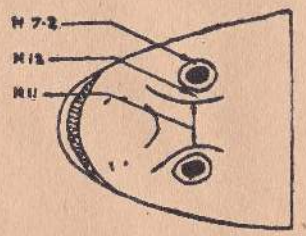


F 4·1 JUGULAR

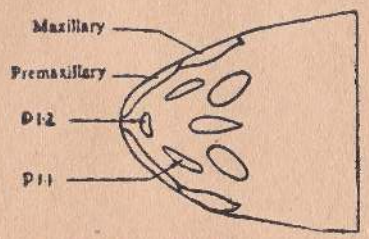


F 4·1 ABDOMINAL

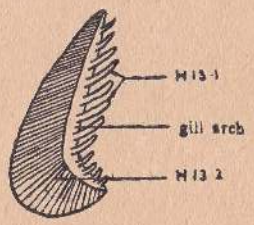
Diagrams showing the position of the pectoral fins



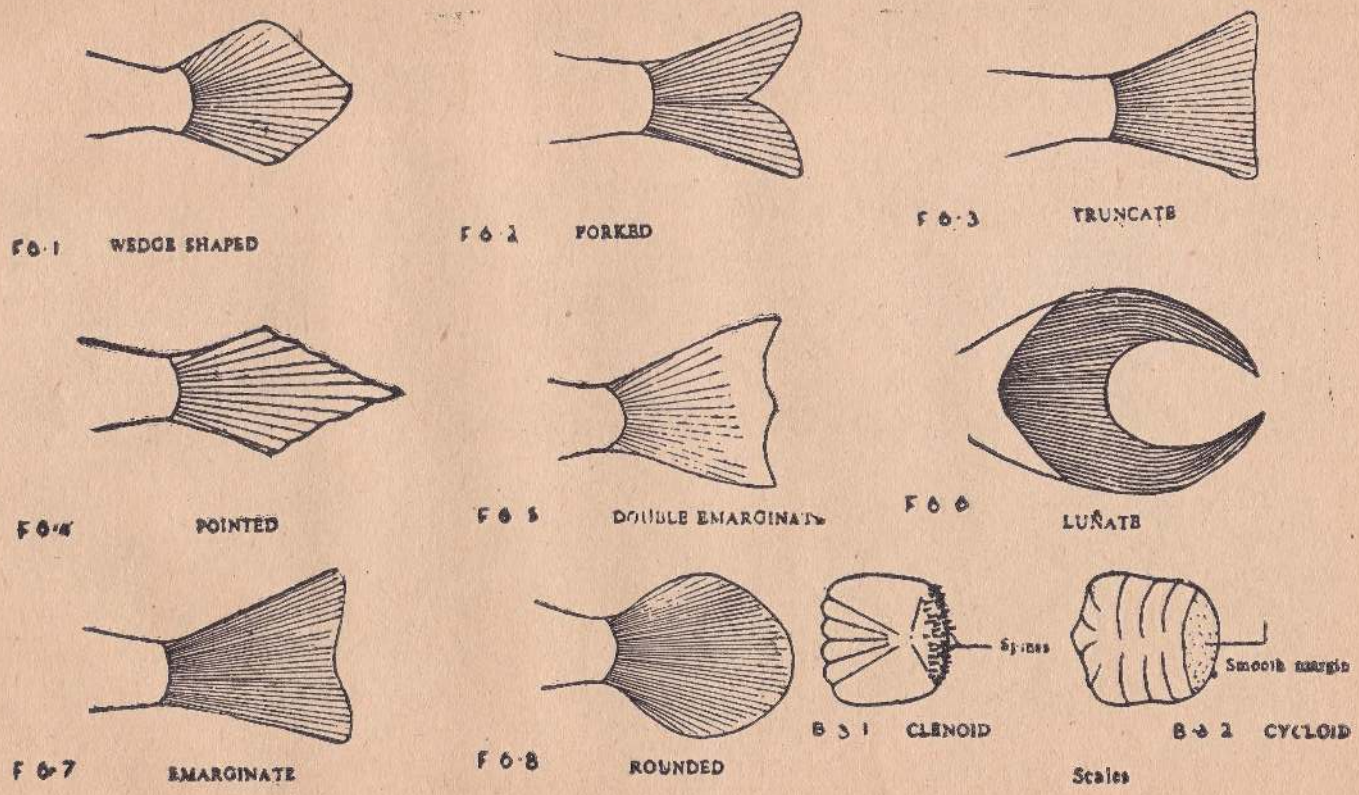
Dorsal view of head



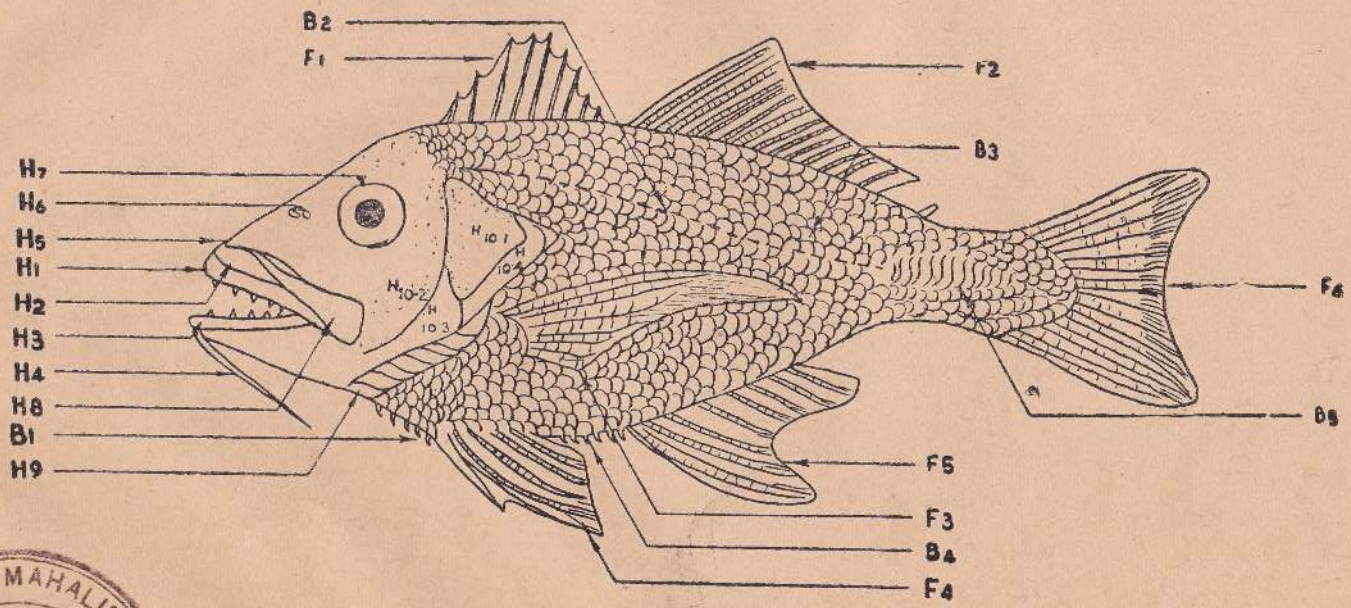
Inside of roof of mouth showing bones which may bear teeth



Structures of a gill component



Diagrams showing the different types of caudal fins and 2 types of scales.



A diagrammatic bony fish with characters used in the description

KEY

H—Head

H1 Upper jaw.
H2 Inter maxillary.
H3 Lower jaw.
H4 Barbel.
H5 Snout.
H6 Nose.
H7 Eye.
- H7·1 Round eye.
- H7·2 Oval eye.

H8 Maxillary.
H9 Branchiostegals.
H10 Operculum.
- H10·1 Opening.
- H10·2 Pre-opercle.
- H10·3 Inter opercle.
- H10·4 Sub-opercle.

H11 Inter orbital region.
H12 Orbital ridges.
H13 Gills.
- H13·1 Gill rakers.
- H13·2 Gill filament.

H14 Palate.
- H14·1 Palatine.
- H14·2 Vomerine

F—Fins.

F1 First dorsal
F2 Second dorsal
F3 Pectoral
F4 Pelvic
- F4·1 Thoracic region
- F4·2 Jugular
- F4·3 Abdominal

F5 Anal
F6 Caudal
- F6·1 Wedge shaped
- F6·2 Forked
- F6·3 Truncate
- F6·4 Pointed
- F6·5 Double emarginate
- F6·6 Lunate
- F6·7 Emarginate
- F6·8 Rounded

B—Body

B1 Abdominal scutes
B2 Lateral line
- B2·1 Complete
- B2·2 dotted line
- B2·3 Broken line

B3 Scales
- B3·1 Ctenoid
- B3·2 Cycloid

B4 Anal spine
B5 Caudal scutes

less omissions than when allowed to make observations without such a guidance. Even a research worker in the field will find this more useful in regulating the observational notes. Further, additional features to be observed could also be introduced at the appropriate places.

3·0 **Use of labelled diagrams as a supplement to the description of fishes. (Refer diagrams 1, 2, 3 & 4 and its key.)**

A glance through the numbering of the diagrams and the key will show that there is a definite system in it Every one may not be expected to use the exact denotations. But, it introduces one to a Systematic method. This could lead to the elimination of a voluminous terminology that normally accompanies any such description.

This has been found to be useful in our present context where we have students whose mother tongue is not English and the language that they speak does not carry sufficient Scientific literature. Here, one need not remember all the English terms. Even the numbers need not be remembered, if they have the figure in front of them. From the figure they have just to give the corresponding number when they describe it. It was found that some English terms were remembered later through familiarity. For example, a student could deseribe intermaxillary, as H 2 and interorbital as H 11, without troubling himself to remember the names and to write down the correct spelling.

Description based on the above system for the 47 fishes collected from the Thondaimannar lagoon is given in Appendix 2.

4·0 **Environment in the 'Lake'**

4·1 **History** : The Thondaimannar lagoon which covers an area of approx. 30 sq. miles in rainy season (refer map in frontispiece) was a brackish water body connected to the sea at Thondaimannar. In 1953 the connection to the sea was blocked by a barrage with sluice gates. The purpose was to prevent the ingress of salt water from the sea and leach away periodically with rain

water, the salt from the blocked area of the lagoon so that ultimately, this lagoon may become a fresh water lake and the adjoining lands may be reclaimed for cultivation.

Our observations started in 1963 ie nearly 10 years after it was blocked. On a preliminary survey carried out on salinity, nature of habitat and varying distances from the mouth, 3 stations were fixed for systematic study (refer frontispiece map), The stations referred to in the descriptions are these 3 stations.

4·2 Chemical factors

There is a significant difference in salinity between Station 1 and station 3. Further, the variation in salinity in each of the 3 stations. follows a definite pattern and there are differences among the 3 stations. (Refer Appendix 9). On the other hand, there was no significant difference between the hardness of water at the mouth and that at 20 miles further down.

4·30 Physical factors

4·31 The specific gravity at the barrage varies from 1·005 to 1·025 between February and July whereas 20 miles further down in the same period, it varies from 1·000 to 1·002.

4·32 The difference between the maximum and minimum temperature at the barrage is 4·0°C in February and 6·0°C in July. During the corresponding period, it is 6·0°C and 10·6°C further down 20 miles.

4·33 The maximum depth at Thondaimannar goes up to 8·0—8·5 ft and during the dry season, it comes down to about 6 ft. For a stretch of a mile and a half from the barrage there is always a continuous stretch of water, though mud flats colonised with **Salicornia** appear at certain regions. A similar situation exists 20 miles further down; that is at Nagarkovil where the water level comes down from about 5·5 ft to 2·0 ft. The position is different in between these two regions where stretches of water are isolated during the dry season. Thus, in fact, there is no continuity from Thondaimannar to Vallai and from Vallai to

Nagarkovil. (Rate of evaporation during the dry season is 163·9 cu. ins/sq ft. per 24 hrs.) During this period there is a high rate of mortality of fishes that get trapped in these pools.

4·4 Biological factors

For the sake of description, the 'lake' could be broadly divided into 2 major areas. The first area is from the barrage to about 5 miles to the interior and this covers the 1st and 2nd stations. The other area extends from about 10 miles to 20 miles and covers station 3.

4·31 Thondaimannar—Vallai area (Photograph 1)

This is the first area where the bottom of the 'lake' is mainly rocky and no big Plants grow here. The main benthic plants that support the fauna are **Halophylla ovata, Cynodocoea sp.** and **Chara sp.** Pure marine forms, like **Acetabularia granulata, Polysiphonia sp, Laurentia sp.** and **Gracilaria corticata** appear in July (dry season). **Halophila ovata** seems to form the main abode of the rich Prawn fauna found in this area. Common prawn forms are **Penaeus dobsoni, P. monodon, P. indicus** and **Macrobrachium sp.** These prawns, form the food of some carnivorous fishes like **Macrones gulio** and **Epinephelus tauvina.** The other animal forms that become the food for the fishes are amphipods and isopods and larvae of insects. There is a rich plankton population found especially during the wet season ranging from Diatoms to others like **Osphranticum, Diaptomus, Bryocamptus, Gammarids** and **Megalopa** larva. There is a large variety of birds that visit this open stretch of area to feed on fishes.

4·32 Nagarkovil area (Photograph 2)

The second stretch of area is usually muddy and in certain places it is inaccessible. This area becomes progressively thickly populated with Mangrove vegetation. The flora within the water are **Cynodon dactylon, Bacopa monniera, Naias marina, Fimbrystylis ferruginea, Cyperus Corymbosus, Nymphaea nouchali, Paspalum sp. Chara sp. Blue greens** and **Diatoms.** Prawns are conspicously absent. Crabs have not been recorded. Other

animal forms are Gammarids, and larvae of insects. These seem to form the food of some fishes. Birds are, as common as in the other area.

5·0 **Pattern of distribution of the fishes.**

33 of the 47 fishes inhabit the Thondaimannar-Vallai area. Four varieties are confined to the Nagarkovil area.

5·1 The factor that is significantly different as between the two areas is salinity, indicated by 'chloride content (Ref. Appenix 9) This is associated with a significant difference in specific gravity both during the wet season and during the dry season.

5·2 Hardness of water did not show significant difference. Similarly, the difference in the variation of temperature within 24 hrs, in the two areas, also did not show any difference worth considering as a factor.

5·3 Two types of predators for these fishes, are birds and other fishes in the 'lake'. Fish predators likes **Ophiocephalus striatus. Epinephelus tauvina** and **Macrones gulio** are found in both areas. As most of the fishes of the lagoon are armed with spines, they do not easily fall a prey to common Predator fishes. In spite of the fact that more birds prey in open stretches of water in the Thondaimannar-Vallai area, more fishes are found here. This shows that predators cannot form a limiting factor in distrbution. Similarly, food of the fishes is found throughout the lake and hence not expected to be a limiting factor. Food habits of Macrones gulio, are being studied.

5·4 The Benthic floral composition in the Thondaimannar-Vallai area is marine, like **Acetabularia, Gracillaria, Laurentia, Polysiphonia, Hallophila ovata** and brackish like **Chara** and **Cyanodon dactylon**. The appearance of **Spirogyra** in February is an exception. On the other hand, the plants in the Nagarkovil area are brackish like **Naias marina, Fimbristylis ferruginia, Chara,** blue **green algae** and fresh water forms like **Nymphaea nauchali, Bocopa** monniera and Paspalum sp. This type of distribution indicates that Thondaimannar-Vallai area is something of the

type of an estuary, where there is a gradation from marine to brackishness and the Nagarkovil area shows the other extreme of gradation from brackishness to fresh water.

The peculiar distribution of the fishes, ie. 33 forms, peculiar to Thondaimannar-Vallai area and 4 varieties confined to Nagarkovil area, is worth considering.

5·5 The fact that this distribution cannot be attributed to seasonal migration is clear from the fact, that the peculiar distrbution given in Chart III is based on collections made at different times of the year, and not during any particular season. The two fishes that appear to show migration during the wet season, are the 2 fresh water eels **Anguilla bicolor bicolor** and **Anguilla nebulosa nebulosa**.

5·6 The occurrence of these fishes outside Thondaimannar 'lake' in other habitats, substantiates the fact that salinity may be a cause for the distribution. Of the 33 fishes peculiar to Thondaimannar-Vallai area, none are seen to be living in only freshwater. The break down is as follows.

Marine	 18
Marine and estuarine	 10
Estuarine	 3
Marine, estuarine and fresh water	... 1
Estuarine and fresh water	 1

Of the 4 fishes peculiar to Nagarkovil area, 3 are found only in fresh water situations and one in fresh water and estuarine situation.

Another group of fishes which throw further evidence, is the presence of 6 varities throughout the 'lake' from the barrage to Nagarkovil. None of these are of the pure marine form. The break-down is as follows :

Marine and estuarine	 2
Estuarine	 1
Estuarine and fresh water	... 2
Fresh water	 1

The 2 fishes that are mainly seen at Nagarkovil and occasionally collected as far down as Vallai, are both freshwater forms. Further, the two freshwater eels were seen at Nagarkovil and Thondaimannar only, and not anywhere in between.

5·7 Some peculiarities in the distribution, are the presence of fresh water forms **Rasbora dandiconius** (F_2) and **Anabas testudineus** (F_{36}) as far down as Vallai. **Tylosurus strongilurus** (ME_9) and **Hyporhamphus gaimardi** (ME_{10}) are found at Nagarkovil (Refer appendix 7)

The presence of a fresh water form, **Etroplus maculatus** (F_{32}) is also noted as far down as Thondaimanrar. This appears to have adapted itself to marine and estuarine conditions as it is found in abundance all over the 'lake' (ie tolerating halide concentration from 3,000 p. p. m to 39,000 p. p. m.)

6·0 Economic potential

A separate investigation regarding the economic importance, was made by students (Ref. Appendix VIII, VIII 1 VIII 2). They adopted 2 independent methods of investigation. First investigation was made by counting the number of fishes that come to the common markets. The other was by collecting information from fishermen, fish salesmen and fish consumers. By these two independent methods of investigation. it was found that 40% of the fishes of the 'lake' is not of economic importance in the Northern part of the Island. Only 2 popular varieties of fishes are found to be abundant in the 'lake' This means that quite a large percentage of the popular varieties are not thriving in the 'lake'. Whether this is due to uncongenial environment or to predator preferance or limitation of food, one canot say. The problem of making the 'lake' a potential source of fish production is closely tied up with the econmic potential of these fishes and further investigation based on data already obtained.

7·0 Conclusion

The results of the work done during the last six years (1963-1968) regarding the fishes of the 'lake', have enabled us

to list the 47 varieties that are found in the 'lake'. The systematic observations made at the 3 stations of the 'lake', have been very useful in studying the distribution of the fishes, against a background of the environment that has been created by man in the lagoon. Our studies of the chemical, physical and biotic factors in the lagoon have enabled us to understand the distribution of the fishes more fully. We see that the pattern of distribution of the fishes is closely linked with the pattern of distribution of plants, the halide variations and specific gravity variations. Further, a knowledge of the natural habitats of these fishes enabled us to make use of the distribution of the fishes as an indicator of the habitat. This is an important, fact from the point of view of the Hydro-bilogical survey programme, where we are interested in the nature of changes in the lagoon. That is, as we go towards the barrage, the habitat is transforming from freshwater, through freshwater-estuarine habitat to estuarine marine habitat. The last habitat may be due to leakage of sea water through the barrage.

Economic importance of the fishes of the lagoon shows that only 2 popular varieties are found in abundance in the lagoon. Other popular varieties are not found in abundance though 60% is consumed by people. The fact that 40% of the fishes is seldom or never used is also worth reckoning.

The peculiar distribution of a few types of fishes needs further study and this may throw more light on other contributory factors of distribution.

Work on this paper could not have been possible if not for the full co-operation of the staff and students of J/Chithambara College, Valvettithurai. We also place on record the guidance and useful criticism of Dr. K. Sivasubramaniam of the Fisheries Research Station, Colombo. We are also thankful, to Mr. N. R. L. Munasinghe, of the same Research Station for the help rendered in the identfication of the fishes

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Appendix I

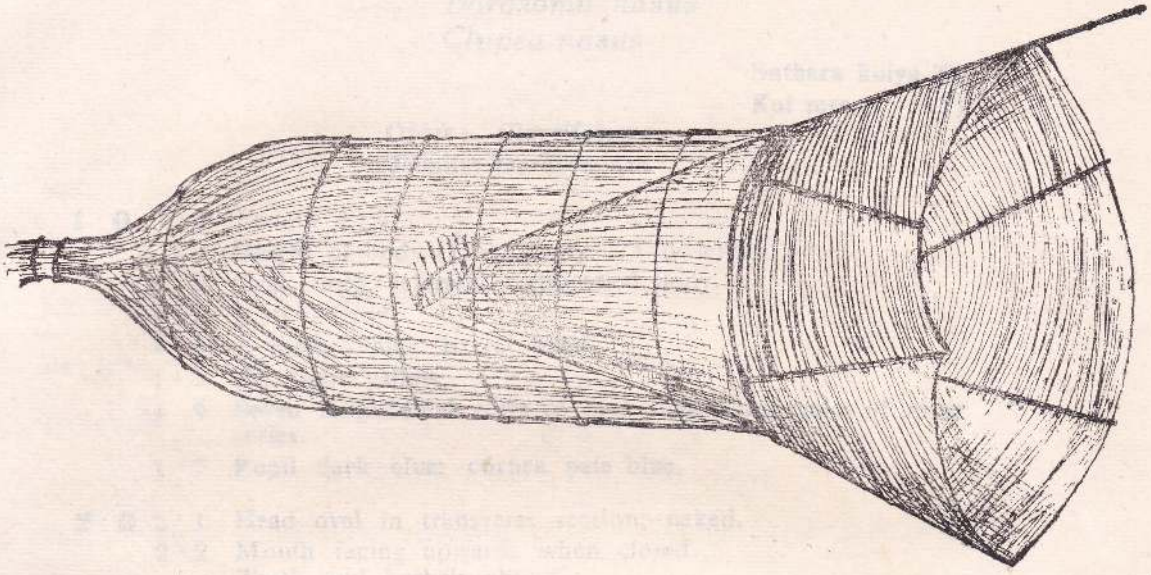
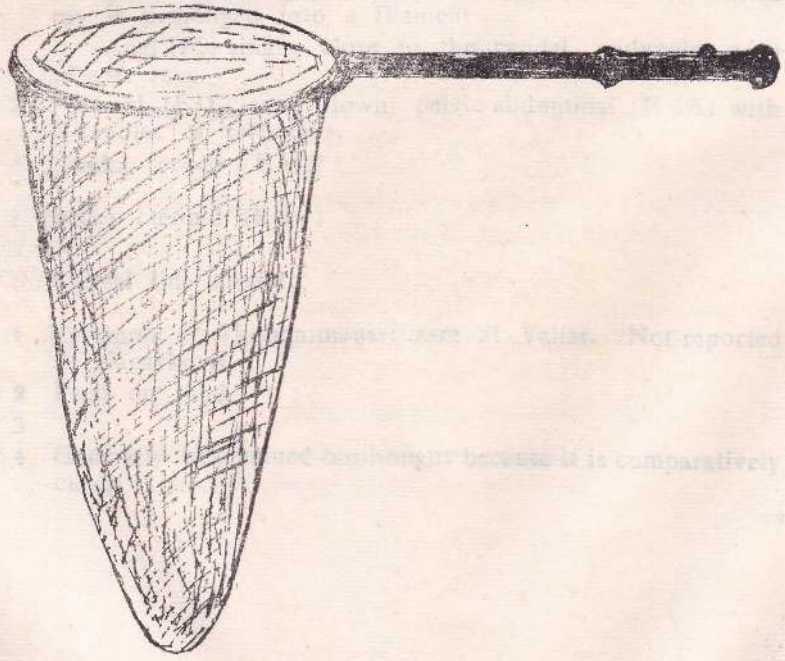


Fig 1



Flg 2

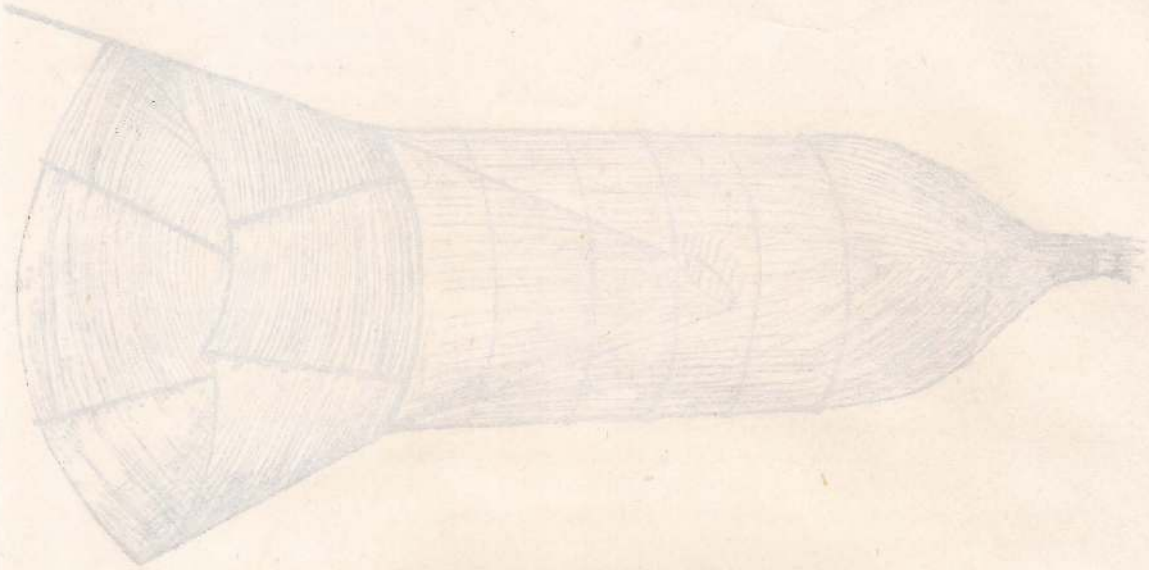


Fig. 1

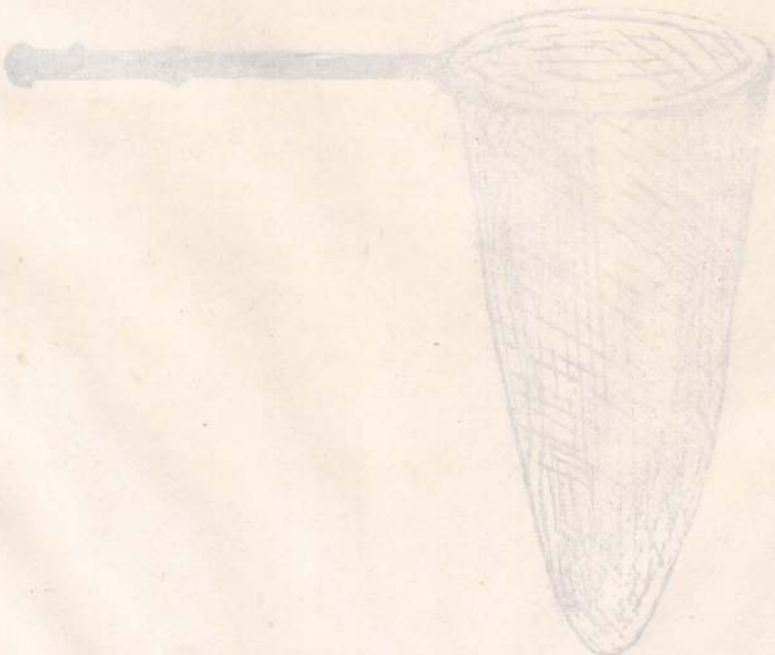


Fig. 2

APPENDIX II

T1 : Nematolosa nasus

Dorosoma nasus
Clupea nasus

Suthara koiya (S)
Koi meen (T)

Order : **Clupeiformes**
Family: **Dorosomidae**

1·0 1·1 Length 4·0"
Height of body (L 6) nearly 1/3 the length.
1·2 Oval, deep, laterally compressed body.
1·3 Body silvery.
1·4 A diffuse pink lateral band.
1·5 Fin light yellow.
1·6 Seven longitidinal rows of dark dots along scales of upper series.
1·7 Pupil dark blue; cornea pale blue.

2·0 2·1 Head oval in transverse section; naked.
2·2 Mouth facing upwards when closed.
Teeth and barbels absent.
2·3 Nostrils one pair, anterior to the eye in line with the upper border of the orbit.
2·4 Eyes circular (H 7·1); situated laterally towards the dorsal most point.
2·5 Gill rakers (H 13·1) present. Brangiostegals (H 9) six.

3·0 3·1 Dorsal fin (F1) single with 16 soft rays. The last dorsal ray is prolonged into a filament.
Anal (F5) single; close to the caudal peduncle with 21 soft rays.
3·2 Pectoral (F3), lower down; pelvic abdominal (F 4·3) with 7 bundles of soft rays.
3·3 Caudal forked (F 6·2)

4·0 4·1 Scales ctenoid (B 3·1)
4·2 ——
4·3 Lateral line absent.

5·0 5·1 Common at Thondaimanar; rare at Vallai. Not reported at Nagarkovil.
5·2 Feed on mud.
5·3
5·4 Generally not valued but bought because it is comparatively cheap.

T_2: Rasbora dandiconius

Rasbora dandia

Order: **Cypriniformes**

Family: **Cyprinidae**

1 : 0 1 · 1 Length 2 to 3 inches.
Height of body (L 6) 1/5 the length.

1 · 2 Elongate, rather rounded, compressed body. Broader at the abdominal region. Dorsal profile more convex than ventral.

1 · 3 Dorsally greenish - yellow; sides faintly silvery. Operculum bright silvery.

1 · 4 A blue - black silvery lateral stripe runs the length of the body except the head.

1 · 5 Caudal (F6), anal (F5) and ventral (F4) and dorsal (F3) pale orange. Pectoral (F3) glassy.

1 · 6 A black longitudinal blotch on the operculum (H 10) in line with the lateral line.

1 · 7 Pupil - ash; cornea - light golden yellow.

2 · 0 2 · 1 Head naked; nearly rectangular in transverse section. Snout slightly elevated.

2 · 2 Mouth protractile, facing dorsally, Teeth pointed. No barbels.

2 · 3 Nostrils one pair.

2 · 4 Eyes circular (H 7·1)

2 · 5 Gill rakers (H 13·1) present.

3 · 0 3 · 1 Dorsal fin (F2) single with 8 rays, originating from the anterior region of the posterior half.
Anal (F4) with 7 rays; originating from a region opposite the porterior end of the dorsal fin (F1).

3 · 2 Pectoral (F3) lower down, almost ventral. Ventral fin abdominal (F 4·3) with 9 rays.

3 · 3 Caudal forked (F 6·2).

4 · 0 4 · 1 Scales ctenoid (B 3·1)
Predorsal scales 15; 30–35 scales in lateral series.

4 · 2 ——

4 · 3 Lateral line complete (B 2·1).

5 · 0 5 · 1 Common at Thondaimannar; rare at Vallai. Not found at Nagarkovil.

5 · 2

5 · 3

5 · 4 Normally not bought; but bought as a last resort when there are no other fishes in market.

T_3: Puntius filamentosus

Leuciscus filamentosus
Barbus filamentosus

Order: **Cypriniformes**
Family: **Cyprinidae.**

Ipillikadaya (S)

1·0 1·1 Length 3 1/4 inches.
Height of body (L 6) 0·9 ins.

1·2 Laterally compressed, oblong body with equally convex dorsal and ventral profiles.

1·3 Pale yellow above lateral line. Sides silvery.

1·4 ——

1·5 Caudal fin (F6) orange with white tips. Ventrals (F4) light green; other fins orange.

1·6 A blotch above posterior part of anal fin (F5).

1·7 Eyes dark blue.

2·0 2·1 Head quadrangular in section. Interorbital region (H11) flat.

2·2 Mouth protractile, small, faces upwards when closed. Teeth absent. Two pairs of barbels (H 4) present. Longer pairs originates at the angle of the jaws. Shorter pair in the outer border of the upper jaw.

2·3 Nostrils 2 pairs; one behind the other in line with the dorsal orbital ridge (H12). The anterior pair with a siphon like structure.

2·4 Eyes circular (H7·1), found laterally at the dorsal most point; $1\frac{1}{2}$ eye diameter apart.

2·5 Gill rakers (H 13·1) present.

3·0 3·1 Dorsal fin single (F 1), originating from a point slightly anterior to the mid-point with 4 spines and 8 bundles of soft rays. First and second spine very short; fourth strong, long and with a serrated posterior border.

Anal fin (F 5) single, originating from the anterior region of the last one-third; with one feeble spine and 7 soft rays.

3·2 Pectoral fins (F 3) lower down. Pelvic fin abdominal (F 4·3) with 9 soft rays.

3·3 Caudal fin forked (F 6·2).

4 · 0 4 · 1 Scales cycloid (B 3·2).

4 · 2 ——

4 · 3 Lateral line distinct (B 2·2), starting just behind the upper border of the operculum, comes down in the region of the dorsal fin and takes a mid - path in the caudal peduncle.

Number of scales between lateral line and dorsal edge 6 to 7.

5 · 0 5 · 1 Rare at Nagarkovil, not reported at Thondaimannar and Vallai.

5 · 2

5 · 3

5 · 4 Normally not bought; but bought as a last resort when there are no other fishes in the market.

T_4 : Puntis sarana

Cyprinus sarana

Barbus pinnauratus

Vellan Kola Petiya (S)

Order : **Cypriniformes**

Family : **Cyprinidae**

1 · 0 1 . 1 Length 6 inches; heigth of body (L 6) 2 inches.

1 . 2 Laterally compressed fish, tapering towards the tail. Fish with large conspicuous scales.

1 . 3 Dorsally pale black; lateral and ventral regions with silver and gold reflections. Cheeks golden.

1 . 4 ——

1 · 5 Fins pale brown.

1 . 6 Large black blotch near the caudal pediuncle.

1 . 7 Colour of the eye varies.

2 · 0 2 . 1 Head nearly quadrangular in section. A shallow depression in the interorbital region (H11).

2 · 2 Mouth small, facing upwards when closed; protrusible; faces downwards when open. Teeth absent. Barbels (H4) two pairs. Longer pair originates at the angle of the jaws. Shorter pair in the outer border of the upper jaw.

2 . 3 Nostrils 2 pairs; one behind the other in line with the dorsal orbital ridge (H12). The posterior pair with a flap.

2 · 4 Eyes circular (H 7·1) found laterally in the dorsa most point.

2 . 5 Gill rakers (H 13·1) present.

3 . 0 3 . 1 Dorsal fin (F1) single, originating from the middle point. with 4 spines and 8 soft rays. First and second spines very short. Third spine is slightly less than half the fourth spine. Fourth is strong with a serrated posterior border. Fourth, fifth and sixth soft rays shorter than the rest

Anal fin (F5) single originating from the anterior region of the last one-third. with 3 spines and 5 soft rays. Third and fourth soft rays shorter than the rest.

3 . 2 Pectoral fin(F3) originatingl ower down; pelvic fin abdominal (F 4·3), with one short spine and 9 soft rays.

3 . 3 Caudal fin forked (F 6·2).

4 · 0 4 . 1 Scales large and cycloid (B 3·2) two - third glassy and; one – third lightly coloured.

4 . 2 ——

4 . 3 Lateral line distinct, complete (B 2·1), and stars behind the upper region of the operculum (H 10). Number of scales between lateral line and dorsal edge 3 to 6.

5 · 0 5 · 1 Rare at Nagarkovil. Not reported at Thondaimannar and Vallai.

5 · 2

5 · 3

5 · 4 Normally not bought, but bought as a last resort.

T_5: Tachysurus caelatus

Res caelatus

Kerluru (T)
Anguluva (S)

Order Cypriniformes
Family: Tachysuridae

1·0 *1·1* Length $3\frac{1}{2}$ ins.
Height of body (L 6) 0·6 ins.

1·2 Elongate body; snout dorso-ventrally compressed. Trunk and caudal region laterally compressed.

1·3 Dusky brown.

1·4 ——

1·5 Fins greyish.

1·6 ——

1·7 Eyes pale blue.

2·0 *2·1* Head compressed dorso-ventrally. Interorbital region (H II) flat. Head shield granular.

2·2 Mouth small; faces downwards when opened. Teeth on both jaws and palate. Barbels 3 pairs. Maxillary barbel reaches the middle of pectoral fin (F 3). Mandibular reaches the origin of the pectoral fin. Mental shorter than the mandibular.

2·3 Nostrils 2 pairs; openings fairly large; one behind the other, found just behind the upper jaw. Posterior pair with a flap.

2·4 Eyes oval (H 7·2); situated dorso-laterally.

3·0 *3·1* Two dorsal fins. First dorsal (F1) with one strong spine and 7 soft rays; originates from the second quarter.

Second dorsal (F 2), leaf like, orginating at the middle of the third quarter.

Anal fin (F 5) opposite the second dorsal with 17 rays.

3·2 Pectoral fins (F 3) lower down, with one spine and 8 soft rays. Pectoral spine shorter than dorsal spine; pointing slightly upwards.

3·3 Caudal deeply forked (F 6·2).

4·0 4·1 Scales absent.

4·2 ——

4·3 Lateral line distinct and complete (B 2·1)

5·0 5·1 Rare at Thondaimannar and Vallai. Not reported a, Nagarkovil.

5·2

5·3

5·6 Normally not bought; bought as a last resort.

Ts: Macrones gulio

Pinelodus gulio

Bagrus albilabris

Suncan (T)

Vel anguluva (S)

Order : Cypriniformes

Family : Bagridae

1·0 1·1 Length (L 1) 2" to 5".
Height of body (L 6) $\frac{1}{5}$ the length of the fish.

1·2 Elongated body. Triangular in section in the abdominal region. Laterally compressed in the caudal region. Dorso-ventrally compressed in the head region.

1·3 Dorsally olive-brown, sides silvery yellow and belly white.

1·4 ——

1·5 Fins yellow. Caudal (F 6) with an ash coloured border.

1·6 ——

1·7 Pupil light blue and cornea yellow.

2·0 2·1 Head sub-conical. Interorbital region (H 11) flat.

2.2 Mouth not protrusible. Teeth one set in the lower jaw and two sets in the upper jaw (H 1). Each set with numerous rows of teeth. Teeth pointed, cone shaped.

Four pairs of barbels (H4)-nasal, mental, maxillary and mandibular. Maxillaries reach the base of the ventral fins (F 4). Mandibularis reach the base of the pectoral fins (F 3).

2.3 Nostrils 2 pairs; remote from each other. The posterior pair with nasal barbels.

2.4 Eyes circular; surface of the eye in level with the rest of the head.

2.5 Gill rakers (H 13·1) present.

3.0 3.1 Dorsal fins two. Anterior dorsal (F 1) with one serrated spine and 6 rays.
Posterior dorsal (F2) skin-like.
Anal fin (F5) opposite the posterior dorsal (F 2) with 13 rays.

3.2 Pectoral fins (F 3) lower down originating from the meeting point of the lateral and ventral sides, just behind the operculum. Pelvic fin abdominal (F 4·3).

3.3 Caudal fin forked (F 6.2).

4.0 4·1 Body without scales.

4·2 Just-anterior to the pectoral fin (F 3) is a serrated spine.

4.3 Lateral line, distrct and complete (B 1·2).

5·0 5.1 Abundant at Thondaimannar and Vallai; common at Nagarkovil.

5.2 Feeds mainly on prawns.

5.3 Makes a squeeking noise when removed from the water, audible at a distance of 3" from the ear.

5·4 Normally not bought but bought as a last resort when there are no other fishes in the market.

T_7 : Anguilla bicolor bicolor

Anguilla australis

Villangu (T)
Mada arndba (S)

Order: **Anguilliformes**
Family: **Anguillidae**

1·0 *1·1* Length (L 1) 17″.
Height of body (L 6) 1·0″.

1·2 Elongate, snake-like, cylindrical body. caudal region laterally compressed

1·3 Light blue dorsally, brown on sides, bright yellow ventrally.

1·4 ———

1·5 Pectoral fins (F3) transparent; others same colour as the part of the body in which they are present.

1·6 ——

1·7 Eyes dark blue

2·0 *2·1* Head nearly rectangular in transverse section with a long snout. Inter orbital region (Hll) flat with a median longitudinal groove.

2·2 Mouth terminal. Gape extends beyond the eyes. Teeth small, present on both jaws and palate. No edentulous (without teeth) grooves in teeth bands. Tongue present.

2·3 Nostrils 2 pairs. Anterior pair with a conspicuous chimney like pouch.

2·4 Eyes small and oval.

2·5 Gill rakers absent. Gill openings vertical slits found below the insertion of the pectoral fin (F3)

3·0 *3·1* Dorsal fin (F2) single originating almost above the anus. Anal fin (F5) single starting just behind the anus Rays in both fins visible externally concealed by skin.

3·2 Pectoral fins (F 3), leaf like and originate just behind the gill openings. Pelvic fins absent,

3·3 Dorsal (F 2), caudal (F 6) and anal (F 5) confluent. Caudal fin pointed (F 6·4).

4·0 4·1 Scales small.

4·2 ——

4·3 Lateral line distinct (B2) occupying the mid-lateral point.

5·0 5·1 Rare at Thondaimannar and Nagarkovil. Not reported at Vallai.

5·2

5·3

5·4 Not recorded as eaten by the population in the Northern region.

T_8 : Anguilla nebulosa nebulosa

Anguilla elphinstonei benglensis
Muraena maculata

Pulli Vilanku (T)
Vali arndha (S)

Order : **Anguilliformes**
Family : **Anguillidae**

1·0 1·1 Length (L 1) *25"*.
Height of body (L 6) *0·4"*.

1·2 Elongate snake like cylindrical body. Caudal region laterally compressed

1·3 Body brownish dorsally, mottled with darker brown. Ventrally yellowish.

1·4 ——

1·5 Fins same colour as body.

1·6 ——

1·7 Eyes dark blue

2·0 2·1 Head oval in transverse section. Snout pointed.

2·2 Mouth ventral in position. Teeth small present in both jaws and palate Edentulous (without teeth) groove in teeth bands. Tongue present. No barbels.

2·3 Nostrils 2 pairs. External pair with conspicuous chimney–like pouches.

2·4 Eyes small.

2·5 Gill rakers absent. Gill openings vertical slits, found below the insertion of the pectoral fins (F 3)

3·0 3·1 Dorsal fin (F 1) single, originating from a point anterior to the anus. Anal fin (F5) single, originating just behind the anus. Fin rays not visible in both the dorsal and anal fins.

3·2 Pectoral fin (F3), ovate, leaf-like and originating just behind the gill-opening. Pelvic fin (F4) absent.

3·3 Dorsal fin (F1), caudal fin (F6) and anal fin (F5) confluent.

4·0 4·1 Scales small.

4·2 ———

4·3 Lateral line distinct (B. 2·1.)

5·0 5·1 Rare at Thondaimannar and Nagarkovil Not reported at Vallai

5·2

5·3

5·4 Not recorded as eaten by the population in the Northern region.

T9: Tylosurus strongilurus

Strongylura strongylura

Beloni strongilura

Paampu Mural (T)
Dhiya Muralla (S)

Order: **Beloniformes**

Family: **Belonidae**

1·0 1·1 Length 16″ – 17″; head 3″.

1·2 Body elongated, nearly quadrangular in section.

1·3 Greenish yellow above, silvery on the sides and whitish below.

1·4 Silvery lateral band, more distinct posteriorly where it is bordered with dark stripe.

1·5 Fins hyaline.

1·6 Blue-black spot at base of caudal fin (F 6).

1·7 Eyes dark blue.

2·0 2·1 The head is triangular in transverse section, flat dorsally, with a depression on the dorsal side in the region of the eyes.

2·1 Jaws are produced into a beak 2" in length, with small and large needle-like teeth which are directed backwards.

2·3 Nostrils paired, found just anterior to and in level with the upper border of the eye. A flap inside the depression of each nostril.

2·4 Eyes circular (H 7·1), slightly protruding out.

2·5 No gill rakers. Operculum scaly.

3·0 3·1 Dorsal fin (F 2) single with 9 rays and opposite to anal fins (F 5). Anal fins with 16 rays. Both dorsal and anal fins found towards the posterior end of the body.

3·2 Pectoral (F 3) high up. Ventrals abdominal (F 4·3) with 6 rays.

3·3 Caudal fin truncate (F 6·3).

4·0 4·1 Scales cycloid (B 3·2) and deciduous.

4·2 ——

4·3 Lateral line not forming keel on caudal peduncle (B 2·1)

5·0 5·1 Abundant at Thondaimannar. Common at Vallai. Not reported at Nagarkovil.

5·2

5·3

5·4 Generally in demand but not so highly valued as a delicacy.

T_{10}: Hyporhamphus gaimardi

Hemirhamphus gaimardi

Hemirhamphus limbatus

Mural (T)
Moralla (S)

Order : **Beloniformes**
Family : **Hemirhamphidae**

1·0 *1·1* Length (L 1) 3″ to 13″.
Height of body (L6) of a 13 inch. specimen is about 1″.

1·2 Body elongated, slightly compressed laterally, nearly oval in transverse section.

1·3 Pale-yellow above, silvery-white on the sides and below. Beak uniformly coloured.

1·4 Narrow, silvery lateral band, bordered above by black line.

1·5 Front edge of dorsal fin (F2) and border of caudal fin (F 6) black.

1·6 ———

1·7 Pupil ash coloured; cornea silvery.

2·0 *2·1* The head is triangular in transverse section; flat dorsally. No dorsal depression on head

2·2 Upper jaw a triangular expansion Lower jaw produced into beak anteriorly beyond the mouth. Beak with a soft fringe medio-ventrally. Fringe broad at the base, and narrowing anteriorly. Teeth minute.

2·3 Nostrils paired, found just anterior and in level with the upper border of the eye. A flap inside the depression of each nostril.

2·4 Eyes circular (H7·1) and in level with the surface of the operculum.

2·5 Gill rakers (H13·1) present.

3 0 *3·1* Dorsal fin (F2) single with 10 rays and 1 feeble spine; opposite to anal fins (F 5). Anal with 14 rays and 1 feeble spine. Both dorsal and anal found towards the posterior end of the body.

3·2 Pectorals (F3) high up. Ventrals (F 6) with 6 rays, arising half way between caudal base and eye.

3·3 Caudal forked (F 6·2).

4·0 4·1 Scale cycloid (B 3·2) and deciduous.

4·2 ——

4·3 Lateral line (B2 1) not forming keel on caudal peduncle 5 rows of scales between dorsal base and lateral line.

5·0 5·1 Abundant at Thondaimannar. Common at Vallai; Not repoted at Nagarkovil.

5·2 Plankton and probably small fishes

5·3 Move in shoals against the current with their beaks slightly open so that the minute organisms could flow with the current into the mouth.

5·4 Generally in demand but not so highly valued as a delicacy.

T11 : Panchax panchax blochii

Haplochilus panchax
Aplocheilus parvus

Udda (S)

Order : **Cyprinodontiformes**
Family : **Cyprinodontidae**

1·0 1·1 Length (L1) about one inch.
Height of body (L6) ⅓ the length.

1·2 Small fish ; body elongate ; head and snout dorso-ventrally compressed ; body laterally compressed, compression increasing from behind the pectoral fins (F3) towards the tail. Dorsal side flat.

1·3 Light green, paler ventrally.

1·4 Body with light faint transverse bands.

1·5 Fins light green.

1·6 Black spot in the base of the dorsal fin extending from the 2nd to the 4th fin rays.

1·7 Pupil brownish and cornea blue.

2·0 2·1 Head depressed, rectangular in transverse section. Interorbital region (H. 11) flat.

2·2 Mouth small. Teeth small; on both the jaws in many rows and on palate.

2·3 Nostrils paired.

2·4 Eyes circular (7·1) large, situated dorsally, 1½ diameter apart.

2·5 Gill rakers (H13.1) present.

3·0 3·1 Dorsal fin single (F2) with 7 fin rays, originating from the posterior third of the body. Anal single (F5) with 15 fin rays.

3·2 Pectorals (F3) originate laterally; Ventral fin abdominal. (F 4·3)

3·3 Caudal fin almost pointed (F 6·4)

4·0 4·1 Scales ctenoid (B 3·1).

4·2 ———

4·3 Lateral line absent.

5·0 5·1 Abundant at Nagarkovil. Not found at Vallai and Thondaimannar.

5·2

5·3

5·4 Not recorded as eaten by the population in the Northern region.

T_{12}: Liza parsia

Mugil parsia

Paluku (T)

Order: **Mugiliformes**
Family: **Mugilidae**

1·0 1·1 Length (L1) 6"; Height of body (L6) 1¼".

1·2 Elongate body: laterally compressed. Compression more towards the tail.

1·3 Pale blue above and silvery below.

1·4 ——

1·5 Fins hyaline Narrow dark edge on both dorsal fins (F 1)and (F 2), Caudal base yellow, dark at the margin.

1·6 Golden spot on upper portion of opercle.

1·7 Pupil reddish.
Cornea pale blue.

2 0 2·1 Head dorso-ventrally flattened at the snout

2·2 Mouth facing upwards when closed; protrusible.
Teeth minute present on both jaws.

2·3 Nostrils two pairs, very distinct and found anterior to the eye, dorsally.

2·4 Eyes circular (H 7·1), laterally situated at the dorsal-most point. Adipose eye-lids well developed.

2·5 Gill rakers (H 13 1) present.

3·0 3·1 Dorsal fins two. First dorsal (F 1) situated at ½ the standard (L3) length of body with 4 spines. First spine longest and strongest. Length and strength decreases posteriorly.

Second dorsal (F 2) occupying almost the mid-point of the body between the tail and the first dorsal; with 9 bundles of soft rays.

Anal fin (F 5), behind the second dorsal (F 2) with 3 spines and 9 bundles of soft rays

3·2 Pectoral (F 3) behind the operculum (H 10), occupying a mid-lateral position with fairly strong fin rays

Pelvic abdominal (F 4·3) with one feeble spine and 5 bundles of fairly strong fin rays.

3 3 Caudal emarginate (H 6·7)

4 0 4·1 Scale ctenoid (B 3·1).

4 2 A strong short spine in the anterior portion of the orbit pointing ventrally.

4·3 Lateral line not distinct.

5 0 5·1 Rare at Thondaimannar and Nagarkovil.
Not reported at Vallai.

5·2

5·3

5·4 Highly valued.

T_{13} : Allanetta forskali

Atherina forskali

Therai *(T)*
Korala bahba *(S)*

Order: **Mugiliformes**
Family: **Atherinidae**

1·0 *1·1* Length *(L 1)* 2″ to 3″.
Height of body *(L6)* ⅓ length.

1·2 Small semi-transparent fishes.
Abdominal region uniform in height.

1·3 Dorsally dirty white; sides including the operculum bright silvery; belly silvery white.

1·4 Silvery band laterally, broad at the anterior end and tapering posteriorly; bordered on the dorsal side with a faint narrow ash coloured line.

1·5 Pectoral fins *(F3)* hyaline; all others faint blue.

1·6 ———

1·7 Pupil-ash; cornea-bright silvery.

2·0 *2·1* Head naked; triangular in transverse section.

2·2 Mouth protrusible, facing dorsally. No barbels.

2·3 Nostrils one pair.

2·4 Eyes circular and large.

2·5 Gills with rakers *(H 13·1)*

3·0 *3·1* Dorsal fins two *(F 1 and F2)* First dorsal (F 1) arising posteriorly at a point ⅓ the entire length of the fish, with 5 fin rays.
Second dorsal *(F 2)* with 9 fin rays.
Anal fin *(F 5)* opposite dorsal with 13 fin rays.

3·2 Pectorals *(F 3)* high up.
Ventral abdominal *(F 4·3)* with 6 rays.

3·3 Caudal fin forked *(F 6·2)*

4·0 4·1 Scale cycloid (B3·2).
Predorsals 25. Scales in lateral series 36.

4·2 ———

4·3 Lateral line complete (B 2·1).

5·0 5·1 Common at Thondaimannar; rare at Vallai and not reported at Nagarkovil.

5·2

5·3

5·4 Normally not bought but bought as a last resort when there are no other fishes in the market.

T_{14}: Elentheronema tetradactylum

Polynemus tetradactylus

Kalaimeen (T)
Kalawa (S)

Order : **Polynemiformes**
Family : **Polynemidae**

1·0 1·1 Length (L 1) nearly $4\frac{1}{4}''$.
Hight of body L6) $\frac{1}{4}$ the length.

1·2 Elongated body, laterally compressed.

1·3 Silvery green above and creamy below.

1·4 ——

1·5 Dorsals (F 1 & F 2) and caudal fin (F 6) grey; dusky at the edges. Ventral (F 4) and anal (F 5) orange.

1·6 Faint dark blotch on the operculum (H 10).

1·7 Eyes blue

2·0 2·1 Head conical; snout blunt. Interorbital region (H 11) convex.

2·2 Mouth moderately large, below snout; faces upwards when closed.

Teeth small on both jaws. Teeth also extend on exterior of jaws.

2·3 Nostrils 2 pairs, one behind the other.

2·4 Eyes circular (H 7·1), occupying almost a mid-point laterally; with adipose eyelids.

2·5 Gill rakers (H 13·1) present.

3·0 3·1 Two dorsal fins. First dorsal (F 1) starting from the posterior region of the anterior third of the standard length (L 3); with 2 spines and 6 soft rays. First spine is much shorter than the second.

Second dorsal (F 2) with one feeble spine and 14 soft rays.

Anal (F 5) opposite the second dorsal (F 2) with 2 spines and 15 soft rays.

3·2 Pectoral (F 3) lower down, pointing downwards in two parts. The lower rays filamentous and 4 in number. The upper pectoral filaments reaches just beyond the origin of the ventral fin.

Ventrals abdominal (F 4·3) with 14 soft rays.

3·3 Caudal deeply forked (F 6·2) and larger in proportion to the rest of body.

4·0 4·1 Scales ctenoid (B 3·1).

4·2 Preopercle (H 10·1) serrated.

4·3 Lateral line distinct and complete (B 2·1).

5:0 5·1 Rare at Thondaimannar. Not reported at Vallai and Nagarkovil.

5·2 Carnivorous.

5·3

5·4 Generally valued.

T_{15} : Polynemus plebeius
Trichidion plebium

Paarmeen (T)
Bandi-kalava (S)

Order : **Polynemiformes**
Family : **Polynemidae**

1·0 1·1 Length (L 1) 3½". Height of body (L 6) nearly ⅛ the length

1·2 Body laterally compresed but moderately deep-

1·3 Dusky golden-olive above with few narrow dusky stripes.

1·4 ——

1·5 Fins greyish.

1·6 ——

1·7 Pupil dark blue; cornea light blue.

2·0 2·1 Snout (H 5) reduced. Head nearly triangular when the mouth is open.

2·2 Mouth large; faces upwards when closed. Small teeth on both jaws in many rows. Lower lip fully developed. No barbels.

2·3 Nostrils 2 pairs; one behind the other, close to the anterior border of the orbit.

2·4 Eyes circular (H 7·1); found laterally towards the dorsal most point.
Adipose eye lids present.

2·5 Gill rakers (H 13·1) present.
Operculum (H 10·1) fllamentous.
Preoperculum (H 10·2) serrated, with seven branchiostigals (H 9) on either side

3·0 3·1 Two dorsal fins. Anterior dorsal (F 1) with 2 spines and 6 fin rays. First spine is very much shorter than the second spine.

Posterior dorsal (F 2) originating from nearly the mid point of the body; with one spine and 15 rays.

Anal *(F 5)* almost opposite the second dorsal with 3 feeble spines and 15 rays.

3·2 Pectoral fins *(F 3)* lower down, pointing backwards. Pectoral filaments 4, reaching little beyond the ventral lips.

Pelvic fin abdominal *(F 4·3)* with one feeble spine and 5 bundles of fin rays.

3·3 Caudal almost lunate *(F 6·6)*.

4·0 *4·1* Scales ctenoid *(B 3·1)*.

4·2 Preopercle *(H 10·2)* serrated; the ventral most spine is stouter than all the others which are all of the same size.

4·3 Lateral line distinct; starts just behind tht dorsal border of the operculum; made up of nearly 75 tubes.

5·0 *5·1* Rare at Vallai. Not reported at Thondaimannar and Nagarkovil

5·2 Carnivorus.

5·3

5·4 Generally in demand but not so highly valued as a delicacy.

T_{16}: Lates calcarifer

Holocentrus calcarifer

Koduvai (T)
Modhe koleya (S)

Order: **Perciformes**
Family: **Latidae**

1·0 *1·1* Length (L 1) 1' to 1½'
Height of body (L 6). ¼ the length.

1·2 Elongated, laterally compresed.

1·3 Golden-brown dorsally, silvery below.

1·4 ———

1·5 Fins dark brown. except the pectorals which are yellowish. Anal and the ventral edge of the caudal darker at their margins.

1·6 ——

1·7 Pupil black; cornea yellowish.

2·0 2·1 There is a shallow depression in the interor bital region just behind the eyes. Nearly triangular in transverse section.

2·2 Mouth large, protrusible, face upwards when opened; maxillary exposed.

Teeth present in both jaws in many rows. Teeth on palate also. No barbels.

2·3 Nostrils 2 pairs. Anterior pair with a circular fleshy structure.

2·4 Eyes circular (H 7·1), present dorsolaterally; one eye diameter apart.

2·5 Gill rakers (H 13 1) present.

3·0 3·1 Two dorsal fins almost separated. First dorsal (F1) with 7 spines very much shorter than the others; third longest and thickest. Thickness and length decreases backwards.

Second dorsal (F 2) with 11 bundles of soft rays and one spine.

Anal (F 5) opposite the second dorsal (F 2) with 3 spines and 8 soft rays.

3·2 Pectoral (F 3) facing slighthy upwards, originating just below the mid-lateral point.

3·3 Caudal truncate (F 6·3).

4·0 4·1 Scales ctenoid (B 3·1).

4·2 Opercular (H 10·1) edge with spine. Preopercle (H 10·2) with spine in angle and serrated edge behind.

4·3 Lateral line complete (B 2·1).
7-8 scales between lateral line and base of dorsal fin.

5·0 5·1 Rare at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2 Feeds on prawns and fishes.

5·3 ——

5·4 Generally not valued but bought because of its comparative cheapness.

T_{17} : Ambassis urotaenia

Selunthi (T)

Order : **Perciformes**
Family : **Ambassidae**

1·0 *1·1* 2·5″ in length *(L 1)*.
Height of body (L 6) nearly $\frac{1}{3}$ the length.

1·2 Oblong, laterally compressed.

1·3 Silvery with purplish reflections.

1·4 Bright silver lateral band from posterior edge of opercle to middle of caudal peduncle.

1·5 Fins hyaline. Edges of caudal yellowih. The membrane between 2nd and 3rd dorsal spine dusky.

1·6 Operculum (H 10) and belly bright silvery.

1·7 Pupil black.
Cornea silvery white.

2·0 *2·1* Head nearly quadrangular in transverse section. Interorbital region (H 11) flat.

2·2 Mouth small, protrusible and faces upwards when opened. Teeth minute and on both jaws. No barbels.

2·3 Nostrils two pairs.

2·4 Eyes circular and fairly large, found laterally at the dorsal most point.

2·5 Gill rakers (H *13·1)* present.
Operculum (H *10·1)* membraneous.

3·0 *3·1* Dorsal fins two ; both occupying the posterior half. Anterior dorsal (F1) with 7 spines. First spine is very much shorter than the second which is the longest.
Posterior dorsal (F 2) with one spine and 10 rays.
Anal *(F5)* opposite the postesior dorsal *(F2)* with *3* spines and *10* rays.

3·2 Pectoral *(F 3)* lower down.
Ventral jugular (F 4·2); with one spine and 5 bundles of rays.

3·3 Caudal forked (F 6·3)

4·0 *4·1* Scales cycloid *(B 3·2)*.

4·2 Preopercle *(H 10·2)* serrated; interopercle *(H 10·3)* smooth.

4·3 Lateral line *(B 2·3)* broken anteriorly and indistinct posteriorly.

5·0 *5·1* Abundant at Thondaimannar; common at Vallai and not reported at Nagarkovil.

5·2

5·3

5·4 Normally not bought.

T_{18}: Epinephelus tauvina

Epinephelus polypodonphilus

Perca tauvina

Gal kossa (S)

Order: **Perciformes**

Family: **Serranidae**

1·0 *1·1* Length *(L 1)* 6·00″.
Height of body *(L 6)* ⅓ the length.

1·2 Robust, elongate body, laterally compreseed compression more towards the tail.

1·3 Brownish.

1·4 Indistinct transverse bands 5 to 6.

1·5 Fins pale yellow.

1·6 Small dark brown spots on head, body, tail and fins.

1·8 Eyes light blue.

2·0 *2·1* Head nearly triangular in transverse section. A longitudinal depression in the interorbital region *(H 11)*, anteriorly.

2·2 Mouth large, with small pointed teeth on both jaws and palate *(P 1)*. No barbels.

2·3 Two pairs of nostrils; anterior pair with a small flap like structure; found anterior to the eye in level with the dorsal orbital ridge.

2·4 Eyes circular (H 7·1); one diameter apart situated dorso-laterally.

2·5 Gill-rakers (H 13·1) present. Margin of preopercle (H 10·2) serrated. Opercular (H 10·1) edge with a stumpy spine.

3·0 3·1 Single dorsal fin (F 1), originating opposite the posterior border of the operculum (H 10·1), with 11 spines and 15 soft rays. First spine nearly half the second spine.

Anal fin (F 5) opposite the last-third of the dorsal fin (F 1); with 3 spine and 8 soft rays.

3·2 Pectoral fin (F 3), lower down. Pelvicabdominal (F 4·3) with one spine and five bundles of soft rays.

3·3 Caudal rounded (F 6·8). The caudal peduncle is at an angle to the body.

4·0 4·1 Scales ctenoid (B 3·1).

4·2 ——

4·3 Lateral line distinct, complete (B 2·1) and parallel to the doral edge.

5·0 5·1 Rare at Vallai. Not reported at Thondaimannar and Nagarkovil.

5·2

5·3

5·4 Generally not valued but bought because it is comparatively cheap.

T19 : Eutherapon theraps

Therapon theraps

Order : **Perciformes**
Family : **Theraponidae**

1·0 1·1 Length (L 1) 4·0". Height of body (L 6) nearly ¼ the length.

1·2 Perch-like fish with oblong body, compressed laterally.

1·3 Pale brown above, silvery below.

	1·4	Three dark brown longitudinal stripes along the body. Two oblique bars accross each caudal lobe.
	1·5	Dorsal fins pale brown ; others dirty white.
	1·6	A black blotch between the 3rd and the 7th dorsal spines.
	1·7	Eyes dark blue
2·0	2·1	A shallow depression dorsally at the junction of the head and trunk. Head nearly triangular in transverse section.
	2·2	Mouth small, slightly protrusible; faces upwards when closed. Teeth conical, many rows in both jaws. No barbels
	2·3	Nostrils 2 pairs one behind the other.
	2·4	Eyes slightly elliptical, situated dorso-laterally. Interorbital (H 11) nearly one eye diameter apart.
	2·5	Gill rakers (H13·1) present. Opercular edge (H10·1) with two spines dorsally. Lower one longer than the other. Preopercle (H 10·2) serrated and with spines.
3·0	3·1	Dorsal fins two united basally. Anterior dorsal (F1) with 10 spines. First spine very short and the 5th spine the longest. Posterior dorsal (F 2) with one spine and 10 to 12 soft rays. Anal (F5) opposite the posterior dorsal with 3 spines and 9 soft dorsals.
	3·2	Pectoral fin (F3) lower down. Pelvic abdominal (F 4·3) with one spine and 5 bundles of rays.
	3·3	Caudal forked (F6·2).
4·0	4·1	Scales ctenoid (B3 1).
	4·2	———
	4·3	Lateral line distinct (B2·1) and curved. Scales above lateral line 10-12.

5·0 *5·1* Rare at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3

5·4 Generally not valued but bought because it is comparatively chepa.

T_{20}: Autisthes puta

Therapon puta

Kove kitchan (T)
Vairan kili (S)

Order : **Perciformes**
Family : **Theraponidae**

1 0 *1·1* Length (L 1) 3·3″ and height of body 1·0″.

1·2 Perch-like fish with oblong body, laterally compressed, with small scales.

1·3 Greyish brown above and light silvery below.

1·4 Four nearly straight longitudinal dark stripes along the sides of the body. The first one is along the base of spinous dorsal. This is found to be absent in some specimens. The 3rd one starts from the snout passing through the eye and takes a mid path in the caudal peduncle. Caudal with 2 oblique bars accross lobes.

1·5 Fins light grey.

1·6 A dark blotch between 3rd and 7th dorsal spines.

1·7 Eyes - pupil light blue and cornea blue.

2·0 *2·1* Interorbital region (H 11) slightly convex. Depth less than head.

2·2 Mouth moderate, facing upwards when closed. Fine teeth in rows in both jaws.

2·3 Nostrils 2 pairs, in line with the anterior region of the dorsal orbital ridge. The anterior pair with a flap.

2·4 Eyes circular (H 7·1), found laterally at the dorsal most point.

2·5 Gill rakers (H 13·1) present.

3·0 3·1 Dorsal fin (F 2) single; occupying the posterior 2/3 of the standard length (L3) with 12 spines and 10 soft rays. The 5th spine the longest.

Anal fin (F 5) opposite the posterior half of the dorsal fin with 3 spines and 8 soft rays.

3·2 Pectorals (F 3) lower down.
Pelvic abdominal (F 4·3) with one spine and 5 bundles of soft rays.

3·3 Caudal forked (F 6·2)

4·0 4·1 Scales, small and ctenoid (B 3·1)

4·2 Opercle (H 10·1) with one large spine.
Preopercle (H 10·2) serrated with spines.

4·3 Lataral line, distinct and complete (B 2·1), originating behind the upper border of the operculum, going higher up in the region of the dorsal fin.

16-18 Scales between dorsal edge and lateral line.

5·0 5·1 Common at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3

5·4 Generally not valued but bought because of its comparative cheapness.

T_{21} : Therapon jarbua

Therapon servus
Sciaenu jabua

Palin kitchan, Kili (T)
Pol bateya, Kili (S)

Order : **Perciformes**
Family : **Theraponidae**

1·0 *1·1* Length *(L1) 2.5"* to *4·0"*.
Height of body *(L 6)* nearly $\frac{1}{3}$ length.

1·2 Oblong-ovate body, ccmpressed laterally.

1·3 Silvery, brownish above ; lighter below.

1·4 Three dark longitudinal cross bands, curved downwards and slightly wavy; first from origin of the dorsal fin; 3rd originates just above the operculum, ending at the point of bifurcation of the caudal fin; 2nd originates in-between the first and 3rd, ending between the candal and the dorsal.

1·5 Pectoral (F 3), Ventral (F 4) and anal (F 5) fins hyaline.
Caudal (F6) yellowish - brown at the base, brownish towards the free end and black edged.
Dorsal hyaline or slightly brownish.

1·6 Fairly large black blotch between the 3rd and 6th dorsal spine.

1·7 Pupil light blue ; cornea dark blue.

2·0 *2·1* Head triangular in transverse section. Depth greater than head.

2·2 Mouth small, terminal and slightly protrusible. No barbels. Fine teeth in many rows on both jaws.

2·3 Nostrils two pairs. Anterior pair with a flap-like structure.

2·4 Eyes elliptical (H7·2); nearly 2 diameter (shorter) apart.

2·5 Gill rakers (H13·1) present.

3·0 *3·1* Single dorsal fin (F1) occupying the posterior $\frac{2}{3}$ the standard length (L 3); with eleven spines and 9 soft rays. First spine very much shorter than the rest; 4th the longest.

Anal (F5) opposite the posterior half of the dorsal with 3 spines and 8 soft rays

3·2 Pectorals (F3) lower down with 12 rays. Ventral abdominal (F4·3), with one spine and 5 rays.

3·3 Caudal emarginate (F 6·7).

4·0 *4·1* Scales ctenoid (B 3·1).

4·2 Operculum (H 10·1) with one strong spine pointing backwards and slightly downwards.
Lower portion of preopercle (H 10·2) serrated.
Branchiostegals (H9) 6 pairs.

4·3 Lateral line distinct complete (B 2·1); traverses the 2nd band in the region beneath the anoterior $\frac{2}{3}$ of the dorsal fin.

5·0 *5·1* Rare at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3

5·4 Generally not valued but bought because of its comparative cheapness.

T_{22}: Sillago sihama

Atherina sihama

Kilaken (T)
Kalanda (S)

Order: **Perciformes**
Family: **Sillaginidae**

1·0 *1·1* Length (L 1) 6·0".
Height of body (L 6) nearly $\frac{1}{6}$ the length.

1·2 Body elongate, tapering from middle to head and tail.

1·3 Dull silvery grey above and bright silvery below. Dorsal portion of head grey.

Preopercle (H 10·2) and operculum (H 10·1) bright silvery.

1·4 A diffuse light green silvery band runs longitudinally below the lateral line (B 2·1), starting just behind the operculum (H 10·1), ending at the caudal pedncle.

1·5 Anterior dorsal (F 1) and posterior dorsal (F 2) hyaline. Ventral (F 4) and anal (F 5) faint yellow.

1·6 Portions of the membrane between the spines of the anterior dorsal (F 1) black spotted. Posterior dorsal (F 2) with four rows of black spots and a faint black border.

1·7 Pupil black; cornea black dorsally and silvery white ventrally.

2·0 *2·1* Head nearly quadrangular in transverse section.

2·2 Mouth small, terminal and protraclile. No barbels. Fine teeth in rows on upper and lower jaws and on vomer (P1·2). None on palatine.

2·3 Nostrils two pairs in pits.

2·4 Eyes elliptical with the longer diameter in the longitudinal direction, situated towards the dorsal side.

2·5 Gill rakers (H 13·1) present.

3·0 *3·1* Anterior dorsal (F1) originates just behind the origin of the pectoral fin; with eleven rays. First ray equal in length to height of body of the fish.

Posterior dorsal (F2) originates from the middle of the body; with 24 rays.

Anal (F5) opposite the posterior dorsal and same length as the posterior dorsal.

3·2 Pectoral (F3) originates just below the light green silvery band; with 5 rays, first one single, others branched distally Ventral abdominal (F 4·3).

3·3 Caudal emarginate (F 6·7).

4·0 *4·1* Scales small; those on cheek cycloid.

4·2 Preopercle (H 10·2) edge completely serrated

A small spine on operculum (H10·1).

4·3 Lateral line complete (B 2·1).

5·0 5·1 Common at Thondaimannar; rare at Vallai and not reported at Nagarkovil.

5·2

5·3

5·4 Highly valued.

T_{23}: Lutianus russelli

Lutjanus russelli
Mesoprion russelli

Unan (T)

Order: **Perciformes**
Family: Lutianidae

1 0 1·1 Length (L1) 3·5″ to 4·0″.
Height of body (L 6) nearly $\frac{1}{3}$ the length.

1·2 Body moderately compressed laterally; oblong.

1 3 Dusky golden above the lateral line, silvery below.

1·4 Eight golden longitudinal bands in adults. First one running from head to the first dorsal spine. Second running below the first ending near the 5th dorsal spine. 3rd ending between the 8th and 9th dorsal spine. 4th one merging indistinctly near the soft dorsal, anteriorly, 5th ending in the black spot. 6th ending in the middle of the caudal peduncle. 7th ending in the posterior edge of the caudal peduncle 8th ending in the posterior edge of the anal fin.

1·5 All fins golden yellow. Dorsal (F1), anal (F 5) and caudal (F 6) pink edged.

1·6 A dark oval blotch on lateral line, mainly above it and opposite anterior part of soft dorsal.

1·7 Pupil black; cornea silvery.

2·0 *2·1* Head elliptical in transverse section. A depression in the interorbital region *(H11)*.

2·2 Mouth small, not protrusible, with fine teeth on both jaws, in many rows.

2·3 Nostrils 2 pairs, one behind the other.

2·4 Eyes large and circular; occupying the dorsal most point laterally.

2·5 Operculum *(H 10)* membraneous. Gill rakers *(H 13·1)* long.

3·0 *3·1* Dorsal fin *(F1)* single with 8 spines and 14 soft rays which bifurcate distally.
Anal **(F 5)** with 3 spines and 8 soft rays which also bifurcate distally.

3·2 Pectoral fin *(F3)* lower down with 15 rays. Pelvic abdominal *(F 4·3)*.

3·3 Caudal emarginate *(F 6·7)*.

4·0 *4·1* Scales ctenoid *(B 3·1)*.

4·2 Preopercle *(H 10·2)* serrated.

4·3 Lateral line distinct, complete *(B 2·1)* and takes a dorsa. route starting behind the operculum in the level of the eyel 17 scale rows below lateral line.

5·0 *5·1* Rare at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3

5·4 Generally not valued but bought because of its comparative cheapness.

T_{24} : Lutjanus chrysotania

Order : **Perciformes**
Family : **Lutianidae**

1·0 *1·1* Length (L1) 4·0".
Height of body (L6) nearly ¼ length.

1·2 Body compressed laterally; oblong.

1·3 Pale brown with silvery.

1·4 Five dark brown bands running longitudinally.

1·5 Pectoral fin (F 3) hyaline. Pelvic (F 4) and anal (F 5) brown edged.

1·6 Dark blotch between 3rd and 7th dorsal spine. Indistinct blotches on either lobes of the caudal fin (F6).

1·7 Eyes pale blue

2·0 *2·1* A distinct ridge in the interorbital region (H 1.1) with shallow longitudinal groves on either side.

2·2 Mouth facing upwards when closed, slightly protrusible. Teeth on both jaws, small and pointed.

2·3 Nostrils 2 pairs.

2·4 Eyes large, circular, occupying the dorsal most point laterally.

2·5 Gill rakers (H 13·1) present.

3·0 *3·1* Dorsal fin (F 1) single originating oppositise the posterior border of the operculum (H 10). running up to the caudal peduncle; with 10 spines and 20 soft rays
Anal (F 5) opposite the posterior third of the dorsal fin, with two spines and 5 soft rays. First spine very much smaller than the others.

3·2 Pectoral fin (F 3) lower down.
Pelvic abdominal (F 4·3) with one spine and 5 bundles of fin rays.

3·3 Caudal truncate (F 6 3).

4·0 *4·1* Scales ctenoid (B 3·1).

4·2 Preopercle (H 10·2) serrated.

4·3 Lateral line complete and distinct (B 2·1).

5·0 *5·1* Rare at Thondaimanar. Not reported at Vallai and Nagarkovil.

5·2

5·3

5·4 Generally not valued but bought because it is comparatively cheap.

T_{25}: Gerreomorpha setifer

Gerres lucidus

Kari moral, Thirali, Udulvau (T)
Oleya, Udassa, Udegamuva (S

Order: **Perciformes**
Family: **Gerridae**

1·0 *1·1* Length (L1) 2·5″ to 3·0″.
Height of body (L6) nearly $\frac{1}{3}$ the length.

1·2 Body laterally compressed, oval.
Compression less towards the tail. Ventral region anterior to the anal fin (F5) flat.

1·3 Body silvery.
Indistinct vertical dark band over nape (the part of the neck adjoining the skull) followed by 3 accross the body under dorsal fin.

1·5 Fins faint yellow.

1·6 Margin of anterior half of dorsal fin black.
A black area between the 2nd and 5th dorsal spines.

1·7 Eyes dark blue.

2·0 *2·1* Head biconvex in transverse section. A transverse depression in the interorbital region (H 11).

2·2 Mouth small, strongly protractile, facing downwards when open. Fine teeth on both jaws. None on palate. No barbels.

2·3 Nostrils 2 pairs; close to the anterior margin of orbit, dorsally.

2·4 Eyes circular, large, situated laterally towards the dorsal most point.

2·5 Gill rakers (H 13·1) present. Gill membrane free from isthmus (fleshy projection of body separating the gill-openings).

3·0 3·1 Single dorsal fin (F 1) with 10 spines and 8 soft rays. First spine very much shorter than the others.

Anal fin (F 5) single with 3 spines and 8 soft rays; opposite the posterior third of the dorsal fin.
First spine very much smaller than the second. Second very much thicker than the others.

3·2 Pectoral fin (F3) lower down with 10 rays. Pelvic fin abdominal (F 4·3) with one spine and 4 bundles of rays.

3·3 Caudal fin forked (F 6·2).

4·0 4·1 Scales ctenoid (B 3·1).

4·2 Lower preopercle (H 10·2) serrated on posterior half.

4·3 Lateral line distinct and complete (B 2·1) with 4 scales between it and base of dorsal fin. Made up of 45-48 tubes.

5·0 5·1 Abundant at Thondaimannar, common at Vallai and rare at Nagarkovil.

5·2

5·3

5·4 Normally not bought but bought as a last resort when there are no other fishes in the market.

T_{26}: Pertica filamentosa

Gerres filamentosus

Order: **Perciformes**

Family: **Gerridae**

1·0 1·1 Length (L1) 4·0".
Height of body (L 6) nearly $\frac{1}{3}$ the length.

1·2 Body laterally compressed, oval. Compression more towards the tail.

1·3 Blue-grey above, silvery below.

1·4 Series of bluish blotches laterally; sometimes giving the appearance of transverse bands which when present vary from 3 to 6.

1·5 Dorsal fin (F 1) light grey, ventral fin (F4) whitish; others faintly yellow.

1·6 Posterior margin of the 2nd spine of the dorsal fin black.

1·7 Eyes pale blue.

2·0 2·1 Head pointed; shallow concavity in the region anterior to the eyes. Interorbital region (H *11*) flat with a deep notch in the middle.

2·2 Mouth small, strongly protractile, downwards. Teeth on both jaws. None on palate.
No barbels.

2·3 Nostrils 2 pairs. Posterior pair larger than the anterior.

2·4 Eyes circular, large, situated laterally towards the dorsal most point.

2·5 Gill rakers (H *13·1*) present. Gill-membranes free from isthumus.

3·0 *3·1* Single dorsal fin (F 1) with 9 spines and *10* rays. First spine very short; second spine the longest, length equal to height of body.

Anal fin (F5) single, opposite the posterior third of the dorsal fin with 3 spines and 7 rays. First spine very much smaller than the 2nd. 2nd is thicker than the first or the 3rd.

3·2 Pectoral fin (F3) originating lower down, with *10* rays. Pelvic fin abdominal (F4·3) with one spine and 5 bundles of rays

3·3 Caudal forked (F6·2).

4·0 4·1 Scales ctenoid (B3·1).

4·2 Lower preopercle (H10·2) serrated on posterior half.

4·3 Lateral line distinct and complete (B2·1), with 4 to 5 scales between it and the base of dorsal fin; made up of 45 to 47 tubes.

5·0 5·1 Rare at Thondaimannar and Vallai, not reported at Nagarkovil.

5·2

5·3

5·4 Generally not valued but bought because it is comparatively cheap.

T_{27}: Leiognathus fasciatus

Clupea fasciata

Karel (T)

Order: **Perciformes**

Family: **Leiognathidae**

1·0 1·1 Length (L1) 3·0" to 4·0". Height of body (L6) nearly $\frac{1}{3}$ the length.

1·2 Body laterally compressed and slimy. Back strongly elevated behind occiput (hind part of the skull).

1·3 Silvery.

1·4 Diffuse irrequlor vertical streaks on upper half of body.

1·5 Fins hyaline.

1·6 Pectoral axilla dark.

1·7 Eyes dark blue.

2·0 2·1 Head nearly $\frac{1}{3}$ the entire length of the fish. A depression in the interorbital region (H11).

2·2 Mouth small, horizontal forming a tube which points down when protracted. Teeth minute.

2·3 Nostrils two pairs, just anterior to the eyes.

2·4 Eyes circular, situated laterally, towards the dorsal side.

2·5 Gills (H 13) with rakers (H 13·1). Gill membrane united with isthmus.

3·0 3·1 Single dorsal (F 1) with 8 spines and 16 soft dorsals. First spine very much shorter than the second. Second dorsal spine, elongated, filiform and longer than the body depth. Third spine equal to half the length of the second spine.

Anal fin (F 5) shorter than dorsal, with 3 spines and 14 fin rays.

Dorsal (F 1) and Anal (F 5) with basal sheath.

3·2 Pectoral fin (F 3) small, originating in level with the ventral border of the eye. Pectoral axilla dark.

Pelvic fin thoracic (F 4·1) with one spine and 5 rays.

3·3 Caudal fin forked (F 6·2),

4·0 4·1 Body appears naked.

4·2 Lower border of preopercle (H 10·2) serrated. A stumpy spine in the dorsal orbit.

4·3 Lateral line distinct and complete (B 2·1), with 65 tubes, terminating at caudal base.

5·0 5·1 Common at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3 Extrude large amounts of mucus after death.

5·4 Generally not valued but bought because of its comparative cheapness.

T28: Leiognathus equulus.

Scomber equula
Leiognathus edentulu

Karal (T)
Hotu panna, Mas karalla (S)

Order: **Perciformes**
Family: **Leiognathidae**

1·0 *1·1* Length (L1) about 3·0″.
Height of body (L6) ⅓ the length.

1·2 Body laterally compresed and slimy.

1·3 Silvery with irridescence.

1·4 Faint vertical narrow cross-bands on upper part of body.

1·5 Fins hyaline; soft dorsal and pectoral base greyish.

1·6 ——

1·7 Eyes dark blue.

2·0 *2·1* Head nearly ⅓ the entire length of the fish. A depression in the interorbital region (H 11).

2·2 Mouth small, horizontal and when protracted points downwards. Teeth very fine, pointed, Mandibles strongly concave.

2·3 Nostrils 2 pairs, just anterior to the eyes.

2·4 Eyes circular, situated laterally, towards the dorsal side.

2·5 Gills (H13) with rakers (H 13·1). Gill membranes united with isthmus.

3 0 *3 1* Single dorsal (F1) with 8 spines and 16 soft dorsals. First spine very short and stumpy. Second dorsal spine more than twice in body depth. Third spine slightly smaller than 2nd.

Anal fin (F 5) shorter than dorsal fin with 3 spines and 14 fin rays.

Dorsal and anal with basal sheath.

3·2 Pectoral fin (F 3) small with greyish base, originating in level with the ventral border of the eye.

Pelvic fin abdominal (F 4 3) with one spine and 5 bundles of rays.

3·3 Caudal forked (F 6·2).

4·0 4·1 Breast with very thin cycloid scales; thus appears naked.

4·2 Lower border of preopercle (H10·2) serrated. A stumpy spine in the dorsal orbit.

4·3 Lateral line distinct, complete (B2·1). with 60 tubes, terminating at caudal base.

5·0 5·1 Rare at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3 Extrude large amounts of mucus after death.

5·4 Generally not valued but bought because of its comparative cheapnes.

T_{29}: Pomadasys hasta

Lutjanus hasta

Pristipoma hasta

Kithalu valayen (T)

Iri bateya (S)

Order: **Perciformes**

Family: **Pomadasyidae**

1·0 1·1 Length (L1) 2·5" to 3·0".
Height of body (L6) nearly $\frac{1}{3}$ the length.

1·2 Laterally compressed, typical perch-like fish; flat ventrally with a shallow pit beneath the chin.

1·3 Silvery grey.

1·4 Four to five interrupted dark grey lines along the sides; 3 to 4 of which above lateral line.

1·5 Fins hyaline.

1·6 Dorsal fin (F1) with 2 to 3 rows of brown spots which may reduce to one row at base of fin in adults.

1·7 Eyes dark blue.

2·0 2·1 Head oval in transverse section. Head nearly $\frac{1}{3}$ the standard length of the body (L3).

2·2 Mouth small; towards the ventral side Teeth feeble, pointed and found on both jaws. No barbels.

2·3 Nostrils one pair, found towards the dorsal side just anterior to the eye.

2·4 Eyes large, circular, found towards the dorsal most point' laterally.

2·5 Gill rakers (H13·1) present.

3·0 3·1 Dorsal fin (F1) single with 12 strong spines and 13 soft dorsals. Fourth spine is the longest.

Anal fin (F5) single with 3 strong spines and 6 soft fin rays. Second anal spine conspicuously longer than the third.

3·2 Pectoral fin (F3) lower down.

Pelvic fin thoracic (F4·1), with one spine and five bundles of soft rays.

3·3 Caudal forked (not deeply) (F6·2).

4·0 4·1 Scales ctenoid (B3·1).

4·2 Preopercular (H10·2) margin serrated.

4·3 Lateral line distinct and complete (B2·1), with 44 to 50 tubes. 4 to 7 scales between lateral line and base of dorsal fin.

5·0 5·1 Rare at Thondaimannar. Not reported at Vallai and Nagarkovil.

5·2

5·3

5·4 Generally not valued.

T_{30}: Lethrinus mahsenoides

Lethrinus mahsena
Lethrinus insulindicus

Sanku sothai vella meen (T)

Order : **Perciformes**
Family : **Lethrinidae**

1·0 *1·1* Leng;h (L1) 4 0".
Height of body (L6) nearly $\frac{1}{3}$ the length.

1·2 Moderately compressed perch-like fish.

1·3 Pale green. Membranous edge of opercle red.

1·4 ——

1·5 Vertical fins greenish ; others hyaline.

1·6 White spot at angle of every scale. Numerous white points on cheek.

1·7 Pupil dark blue; cornea light blue.

2·0 *2·1* Long snout, scaleless. Maxillary reaches more than half way to eye.

2·2 Mouth facing slightly upwards when closed ; slightly protrusible. Teeth on both jaws, in many rows; some teeth larger than others. No barbels.

2·3 Two pairs of nostrils; anterior pair with a flap.

2·4 Eyes circular, large and slightly protruding out; present laterally at the dorsal most point.

2·5 Gill rakers (H13 1) present.

3·0 *3·1* Dorsal fin (F1) single; nearly half the length of the total length of the body (L1). Anterior point of origin in the same line as that of the pectoral fin (F3). Dorsal fin (F1) with 9 spines and 18 soft rays in pairs. First spine slightly shorter than the others. Anal fin (F5) single, nearly $\frac{1}{4}$ the total length of the body (L1), with 3 spines and 16 soft rays in 8 pairs. First spine nearly half the length

of the second. The second spine is shorter than the other two.

3·2 Pectoral fin (F3) originating lower down. Pelvic fin abdominal (F4 3), with one feeble spine and soft rays in 5 bundles.

3·3 Caudal emarginate (F6 7).

4·0 4·1 Scales ctenoid (B3·1).

4·2 ——

4·3 Lateral line distinct and complete (B2·1). 5 to 6 rows of scales between lateral line and dorsal edge.

5·0 5·1 Rare at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3

5·4 Highly valued.

T31 : Tilapia mossambica

Chromis mossambicus

Japan meen (T)

Order : **Percifomes**

Family : **Cichlidae**

1·0 1·1 Length (L1) 6″ to 8″.
Height of body (L6) ⅓ the length.

1·2 Flattened robust-fish with compressed oblong body.

1·3 Greenish-olive generally but in the females the ventral portion of the head is yellowish and the body colour lighter than the male.

1·4 Young specimens with an ovate black spot behind base of last dorsal spine.

1·5 The dorsal (F1) and caudal fins greenish black and orange edged.

In the female the dorsal fin is lighter in colour.

Pectorals (F3) and anal (F5) fins light orange. Ventral fins (F4) bluish-green.

1·6 Each scale with dark centre.

1·7 Pupil ash coloured and cornea golden yellow.

2·0 2·1 Head biconvex in transverse section slight depression in the interorbital region (H11).

2·2 Mouth protractile with small, compressed, lobate teeth in several series.

2·3 Nostrils paired, just anterior to the interorbital depression.

2·4 Eyes circular, slightly protruding out.

2·5 Gill rakers (H13.1) present.

3·0 3·1 Dorsal fin (F1) single with 15 spines and 12 fin rays; occupying the entire trunk region except the caudal peduncle.

Anal (F5) with 3 spines and 14 fin rays.

3·2 Pectorals (F3) lower down with 13 rays. Pelvic fin jugular (F 4·2) with 6 rays

3·3 Caudal fin sub-trincate (F 6·3).

4·0 4·1 Scales ctenoid (B3·1).

4·2 ———

4·3 Lateral line interrupted (B 2·3).

5·0 5·1 Rare at Thondaimannar; common at Vallai and Nagarkovil.

5·2

5·3

5·4 Normally not bought; bought as a last resort when there are no other fishes in the market.

T32: Etroplus maculatus

Chaetodon maculatus

Sepali meen (T)
Ran koraliya, Raha koraliya Ralliya (S)

Order: **Perciformes**
Family: **Cichlidae**

1·0 *1·1* Length (L1) 1·0" to 3·0".
Height of body (L6) half the length of body.

1·2 Perch-like fish with compressed oblong body.

1·3 Yellowish with greenish back with 17 horizontal rows of golden spots and a few others on dorsal fin (F1) abdomen and anal fin (F5). The number of horizontal rows of the spots decreasing as the size increases.

1·4 Five transverse bluish-black bands dorsally. These colour bands are not very clear in all specimens collected.

1·5 Anal fin (F5) either ash or pale yellow. Ventral fin (F4) ash coloured; the colour is more prominent in the distal ends. Pectoral fin (F3) pale yellow proximally; the colour fading towards the distal end.

Dorsal fin (F1) and caudal fin (F6) ash coloured; the caudal with a light yellow border.

1·6 Three bluish-black blotches along lateral line; middle being largest.

1·7 Pupil-light blue; cornea-$\frac{1}{3}$ golden yellow, $\frac{1}{3}$ light-blue and the remaning $\frac{1}{3}$ silvery white.

2·0 *2·1* Head biconvex in transverse section. A slight depression in the interorbital region (H11).

2·2 Mouth protractile, small with small compressed, lobate teeth in more than one row.

2·3 Nostrils one pair, just anterior to the interobital depression.

2·4 Eyes circular, slightly depressed.

2·5 Gill rakers (H13·1) present.

3·0 3·1 Dorsal fin (F1) single with 7 to 9 rays and 18 spines ; opposite to anal fin (F5).

Anal (F5) occupying half the standard length of the body (L3) with 7 rays and 12 spines.

3·2 Pectoral (F3) lower down below the level of the lateral line with 13 rays.

Ventral fin jugular (F4·2); with 6 rays.

3·3 Caudal emarginate (F6·7).

4·0 4·1 Scales moderate size; ctenoid (B3·1).

4·2 ——

4·3 Lateral line distinct and complete (B2·1).

5·0 5·1 Abundant at Thondaimannar; common at Vallai and rare at Nagarkovil.

5·2 Probably a vegetale feeder.

5·3

5·4 Normally not bought; bought as a last resort when there are no other fishes in the market.

T33 : Siganus oramin

Amphacanthus guttatus

Teuthis oramin

Oddy (T)

Order : **Perciformes**

Family : **Siganidae**

1·0 1·1 Length (L1) 2″ to 6″.

Height of body (L6) nearly ½ the length of the fish.

1·2 Oblong, laterally compressed, perciform fish.

1·3 Olive dorsally, silvery light green below.

1·4 Indistinct stripes on upper part of body. Three vertical bars on caudal fin (F6).

1·5 All fins other than pectorals (F3) brownish with a dark margin.

Pectorals (F3) orange.

1·6 Numerous pearly spots. Shoulder with a round black spot and another above eye. Dorsal (F1) spotted with brown.

1·7 Pupil dark blue ; cornea golden yellow.

2·0 2·1 Head biconvex in transverse section. Two ridges on the head dorsally, starting from the interorbital region (H11) and meeting anteriorly above the mouth.

2·2 Mouth small, terminal and not protractile. Teeth lobiate, each lobe pointed ; one row in each jaw. No barbels (H 4)

2·3 Two pairs of nostrils, outside the interorbital ridge. anterior to the eye and one behind the other. The posterior one with a flap.

2·4 Eyes circular and situated towards the dorsal side.

2·5 Gill rakers (H13·1) present.

3·0 3·1 Dorsal fin (F1) single ; occupying half the total length of the body (L 1) with 13 spines and 10 rays.

Anal fin (F5), opposite dorsal fin (F1) with 7 spines and 9 rays. Soft dorsal and anal low and rounded.

3·2 Pectorals (F3) lower down with 18 rays. Ventral abdominal (F 4·3) with 3 rays and 2 spines.

3·3 Caudal emarginate (6·7).

4·0 4·1 Scales minute, longitudinally elongate and cycloid (B3 2).

4·2 A sharp spine projects forward through skin of nape. The upprr orbital ridge is serrated.

4·3 Lateral line curved, distinct (B2 1) and towards the dorsal side.

5·0 5·1 Common at Thondaimannar, rare at Vallai and not reported at Nagarkovil.

5·2

5·3 Painful stabs can be inflicted by the sharp spines of the fins.

5·4 Highly valued. Believed to increase lactation.

T34 : Siganus vermiculatus

Amphacanthus vermiculatus
Tenthis vermiculata

Paraddai or Oora meen (T)

Order : **Perciformes**
Family : **Siganidae**

1·0 *1·1* Length (L1) 2″ to 6″.
Height of body (L6) nearly ½ the length of the fish.

1·2 Oblong, laterally compressed, perciform fish.

1·3 Brownish above, silvery blue on the sides and abdomen white.

1·4 Head, body and lips vermiculated with very sinous. bluish lines of about ¼ width of inter spases. Caudal (F6) with brown lines.

1·5 Dorsal (F1), anal (F5) and ventral (F4) brownish with a darker border. Caudal (F6) and pectoral (F3) hyaline.

1·6 ——

1·7 Pupil dark blue; cornea golden yellow.

2·0 *2·1* Head biconvex in transverse section. Two ridges on the head dorsally, starting from the interorbital region (H 11) and meeting anteriorly above the mouth.

2·2 Mouth small, terminal and not protractile. Teeth lobiate, each lobe pointed; one row in each jaw. No barbels (H 4).

2·3 Two pairs of nostrils, outside the interorbital ridge, anterior to the eye and one behind the other. The posterior one with a flap.

2·4 Eyes circular and situated towards the dorsal side.

2·5 Gill rakers (H13·1) present.

3·0 *3·1* Dorsal fin (F1) single; occupying half the total length of the body (L1) with 13 spines and 10 rays.

Anal fin (F5), opposite dorsal with 7 spines and 9 rays. Soft dorsal and anal high and angular.

3·2 Pectorals (F3) lower down with 18 rays.

Ventral abdominal (F4·3) with 3 rays and 2 spines.

3·3 Caudal emarginate (F6·7).

4·0 4·1 Scales minute, longitudinally elongate and cycloid (B3·2).

4·2 A sharp spine projects forward through skin of nape. The upper orbital ridge is serrated.

4·3 Lateral line curved, distinct (B2·1) towards the dorsal side.

5·0 5·1 Abundant at Thondaimannar, rare at Vallai and not reported at Nagarkovil.

5·2

5·3 Painful stabs can be inflicted by the sharp spines of the fins.

5·4 Highly valued. Believed to increase lactation.

T35: Anabas tertudineus

Anthias tertudineus

Panai uronchi or Kavaiyan (T)
Kavaiya or Pol kavaiya (S)

Order: **Perciformes**
Family: **Anabantidae**

1·0 1·1 Length (L1) 4".

Height of body (L6) nearly $\frac{2}{5}$ the length of the fish.

1·2 Body elongate and ovate; laterally compressed abdomen and tail. Compression not marked in the head.

1·3 Greenish grey above; greenish white below.

1·4 About ten indistinct olive crosss-bars

1·5 Dorsal (F1), caudal (F6) and ventral (F4) same colour as the dorsal side.

Pectoral fin (F3) pinkish.

1·6 Black spot on caudal pedmcle and sometimes another behind opercle.

1·7 Pupil light green; cornea dark-blue.

2·0 2·1 Head cone like; nearly circular in transverse section.

2·2 Mouth facing upwards; protractile. Teeth small, conical and fixed. No barbels (H4).

2·3 Nostrils one pair, occupying an anterior point in the snout.

2·4 Eyes circular, occupying a mid-lateral point on the head.

2·5 Gills with rakers (H13·1); supra branchial organ consists of 2 to 6 bony, perforated, fan-shaped lamellae.

3·0 3·1 Single dorsal fin (F1) with 17 spines and 9 rays; longer than the anal fin (F5), cxtending the posterior $\frac{3}{5}$.

Anal fin (F5) with 10 spines and 10 rays; opposite the dorsal fin (F1); originating below the 8th or 9th dorsal spine.

In both the dorsal and the anal the portion formed of the rays, form a lobe and project beyond the rest.

3·2 Pectoral fin (F3) lower down. Ventral abdominal (F4·3) with one spine and 5 rays. Each ray paired.

3·3 Caudal emarginate (F6 7).

4·0 4·1 Scales ctenoid (B3·1).

4·2 Interopercle (H10·3), sub-opercle (H10·4) and opercle strongly serrated.

4·3 Lateral line interrupted at the anterior base of anal fin (B 2·3).

5·0 - 5·1 Common at Nagarkovil, rare at Vallai. and Not reported at Thondaimannar.

5·2

5·3

5·4 Not valued.

T36: Prionobutis koilomatodon

Eleotris kilomatodon

Order: **Perciformes**
Family: **Eleotridae**

1·0 *1·1* Length (L1) 2 5″.
Height of body (L6) nearly ⅛ the length.

1·2 Body robust, elongate, cylindrical anteriorly and laterally compressed posteriorly.
Head and snout dorso-ventrally compressed slightly.

1·3 Dark-brown with dirty white areas alternating. Brown areas larger than the white areas.

1·4 ——

1·5 All fins dark brown except the pectoral (F3) which is hyaline. Fins are darker olong the rays.

1·6 Black-spot at the base of the pectoral fin (F3).

1·7 Eyes blue.

2·0 *2·1* Head short, obtuse, elliplical in transverse section. A depression in the interorbital region (H11). Orbital crest denticulated, 2 crest on each side of snout.

2·2 Mouth moderate. Jaws subequal. Teeth in several rows on both jaws, outer enlarged. None on palate.

2·3 Nostrils paired.

2·4 Eyes circular, situated almost dorsally ½ diameter apart.

2·5 Gills with rakers (H13·1). Branchiostigals (H9) five to seven.

3·0 *3·1* Dorsal fins two. Anterior dorsal (F1) with one feeble spine followed by 5 rays.
Posterior dorsal (F2) with one feeble spine and 9 rays; nearly double the anterior dorsal.

Anal fin (F5) opposite the second dorsal (F2) with 7 rays.

3·2 Pectoral fin (F3) lower down with a not so prominent muscular base and bent at the insertion of the rays.
Ventral fin thoracic (F4·1), separate with 5 rays.

3·3 Caudal truncate (F6·3).

4·0 4·1 Scales ctenoid (B3·1). Sides of the head also with scales.

4·2 ——

4·2 Lateral line (B2) higher up not very distinct.

5·0 5·1 Rare at Vallai. Not reported at Thondaimannar and Nagarkovil.

5·2 Carnivorous fishes.

5·3

5·4 Normally not bought; bought as a last resort.

T37: Awaous grammepomus

Gobius grammepomus

Vala potha or Thalangoiya (S)

Order: **Perciformes**
Family: **Gobiidae**

1·0 1·1 Length (L1) 7·5".
Height of body (L6) nearly $\frac{1}{5}$ the length (L1).

1·2 Body elongate; dorsovenstrally compresed anteriorly, middle cylindrical and caudal laterally compressed. A longitudinal depression in the medio-dorsal region, anterior to the first dorsal fin (F1).

1·3 Greenish grey above; lighter below.

1·4 Two oblique blackish streaks from eye to maxillary. Back and sides with irregular blackish streaks. Caudal fin (F6) with 7 to 9 blackish streaks.

1·5 Fins pale brown.

1·6 Five brownish indistinct blotches found laterally; first one at the level of the origin of the first dorsal fin (F1) and the last at the caudal peduncle.

1·7 Eyes pale blue.

2·0 2·1 Head dorso-ventrally compresed. A transverse depression in the anterior part of the interorbital region (H11). Lower jaw protruding beyond the upper jaw.

2·2 Mouth large, pointing upwards, both when closed and open. Not protrusible. Tongue bilobate; teeth on both jaws and palate, those in upper jaw a little enlarged in outer series.
No barbels.

2·3 Nostrils 2 pairs close to the snout. Anterior pair with a flap.

2·4 Eyes circular protruding out; 1¼ diameter apart.

2·5 Gill rakers (H13·1) present. Operculum (H10) with membraneous margin.

3·4 3·1 First dorsal fin (F1) with 6 soft rays; begins where the longitudinal depression ends. Second dorsal (F2) with eleven soft dorsals, originating close to the first dorsal (F1).
Anal fin (F5) almost opposite the second dorsal (F2) with 10 soft rays.

3·2 Pectoral fin (F3) large, just behind the operculum (H10) with fleshy flaps on inner edge of shoulder girdle and pointed distal ends.
Pelvic fins thoracic (F4·1); united to form a feeble sucking disc.

3·3 Caudal pointed (F6·4).

4·0 4·1 Body scale ctenoid (B3·1). Scales on head and breast cycloid (B3·2).

4·2 ———

4·3 Three indistinct longitudinal lines are seen laterally. Not possible to say whether any one of them is a lateral line.

5·0 *5·1* Common at Nagarkovil. Not reported at Vallai and Thondaimannar.

5·2

5·3

5·4 Normally not bought; bought as a last resort when there are no other fishes in the market.

T38: Acentrogobius oranatus

Gobius oranatus

Order: **Perciformes**

Family: **Gobiidae**

1·0 *1·1* Length (L1) 3·5".
Height of body (L6) nearly $\frac{1}{5}$ the length.

1·2 Body elongate; anteriorly cylindrical; posteriorly laterally compressed.

1·3 Green to olive above, lighter below.

1·4 Three purple transverse streaks laterally on head. 2 to 4 purple streaks basally on anal fin (F5).

1·5 Dorsal fins (F1 and F2) red to yellow. Ventral fin (F4) with violet tip. Anal fin (F5) yellow with dark border. Caudal fin (F6) orange.

1·6 Head with small yellow spots laterally. Back and upper part of head with irregular rows of violet spots. Caudal with dark and yellow spots.

1·7 Eyes light blue.

2·0 *2·1* Head nearly oval in transverse section. Interorbital region (H11) with a small depression.

2·2 Mouth fairly large, pointing upwards when closed. Small teeth on both jaws. Barbels absent.

2·3 Nostrils 2 pairs.

2·4 Eyes circular, occupying the dorsal most point laterally.

2·5 Operculum (H10) with membraneous flap posteriorly, does not open widely. Gill rakers (H13·1) present.

3·0 3·1 Two dorsal fins. First dorsal (F1) with 6 soft rays.

Second dorsal (F2) with 11 soft rays; more than double the first dorsal in length.

Anal fin (F5) opposite the second dorsal (F2) with 9 soft rays.

3·2 Pectorals (F3). large fins with muscular base, occupying the lower half.

Pelvic fins jugular (F4·2); united with a membraneous structure ventrally forming a feeble sucking disc.

3·3 Caudal fin rounded (F6 8).

4·0 4·1 Breast scales cycloid (B3·2); others ctenoid (B3·1).

4·2 ———

4·3 Lateral line not distinct.

5·0 5.1 Common at Thondaimannar. Not reported at Vallai and Nagarkovil.

5·2

5·3

5·4 Not recorded as eaten by the population in the Northern region.

T39: Mugilogobius valigouva

Vaimosa valigouva

Order : **Percifomes**

Family : **Gobiidae**

1·0 1·1 Length (L1) 4·5".

Height of body (L6) nearly $\frac{1}{5}$ the length.

1·2 Body elongate, sub- cylindrical, tapering posteriorly. Dorso-ventrally compressed in the head region. Caudal region laterally compressed.

1·3 Brownish-black except the ventral region which is white.

1·4 Four to five irregular indistinct transverse bands which are darker than the rest of the body.

1·5 Dorsal fins (F1 and F2) and caudal (F6) ash coloured. Pectorals (F3), ventrals (F4) and anal (F5) hyaline. First dorsal (F1) faintly black edged.

1·6 Caudals (F6) with 5 to 6 rows of black spots. Second dorsal (F2) with 3 to 4 rows of black spots. First dorsal (F1) with a distinct, fairly large, black spot between the first and second fin rays.

1·7 Eyes blue.

2·0 2·1 Head broader than the rest of the body and dorso-ventrally compressed; nearly triangular in transverse section.

2·2 Mouth large, facing upwards and lower jaw slightly produced. Teeth, two rows in upper jaw and one row in lower jaw. No teeth in palate. No barbels.

2·3 Nostrils 2 pairs; found mid-way between the snout and the eyes.

2·4 Eyes circular, prominent above dorsal profile and one diameter apart. Interorbital region (H11) narrow and with a depression.

2·5 Operculum (H10) thin posteriorly; does not open very widely. Gill rakers (H13·1) present.

3·0 3·1 Two dorsal fins. First dorsal (F1) nearly half the length of the second dorsal (F2); with 5 rays. Second dorsal with 9 rays.

Anal fin (F5) single; opposite and equal in length to the second dorsal (F2); with 9 rays.

3·2 Pectorals (F3) just behind the operculum (H10), with a muscular base and bent at insertion of rays.

Ventrals abdominal (F4·3), united anteriorly and posteriorly, taking the shape of a cone. Caudal obliquely truncate (F6·3).

4·0 *4·1* Scales ctenoid (B3·1), smaller anteriorly.

4·2 Single preopercular (H10.2) spine rudimentary.

4·3 Lateral line not very distinct.

5·0 *5·1* Rare at Thondaimannar. Not reported at Vallai and Nagarkovil.

5·2

5·3

5·4 Normally not bought; bought as a last resort when there are no other fishes in the market.

T_{40}: Thysanophrys crocodilus

Platycephalus punctatus

Platycephalus crocodilus

Erival (T)

Mal heluma (S)

Order: **Perciformes**

Family: **Platycephalidae**

1·0 *1·1* Length (L1) 4·5" to 7·0".

Height of body (L6) nearly $\frac{1}{5}$ the length (L1).

1·2 Body elongate, subcylindrical, tapering posteriorly. Dorso-ventrally compressed in the head region and laterally compressed in the caudal region.

1·3 Light brown above and dirty white below.

1·4 Four to five broad, dark transverse bands of variable breadth.

1·5 Fins light brown.

1·6 Head and body with numerous small black spots. Pectorals (F3) and second dorsal (F2) with numerous small brown spots. Ventrals (F4) with 4 rows of brown spots. Caudal (F7) with two elongated dark brown blotches.

1·7 Eyes dark blue.

2·0 *2·1* Head broader than the rest of the body; dorso ventrally compressed and spiny above.

2·2 Mouth large, lower jaw (H*3*) produced. Teeth fine; in both jaws and palate; in many rows in upper jaw (H*1*) and in groups in palate (H*14*).

2·3 Nostrils *2* pairs, found mid-way between the snout and the eyes; with small flaps attached posteriorly.

2·4 Eyes oval; almost dorsal in position, slightly protruding out; one diameter apart.

2·5 Gill rakers (H*13·1*) present. Operculum (H10) very thin; without bony structures.

3·0 *3·1* Two dorsal fins. First dorsal (F1) nearly $\frac{1}{3}$ the second dorsal (F*2*); with 7 spines, the first spine very much shorter than the second spine. Second dorsal (F*2*) with *11* rays; nearly double that of the first dorsal in length.

Anal (F5) single equal in length and opposite to the second dorsal (F*2*); with *11* rays.

3·2 Pectorals (F3) just behind the operculum (H10). Ventrals abdominal (F*4·3*) with *6* rays, each bifurcating distally.

3·3 Caudal truncate (F*6·3*).

4·0 *4·1* Scales ctenoid (B*3·1*).

4·2 Two sturdy preopercular (H*10·2*) spines.

4·3 Lateral line distinct, complete (B*2·1*) and entirely smooth.

5·0 *5·1* Abundant at Thondaimannar and common at Vallai. Not reported at Nagarkovil.

5·2 Carnivorous.

5·3

3·4 Normally not bought; bought as a last resort when there are no other fishes in the market.

T_{41} : Psedorhombus arsius

Pleuronectes arsius

Erumai nakkan (T)

Order: **Pleuronectiformes**
Family: **Bothidae**

1·0 *1·1* Length (L*1*) $7\frac{1}{2}''$.
Height of body (L6) $3\frac{1}{4}''$.

1·2 Asymmetrical, flat-fish with eyes on the left side. Dorsal profile of head straight.

1·3 Light brown on ocular side; dirty white on blind side.

1·4 ———

1·5 Fins light brown.

1·6 Dark spots and rings on ocular side. Unpaired fins with brown spots and rings. A dark spot surrounded by white dots in a ring at commencement of lateral line.

1·7 Pupil pale blue; cornea dark blue.

2·0 *2·1* Dorsal profile of head straight.

2·2 Mouth open upwards. Maxillary extending to below the posterior part of the eyes Teeth present on both jaws. Anterior teeth large caniniform. No barbels.

2·3 Nostrils 2 pairs. Anterior pair with a short tentacular structure. One pair on the ocular side and the other on the blind side.

2·4 Eyes oval, $\frac{1}{4}$ eye diameter apart on the left side. Interorbital region *(H11)* narrow.

2·5 Preopercular (F*10·2*) margin free. Gill rakers (H*13·1*) present.

3·0 *3·1* Dorsal fin single (F*1*), extends from head anterior to the eye, with 72 fin rays.

Anal (F5) starts just behind the pelvic fin (F4); with *60* fin rays.

Dorsal (F1) and Anal (F5) both extend right up to the caudal peduncle.

3·2 Pectoral (F3) originating in level with the left eye. Pelvic jugular (F4·2) with 5 bundles of fin rays.

3·3 Caudal wedge-shaped (F6·1).

4·0 4·1 Scales ctenoid (B3·1).

4·2 ——

4·3 Lateral line complete (B2·1); commences above the operculum (H10) behind the right eye.

5·0 5·1 Rare at Thondaimannar. Not reported at Vallai and Nagarkovil.

5·2 ——

5·3 ——

5·4 Normally not bought but bought as a last resort when there are no other fishes in the market.

T_{42}: Solea elongata

Athall (T)
Handhalla (S)

Order : **Pleuronectiformes**
Family : **Soleidae**

1·0 1·1 Length (L1) 6·5″.
Height of body (L6) 3·0″.

1·2 Asymmetrical, flat-fish with eyes on the right side.

1·3 Brownish on ocular side and paler on blind side.

1·4 ——

1·5 Fins brownish except the pectoral (F3).

1·6 Black blotch on distal part of pectoral fin (F3).

1·7 Eyes dark blue.

2·0 2·1 Dorsal profile of head straight. Snout obtusely pointed.

2·2 Mouth opens upwards. Teeth absent on both jaws. No barbels.

2·3 Nostrils 2 pairs. One pair on the ocular side and the other on the blind side. Anterior pair with a short tentacular structure.

2·4 Eyes circular and small, one diameter apart on the right side.

2·5 Gill opening on ocular side, opposite lower part of pectoral base. Gill rakers (H13·1) present, Preopercle (H10·2) edge covered with skin.

3·0 3·1 Dorsal fin (F1) single; extends from head, anterior to the eye; with 59 fin rays.

Anal (F5) starting just behind the pelvic fin (F4) with 52 fin rays.

Both dorsal fin (F1) an anal fin (F5) extending right up to the caudal peduncle.

3·2 Pectoral fin (F3) originating in level with the right eye

Pelvic jugular (F4·2). Pelvic of the right side joined by a membrane to base of first-anal ray.

4·0 4·1 Scales ctenoid (B3·1).

4·2 ——

4·3 Lateral line complete (B2·1) commences above the operculum (H10); behind the left eye.

5·0 5·1 Rare at Thondaimannar; Not reported at Vallai and Nagarkovil.

5·2

5·3

5·4 Normally not bought; bought as a last resort when there are no other fishes in the market.

T_{43}: Triacanthus biaculeatus

Balistes biaculeatus

Klathi (T)

Order: **Tetradontiformes**

Family: **Triacanthidae**

1·0 *1·1* Length (L1) 3·5".
Height of body (L6) nearly 1/3 the length.

1·2 Body laterally compressed. Caudal region distnict, cone-like and tapering towards the tail. Snout (H5) produced, with upper profile distinctly concave.

1·3 Starting from the snout above the eyes, nearly 1/3 dorsally grey; rest silvery.

1·4 ———

1·5 Fins pale white.

1·6 Black spot on the membrane between first and second spines in the first dorsal (F1).

1·7 Pupil light blue; cornea silvery.

2·0 *2·1* A median ridge in the interorbital region (Hll).

2·2 Mouth small, terminal, not protractile. Teeth not united into a beak, large and distinct teeth 8 on upper jaw and 6 on lower jaw. No barbels.

2·3 Nostrils 2 pairs. Nasal pit present.

2·4 Eyes circular, fairly large and very close to the dorsal side.

2·5 Gill rakers (H13·1) present. Operculum (H10) very much reduced, membraneous and opens by a restricted gill opening.

3·0 *3·1* Dorsals fins two. First dorsal (F1) with 3 spines; first spine ½ the length of the head. 2nd and 3rd spines very much shorter than the first. Membrane present between the spines.

Second dorsal (F2) with 23 rays.

Anal (F5) opposite the 2nd dorsal (F2); with 19 rays.

3·2 Pectorals (F3) just behind the gill opening. Pelvic thoracic (F4·1); reduced to strong serrated spines. Spines slightly shorter than the first spine of the first dorsal (F1).

Two spines extending free laterally; 3rd spine extending posteriorly with the ventral surface and not free. 3 spines forming a tripod.

3·3 Caudal deeply forked (F6·2).

4·0 4·1 Skin with non-over lapping, small, spiny scales.

4·2 ———

4·3 No lateral line.

5·0 5·1 Common at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2

5·3

5·4 Generally not valued.

T_{44}: Chelonodon Patoca

Tetrodon Patoca

Peytthai (T)

Order: **Tetradontiformes**

Family: **Tetradontidae**

1·0 1·1 Length (L1) 2·0" to 3·0".
Height of body (L6) nearly $\frac{1}{3}$ the length.

1·2 Globular fish with puffed body.

1·3 Brownish-black dorsally, white ventrally.

1·4 3 to 4 dark hazy transverse bands.

1·5 Pectoral (F3), dorsal (F1) and caudal (F6) pale yellow. Caudal with dusky edges.

1·6 Numerous light, bluish-white spots, dorsally not extending into the tail.

1·7 Eye-pupil dark green, cornea golden yellow.

2·0	*2·1*	Interorbital region *(H11)* flat. Head nearly rectangular in transverse section. Snout *(H5)* pointed.
	2·2	Mouth small and terminal. Two large plates in each jaw with anterior suture and forming a powerful beak. No barbels.
	2·3	Single nostril Two nasal flaps on each side, in a depression, just anterior to the eyes.
	2·4	Eyes circular, situated laterally at the dorsal most point.
	2·5	Gills *(H13)* with gill rakers *(H13·1)*. Operculum *(H10)* absent. Gill opening restricted.
3·0	*3·1*	Dorsal fin *(F1)* single with 9 fin rays. Anal *(F5)* single, opposite dorsal (F1) with 8 fin rays.
	3·2	Pectoral *(F3)* larger than dorsal *(F1)* and anal **(F5)**; originating just behind the gill opening. Pelvic fin *(F4)* absent.
	3·3	Caudal fin truncate *(F6·3)*.
4·0	*4·1*	No true scales.
	4·2	Small spines all over the body except front of snout *(H5)*.
	4·3	Lateral line indistinct or absent.
5·0	*5·1*	Common at Thondaimannar, rare at Vallai and not reported at Nagarkovil.
	5·2	
	5·3	
	5·4	Not recorded as eaten by the population in the Northern region.

T_{45}: Arothron immaculatus

Tetrodon immaculatus

Order: **Tetradontiformes**

Family: **Tetradontidae**

1·0	*1·1*	Length *(L1)* 2·0″ to 3·0″. Height of body *(L6)* nearly $\frac{1}{3}$ the length **(L1)**.

	1·2	Robust bodied fish; body inflateable into a ball.
	1·3	Yellowish-olive above, lighter below and brownish along middle of sides.
	1·4	———
	1·5	Upper and lower edges as well as margin of caudal fin (F6) black. Older fins hyaline.
	1·6	———
	1·7	Pupil light blue; cornea blue.
2·0	2·1	Interorbital region (H11) slightly curved. Head nearly rectangular in transverse section.
	2·2	Mouth terminal and small. Two large plates in each jaw; with anterior suture and forming a powerful beak.
	2·3	Nostrils one pair; Two nasal tentacles on each side just anterior to the eye.
	2·4	Eyes circular; situated laterally at the dorsal most point.
	2·5	Gills (H13) with gill rakers (H13 1). Operculum (H10) absent gill; opening restricted.
3 0	3·1	Dorsal fin (F1) single, with ten soft rays. Anal (F5) opposite the dorsal (F1) with 9 soft rays.
	3·2	Pectoral (F3) larger than the dorsal (F1) and anal (F5) Pelvic fin (F4) absent.
	3·3	Caudal truncate (F3·3).
4·0	4·1	Scales absent.
	4·2	Whole body spiny except lips and caudal peduncle.
	4·3	Lateral line not distinct or absent
5·0	5 1	Rare at Thondaimannar. Not reported at Vallai and Nagarkovil.
	5·2	———
	5·3	———
	5 4	Not recorded as eaten by the population in the Northern region.

T_{46}: Arothron reticularis

Tetrodon reticularis

Pulli peytthai (T)

Pulli peyttheya (S)

Order: **Tetradontiformes**

Family: **Tetradontidae**

1·0 *1·1* Length (L1) 6·0".
Height of body (L6) nearly $\frac{1}{3}$ the length (L1).

2·2 Robust bodied fish. Body inflateable into a ball.

1·3 Deep grey above and white below.

1·4 Eight to ten longitudinal dark brown stripes which are curved under the eye, around the mough and pectoral fin (F3).

1·5 All fins except the caudal (F6) light pinkish.

1·6 Dorsal fin (F1) and caudal fin (F6) with round white spot with a reticulated interspacing.

1·7 Eyes pale blue.

2·0 *2·1* Head not demarcated from the trunk; circular in transverse section. Interorbital region (H10) broad.

2·2 Mouth small and terminal Two large plates in each jaw; with anterior suture and forming a powerful beak.

2·3 Two nasal tentacles on each side.

2·4 Eyes circular, situtated laterally at the dorsal most point.

2·5 Gills (H13) with gill rakers (H13·1). Operculum (H10) absent; gill opening restricted.

3·0 *3·1* Dorsal fin (F1) single with eleven soft rays. Anal fin (F5) opposite the dorsal (F1); with eleven rays.

3·2 Pectoral (F3) larger than dorsal (F1) and anal (F5) originating just behind the gill opening.
Pelvic fin (F4) absent.

3·3 Caudal truncate (F6.3).

4·0 *4·1* No true scales.

4·2 Small spines all over the body except the anterior region of snout.

4·3 Lateral line present; curved in the trunk region.

5·0 *5·1* Rare at Thondaimannar and Vallai. Not reported at Nagarkovil.

5·2 ———

5·3 ———

5·4 Not recorded as eaten by the population in the Northern region.

T_{47}: Ophiocephalus striatus

Viral (T)

Hal path maha, Lulla (S)

Order: **Ophiocephaliformes**
Family: **Ophiocephalidae.**

1·0 *1·1* Length (L1) 15·0″ to 20·0″.
Height of body (L6) $\frac{1}{5}$ the length.

1·2 Body scaly, elongate, sub-cylindrical anteriorly; compressed posteriorly.

1·3 Olive to dark-brown dorsally and white to yellow with brownish mottling below.

1·4 About 15 W-shaped dark transverse cross-bars.

1·5 Fins mostly olive.

1·6 ———

1·7 Eye-pupil silvery green, cornea dark blue.

2·0 *2·1* Head depressed, with large shield-like scales above. Cephalic sense pits multiple. Prenasals present. Ten transverse rows of dorsicephalic scals before level of opercles.

2·2 Mouth large and protractile. Teeth in many rows on both jaws. Barbels absent.

2·3 Nostrils two pairs; posterior pair close to the eye and larger than the anterior pair.

2·4 Eyes circular; situated dorso-laterally.

2·5 Gills (H13) without gill rakers (H13·1).

3·0 3·1 Dorsal fin (F1) single, with 46 fin rays. Anal fin (F5) with 25 fin rays. Both dorsal and anal spineless.

3·2 Pectoral (F3) lower down with a fleshy base and with 15 rays.
Ventrals abdominal (F4·3) with 6 rays.

3·3 Caudal rounded (F6·8), with 15 rays.

4·0 4·1 Scales cycloid (B3·2).

4·2 ———

4·3 Lateral line complete (B2·0), anteriorly irregular.

5·0 5·1 Common at Nagarkovil. Not reported at Thondaimannar and Vallai.

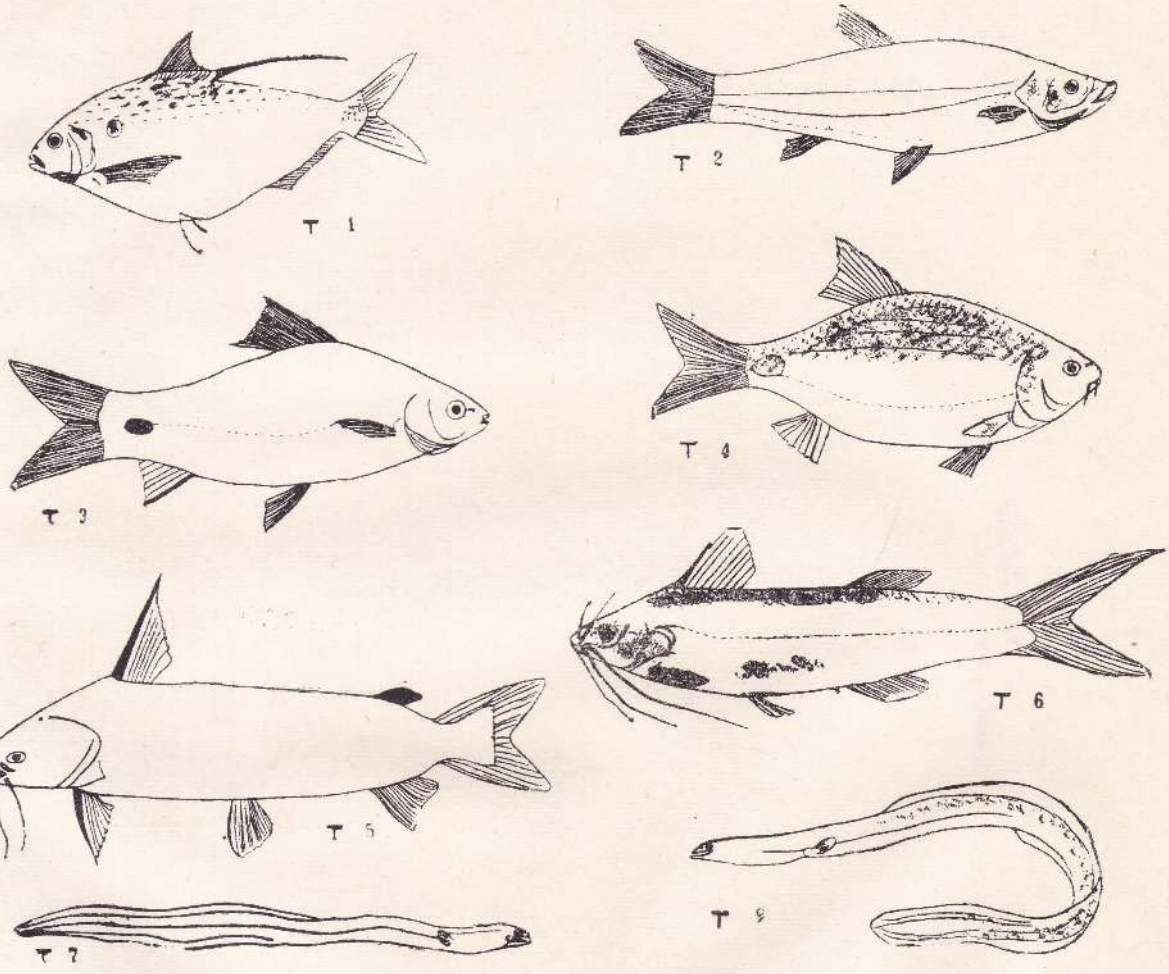
5·2 ———

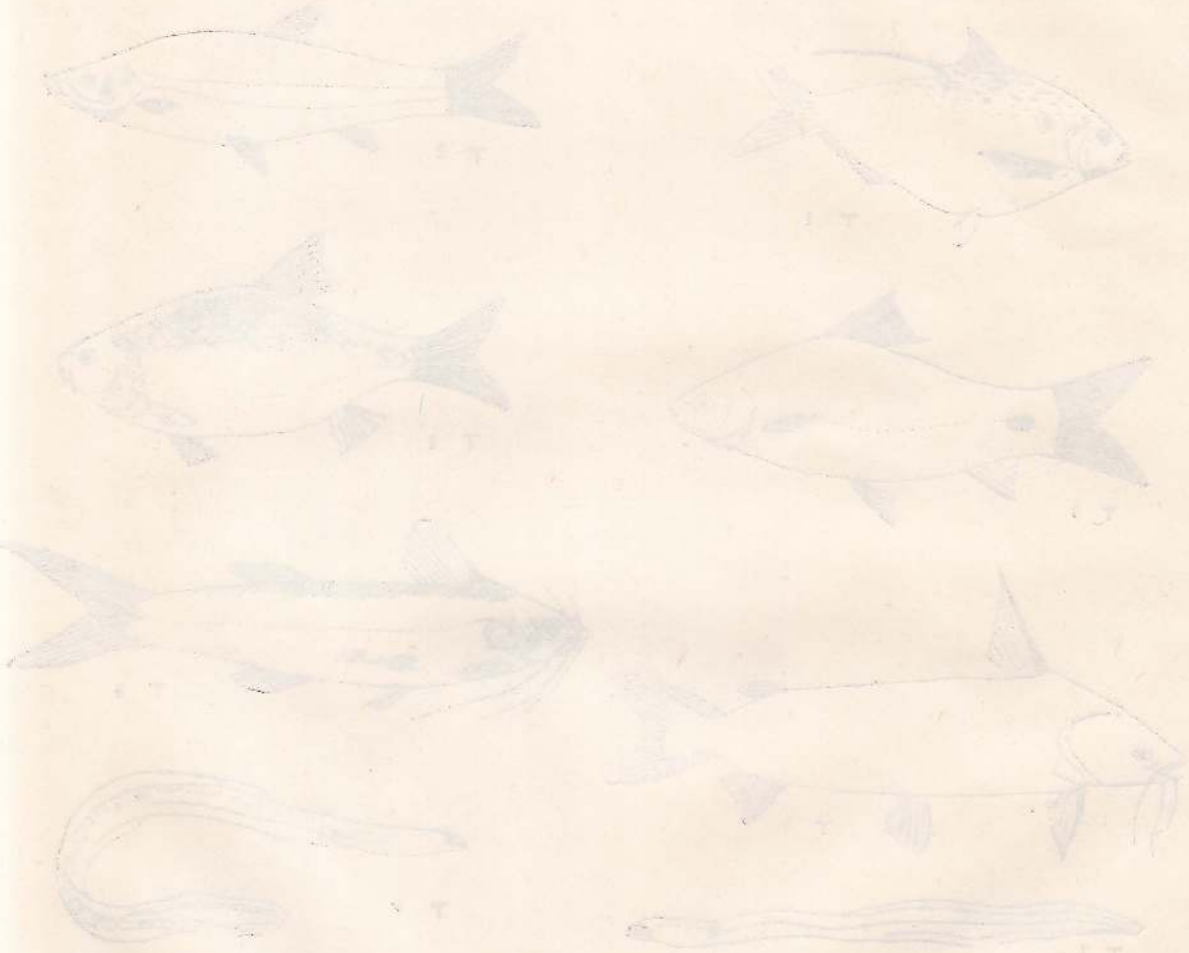
5·3 ———

5·4 Generally not valued but bought because it is comparatively cheap.

———

Appendix III





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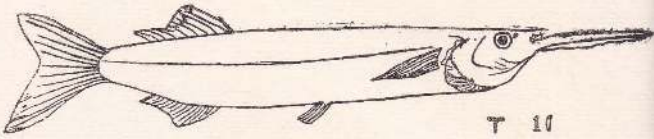

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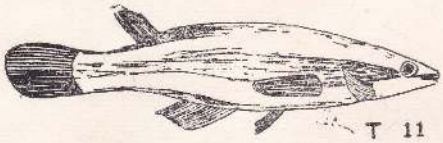

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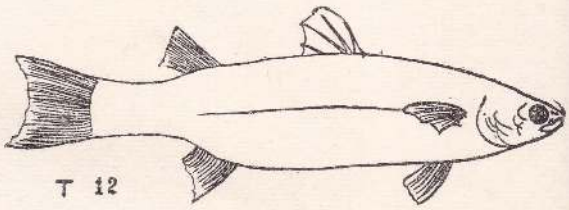

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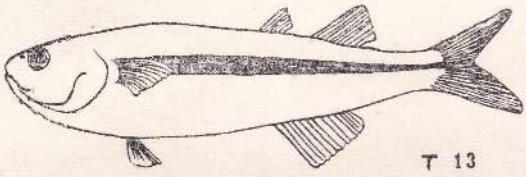

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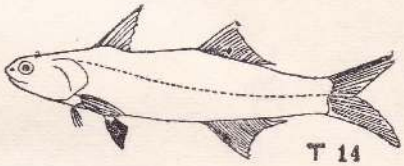

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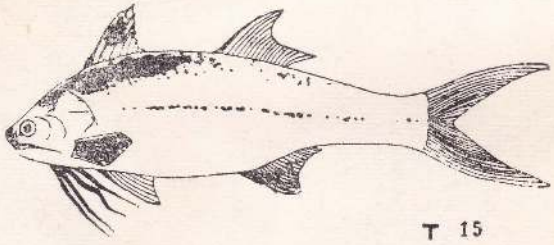

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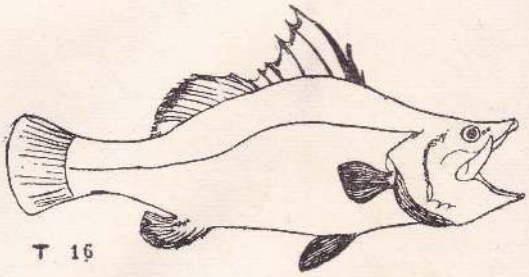

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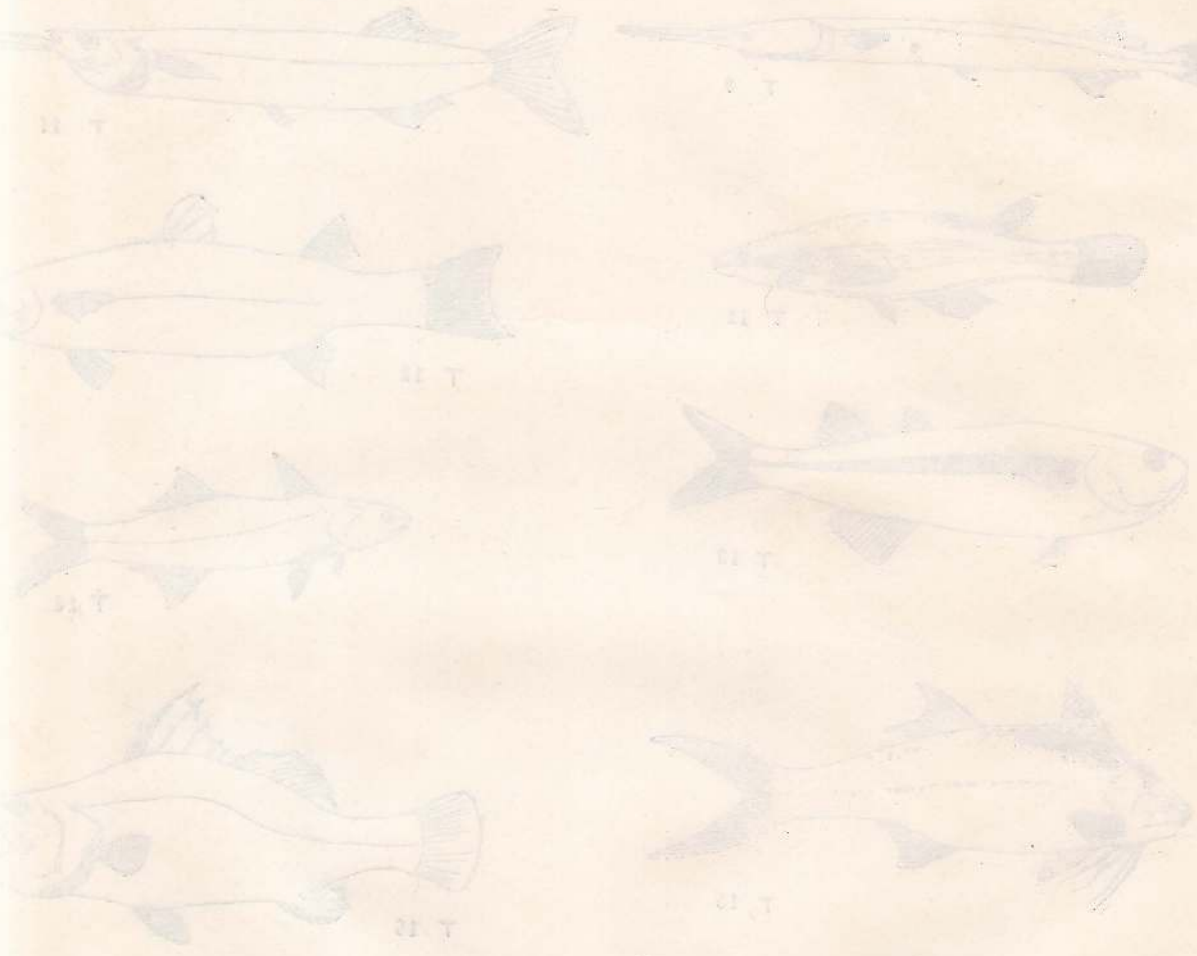

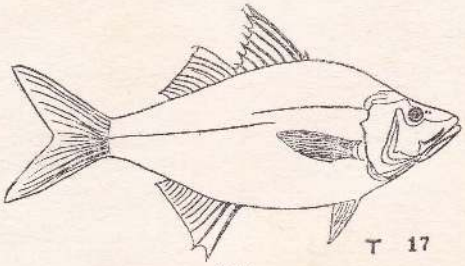

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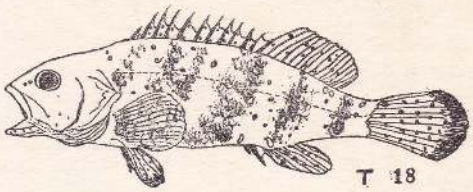

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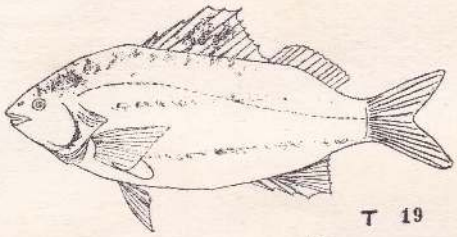

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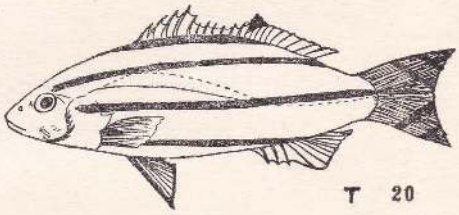

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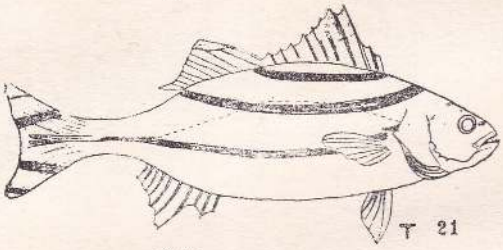

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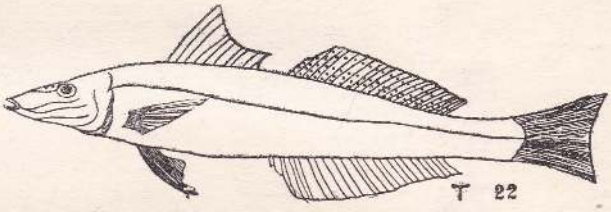

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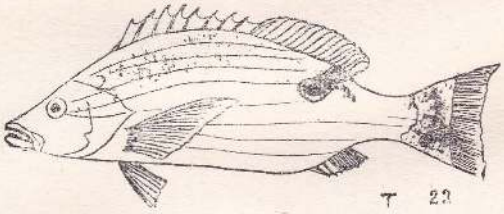

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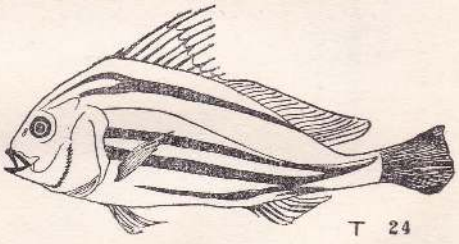

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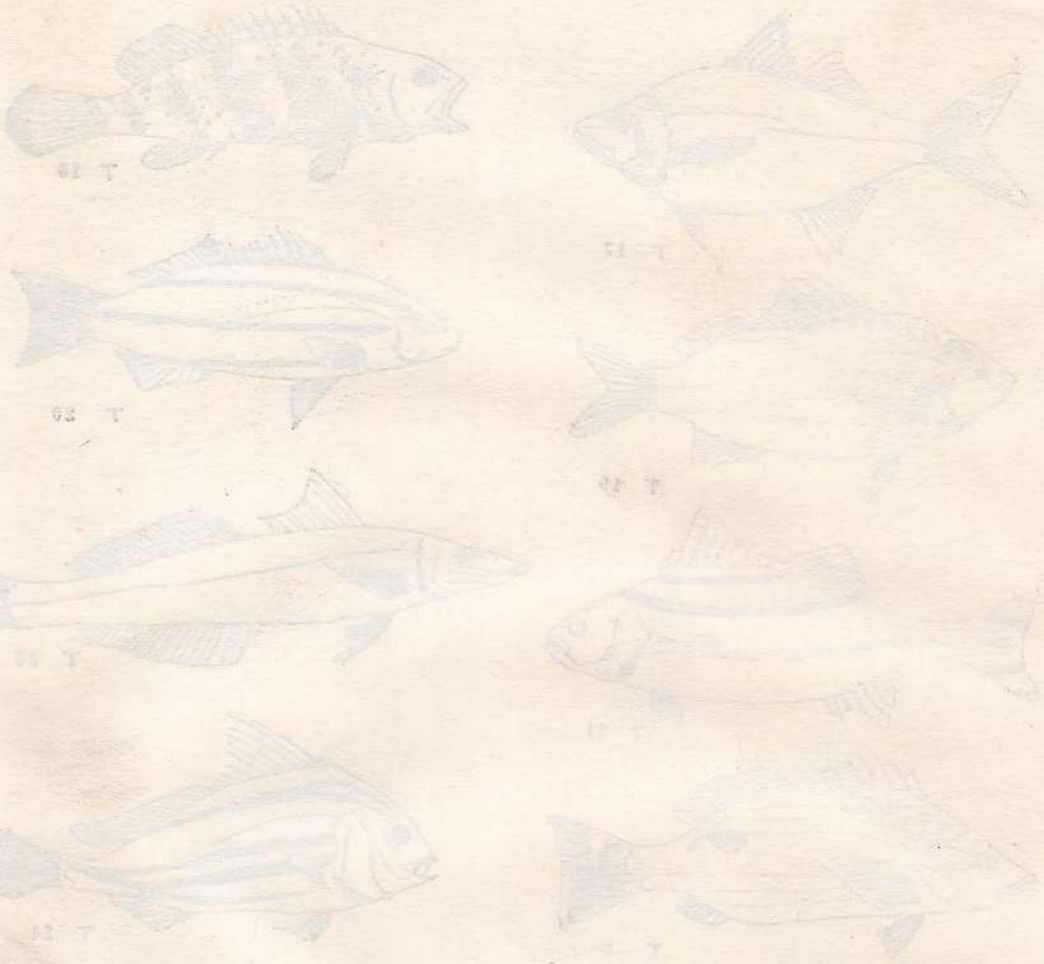

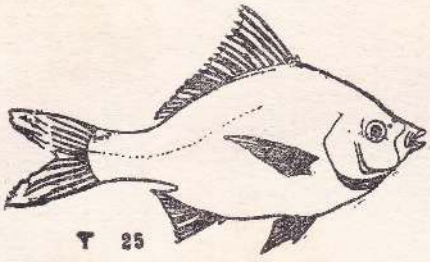

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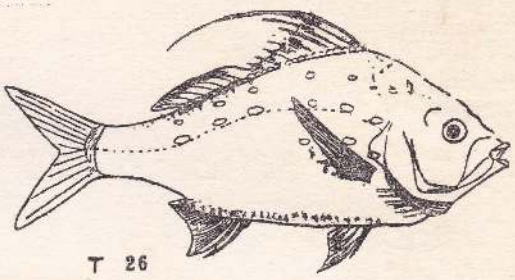
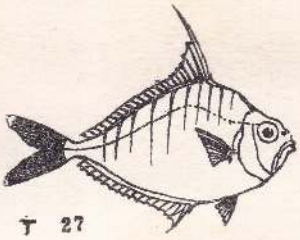


Т 26



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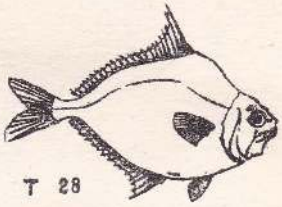

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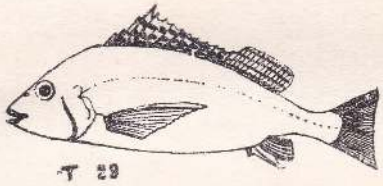

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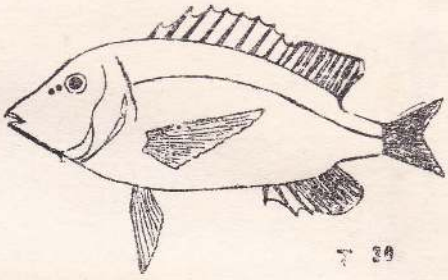

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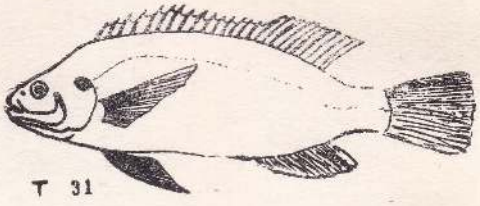

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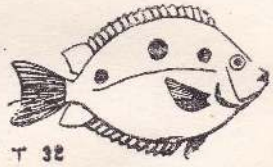

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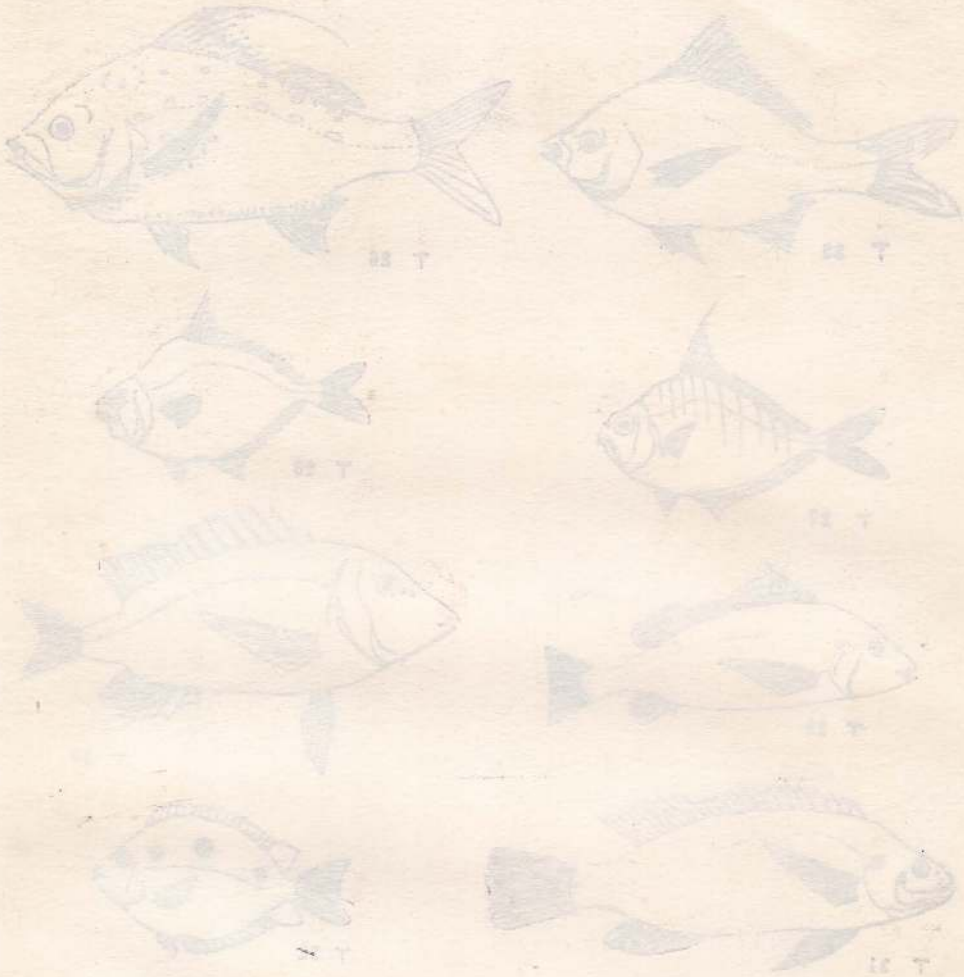

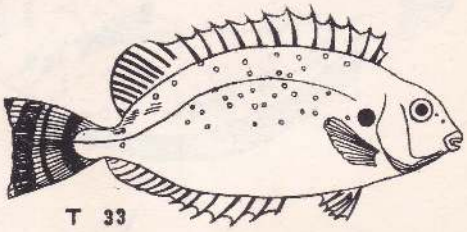

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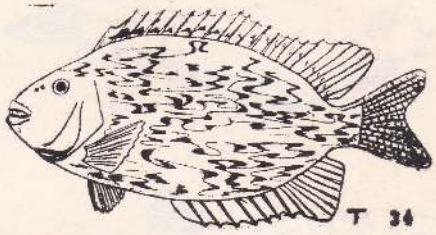

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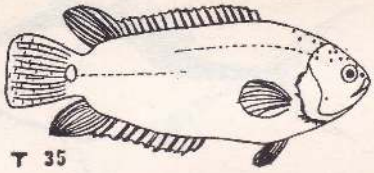

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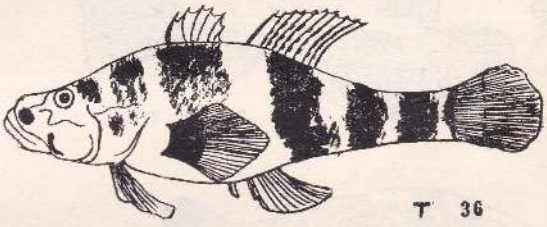

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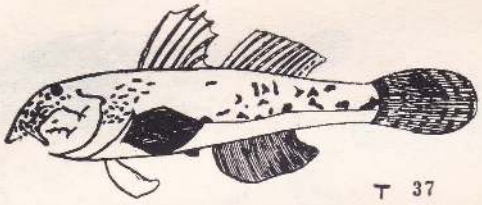

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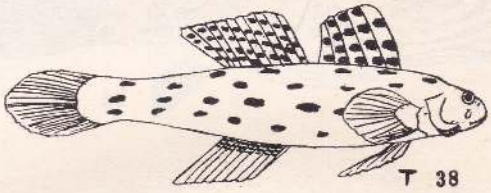

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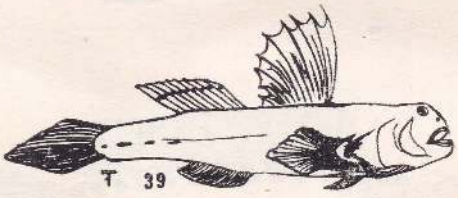

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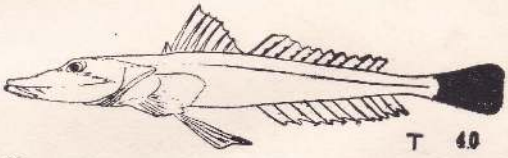

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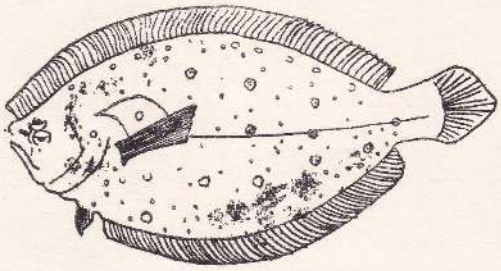

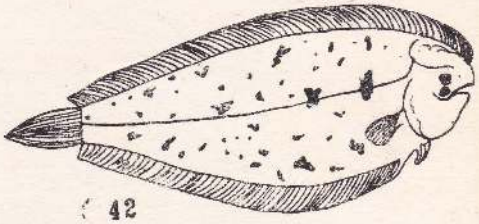

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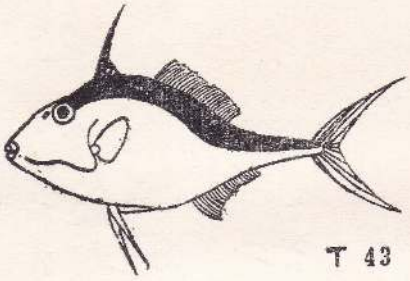

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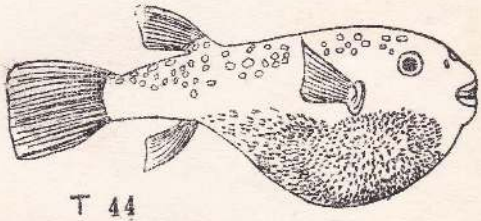
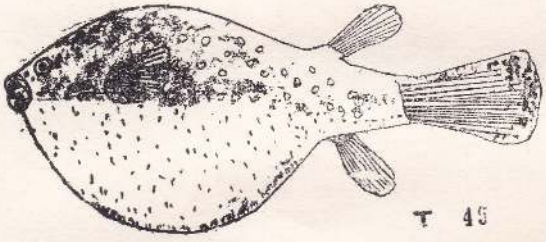


T 44



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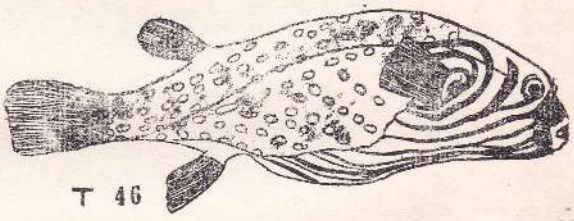

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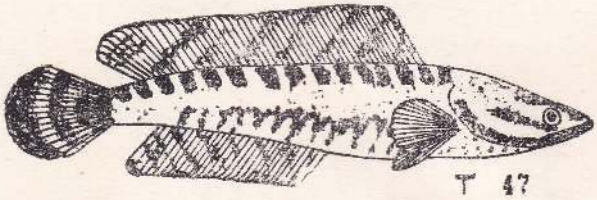
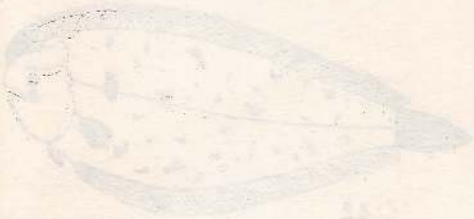
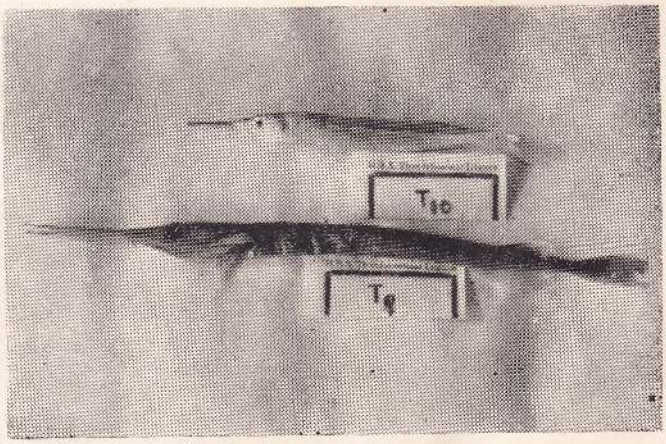


T 47

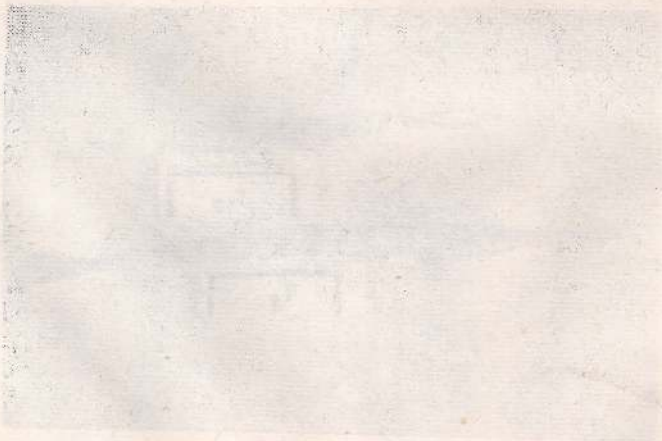


Appendix IV

One that is found throughout the lake (selected for further study.)



The two fishes that are both abundant in the Lagoon and economically popular.

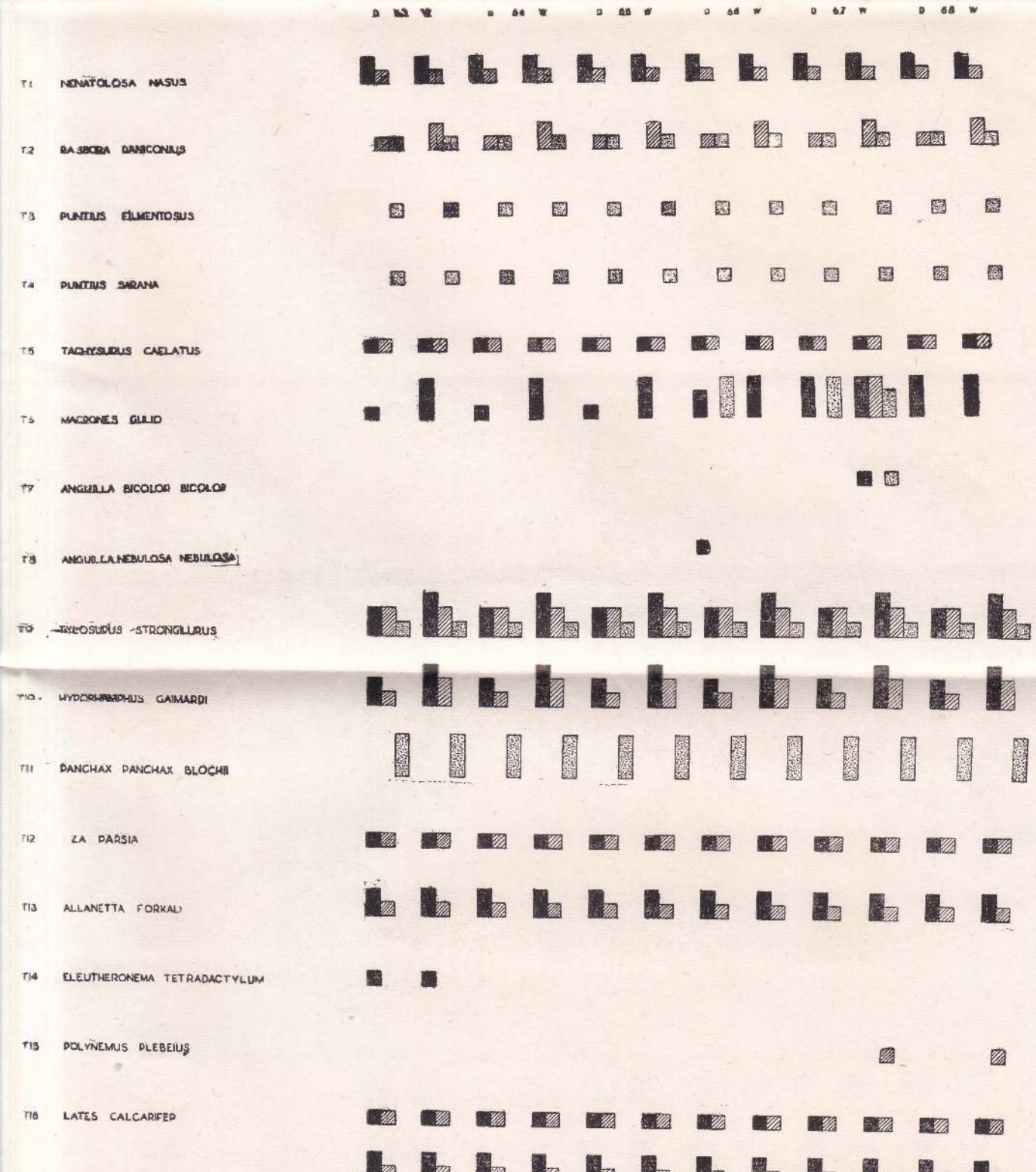


Appendix V

or

CHART I

Frequency Distribution (1963 through 1968)



T12 ZA PARSIA

T13 ALLANETTA FORKALI

T14 ELEUTHERONEMA TETRADACTYLUM

T15 POLYNEMUS PLEBEIUS

T16 LATES CALCARIFER

T17 AMBASSIS UROTAENIA

T18 EPINEPHELUS TAUVINA

T19 EUTHERAPON THERAPS

T20 AUTISTHES PLITA

T21 THERAPON TARBUA

T22 SILLAGO SIHAMA

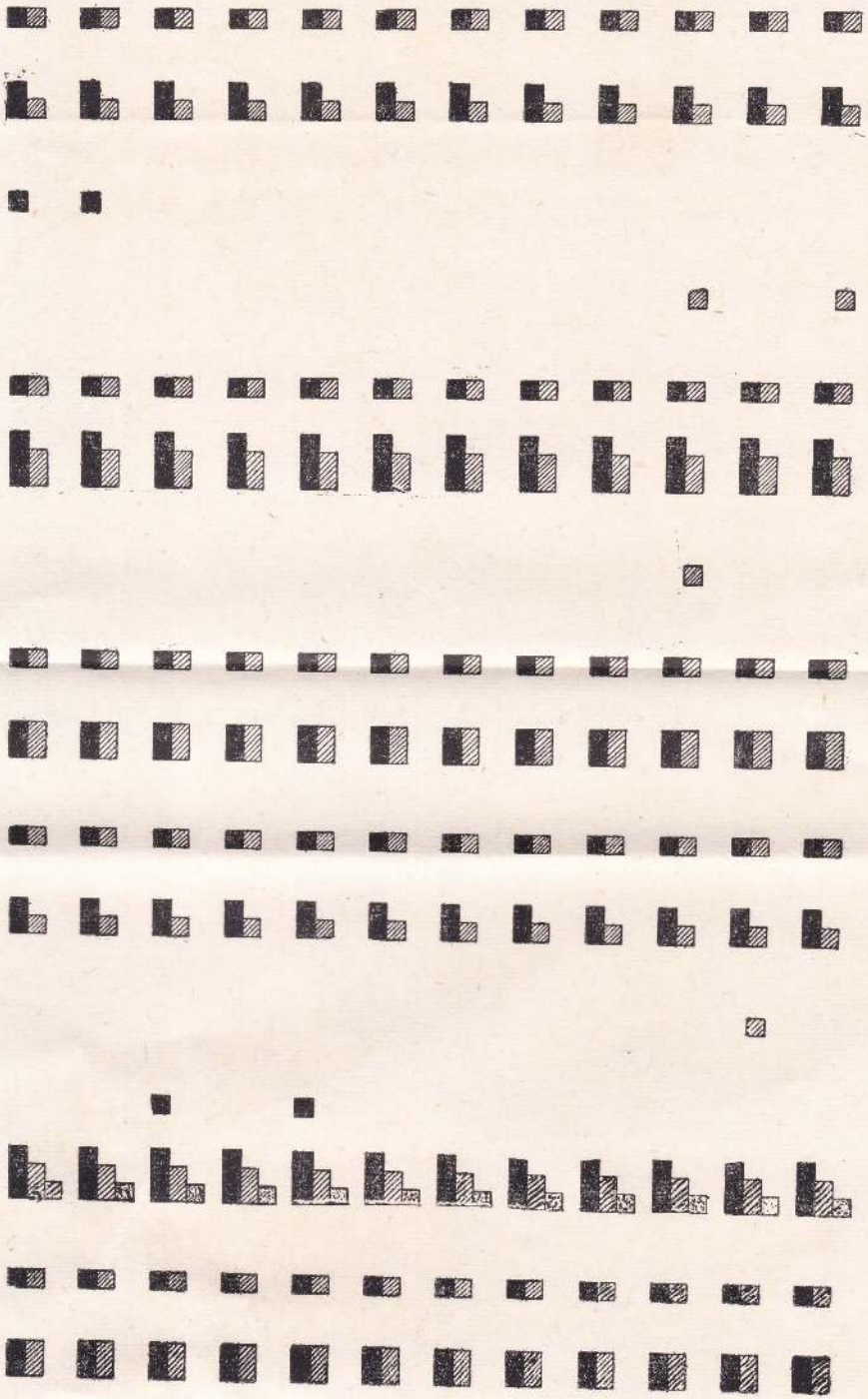
T23 LUTIANUS RUSSELLI

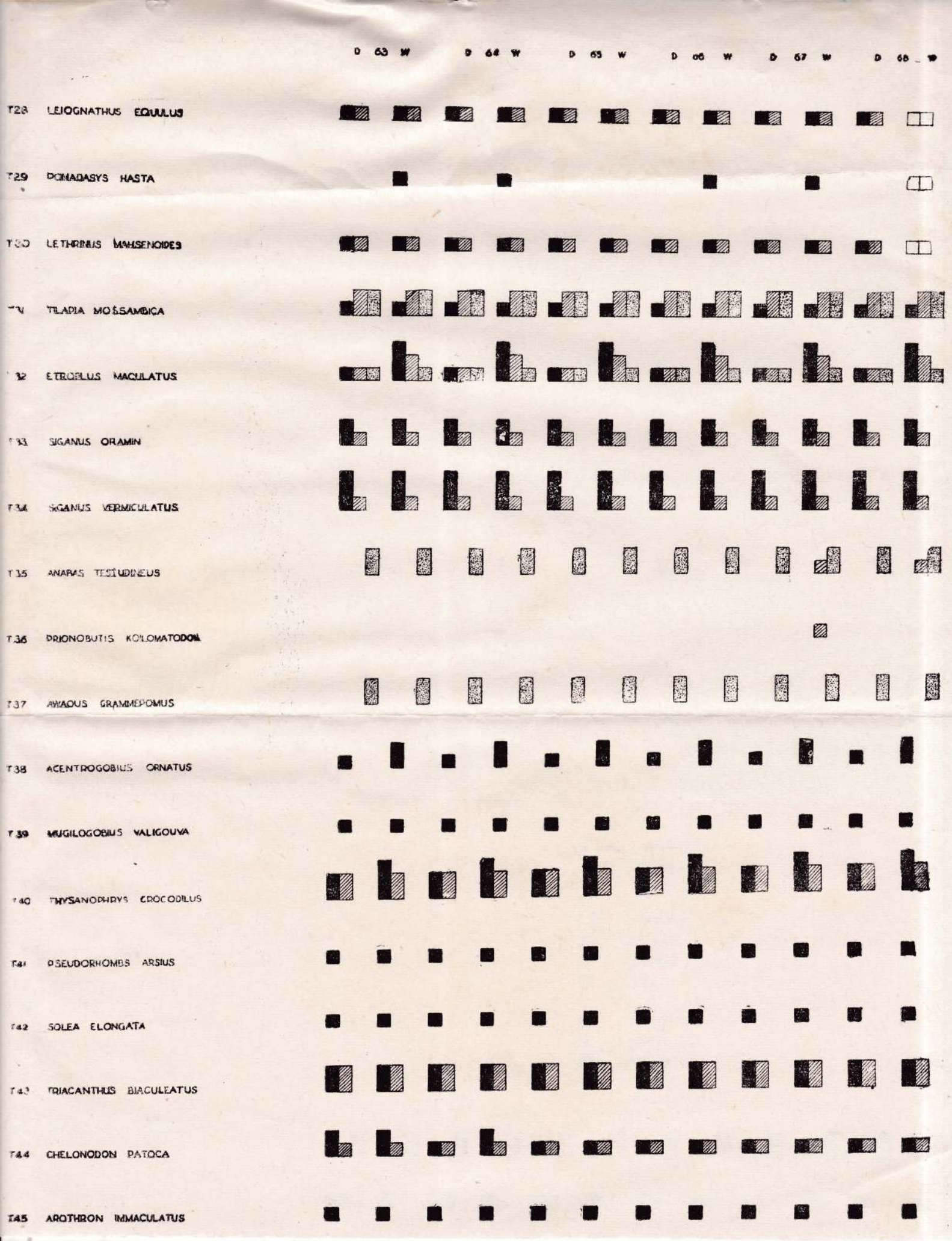
T24 LUTJANUS CHRYSOTANIA

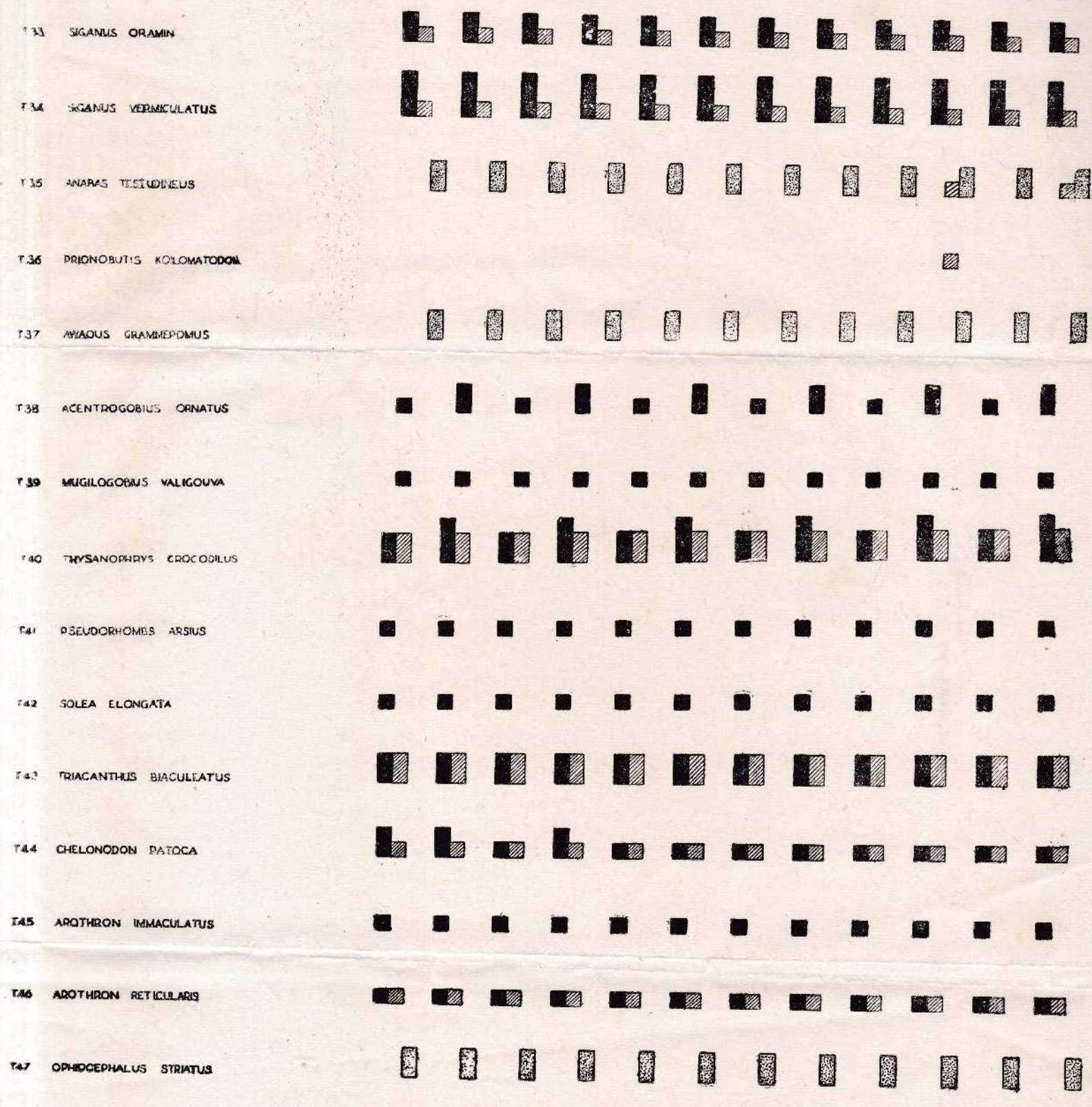
T25 GERREOMORPHA SETIFER

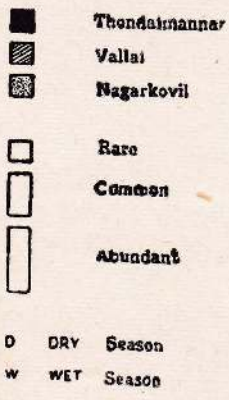
T26 PERTICA FILAMENTOSA

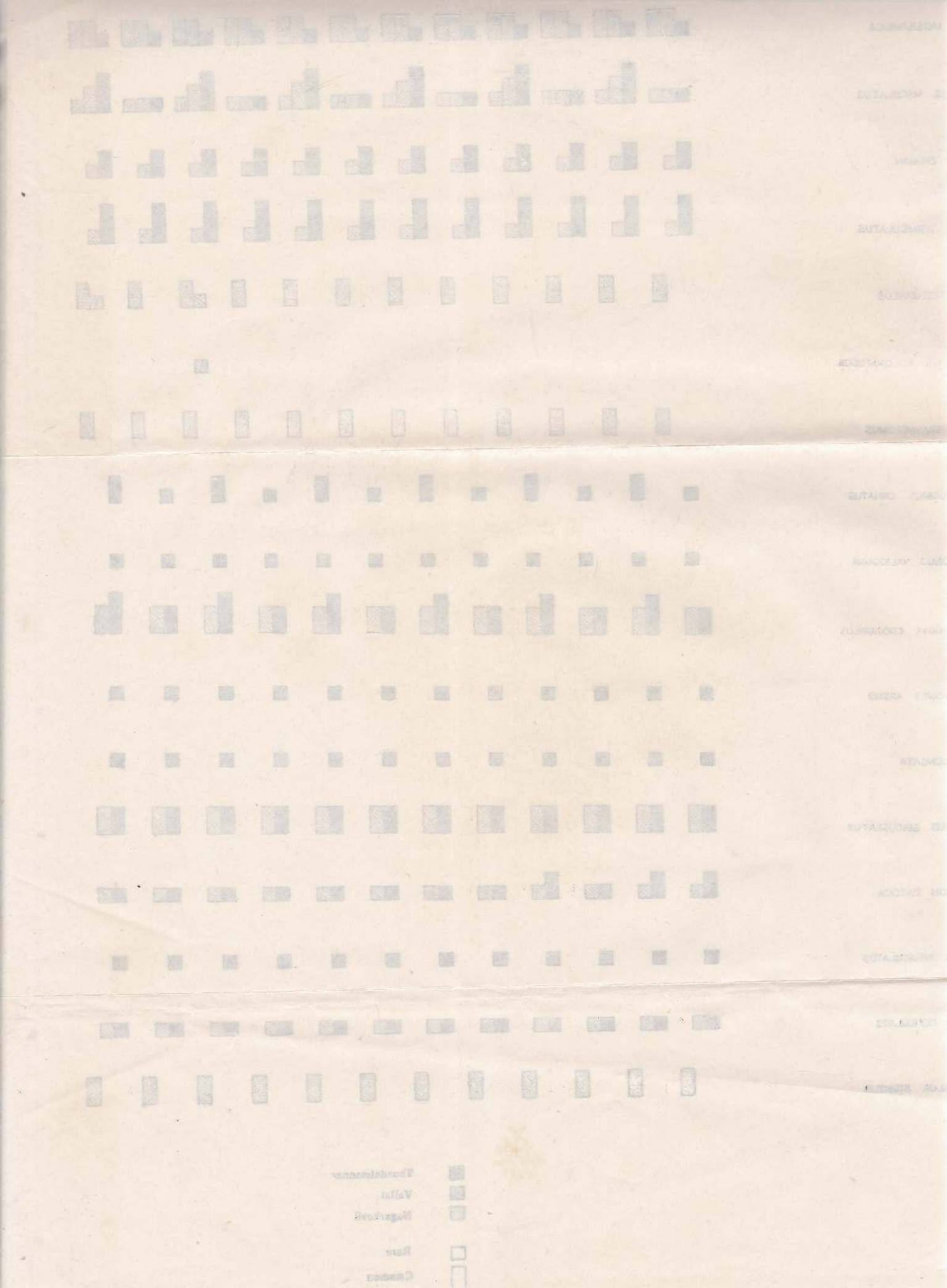
T27 OSTNATHUS FASCIATUS

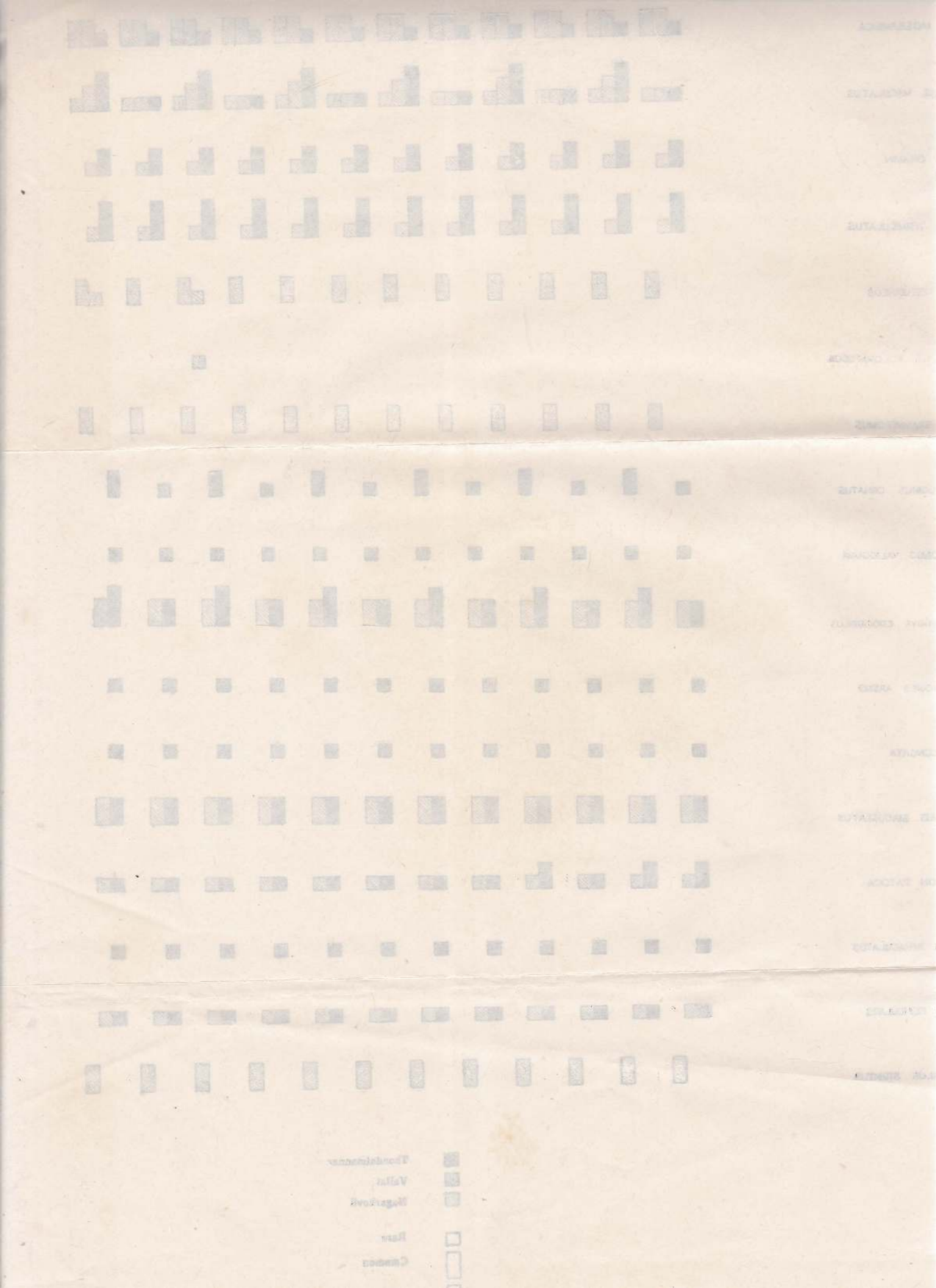



D 63 W
D 64 W
D 65 W
D 66 W
D 67 W
D 68
T28 LEIOGNATHUS EQUULUS
T29 DOMADASYS HASTA
T30 LETHRINUS MAHSENOIDES
T31 TILAPIA MOSSAMBICA
T32 ETROPLUS MACULATUS
T33 SIGANUS ORAMIN
T34 SIGANUS VERMICULATUS
T35 ANABAS TESTUDINEUS
T36 PRIONOBUTIS KOILOMATODON
T37 AWAOUS GRAMMEPOMUS
T38 ACENTROGOBIUS ORNATUS
T39 MUGILOGOBIUS VALIGOUVA
T40 THYSANOPHRYS CROCODILUS
T41 PSEUDORHOMBS ARSIUS
T42 SOLEA ELONGATA
T43 TRIACANTHUS BIACULEATUS
T44 CHELONODON PATOCA
T45 AROTHRON IMMACULATUS


T33 SIGANUS ORAMIN
T34 SIGANUS VERMICULATUS
T35 ANABAS TESTUDINEUS
T36 PRIONOBUTIS KOILOMATODON
T37 AMBLOUS GRAMMEPOMUS
T38 ACENTROGOBIUS ORNATUS
T39 MUGILOGOBIUS VALIGOUVA
T40 TRYSANOPHRYS CROCODILUS
T41 PSEUDORHOMBS ARSIUS
T42 SOLEA ELONGATA
T43 TRIACANTHUS BIACULEATUS
T44 CHELONODON PATOCA
T45 ARQTHRON IMMACULATUS
T46 ARQTHRON RETICULARIS
T47 OPHIOCEPHALUS STRIATUS


Thondaimannar
Vallai
Nagarkovil
Rare
Common
Abundant
D DRY Season
W WET Season





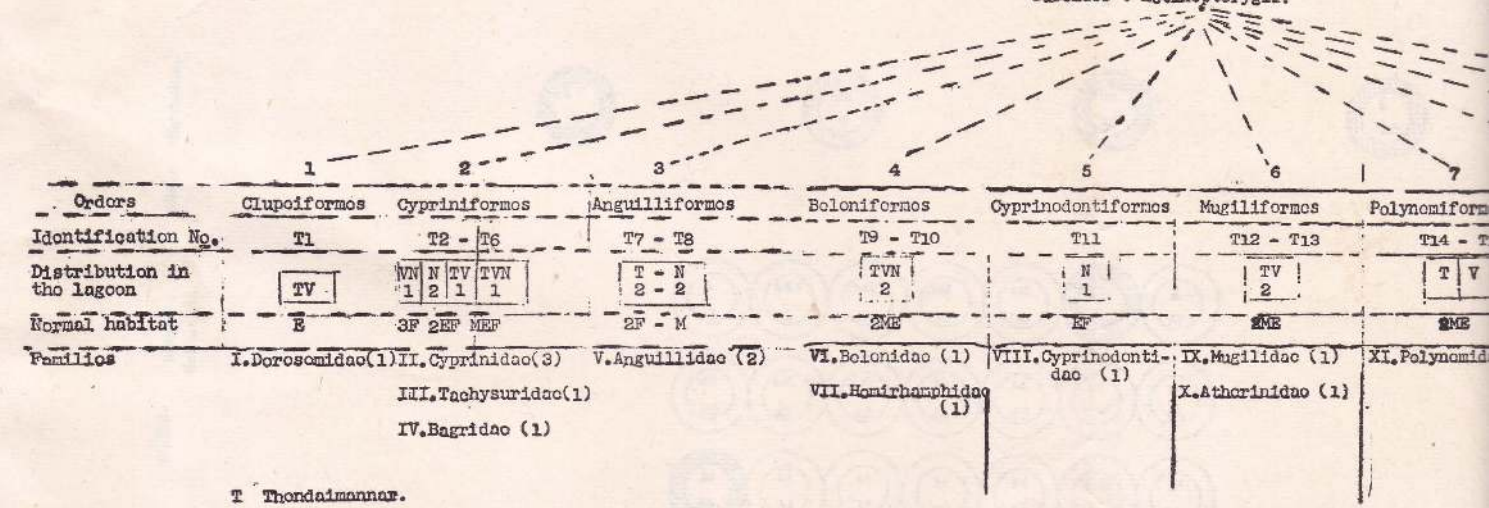
Appendix VI

Chart . II.

TAXONOMY OF THE FISHES OF THE THONDAIMANNAR LAGOON

Class : TELEOSTOMI

Subclass : Actinopterygii.



T Thondaimannar.

V Vellai.

N Nagarkovil.

F Fresh-water

E Estuarine.

M Marine.

The number in bracket against each family gives the number of fishes belonging to that family.

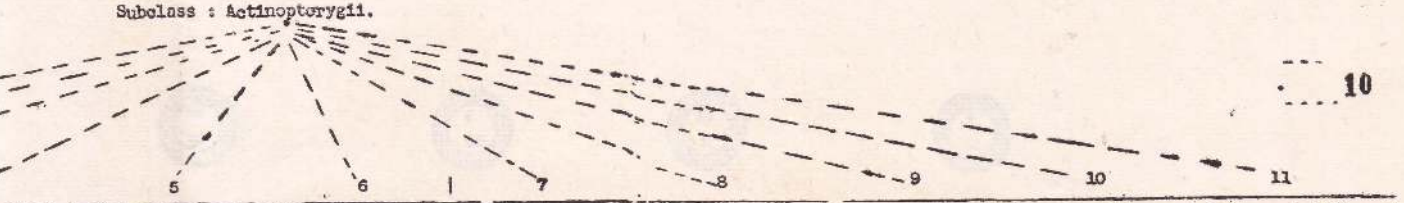
Appendix VI

Chart . II.

TAXONOMY OF THE FISHES OF THE THONDAMANAR LAGOON

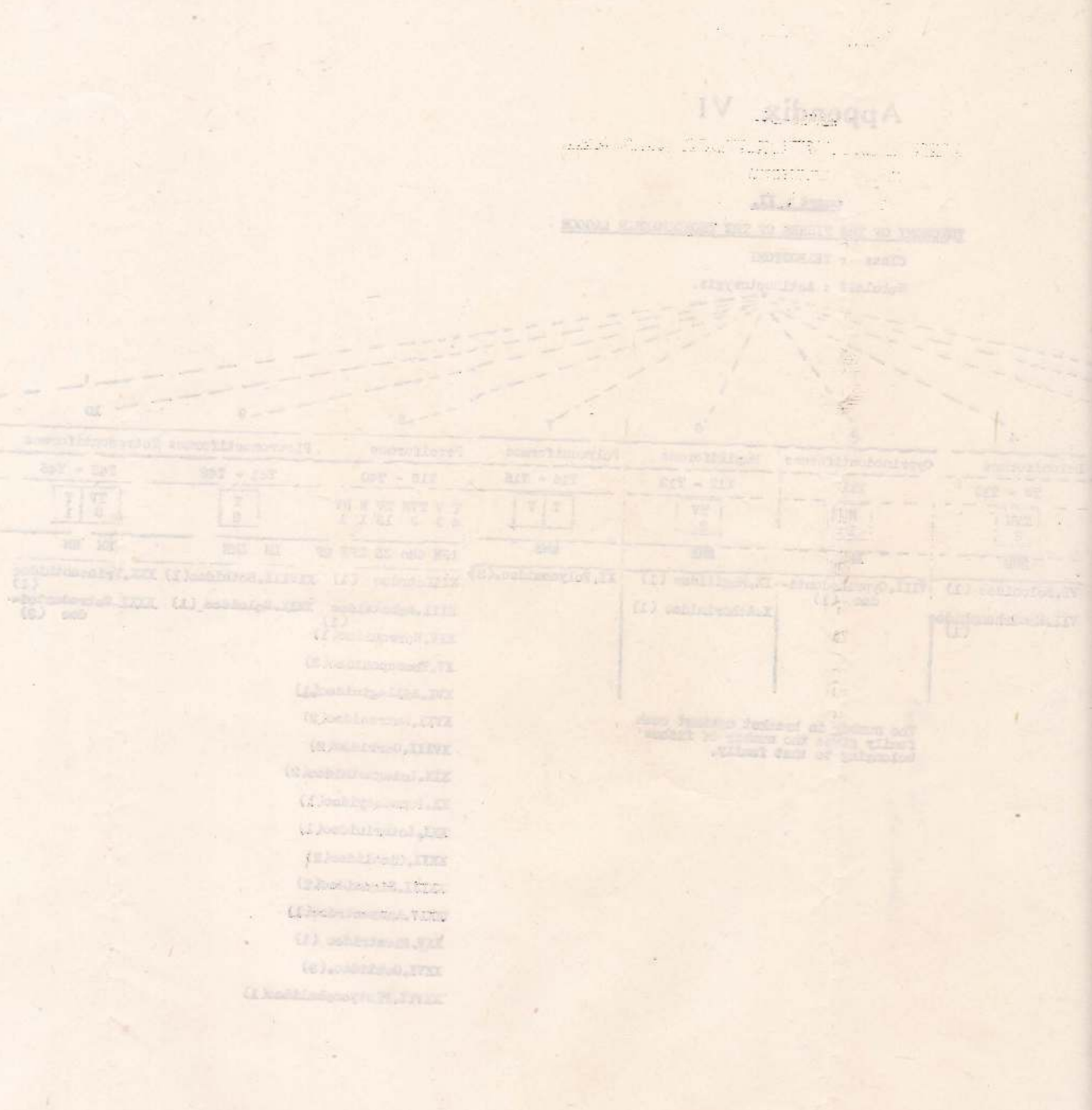
Class : TELEOSTOMI

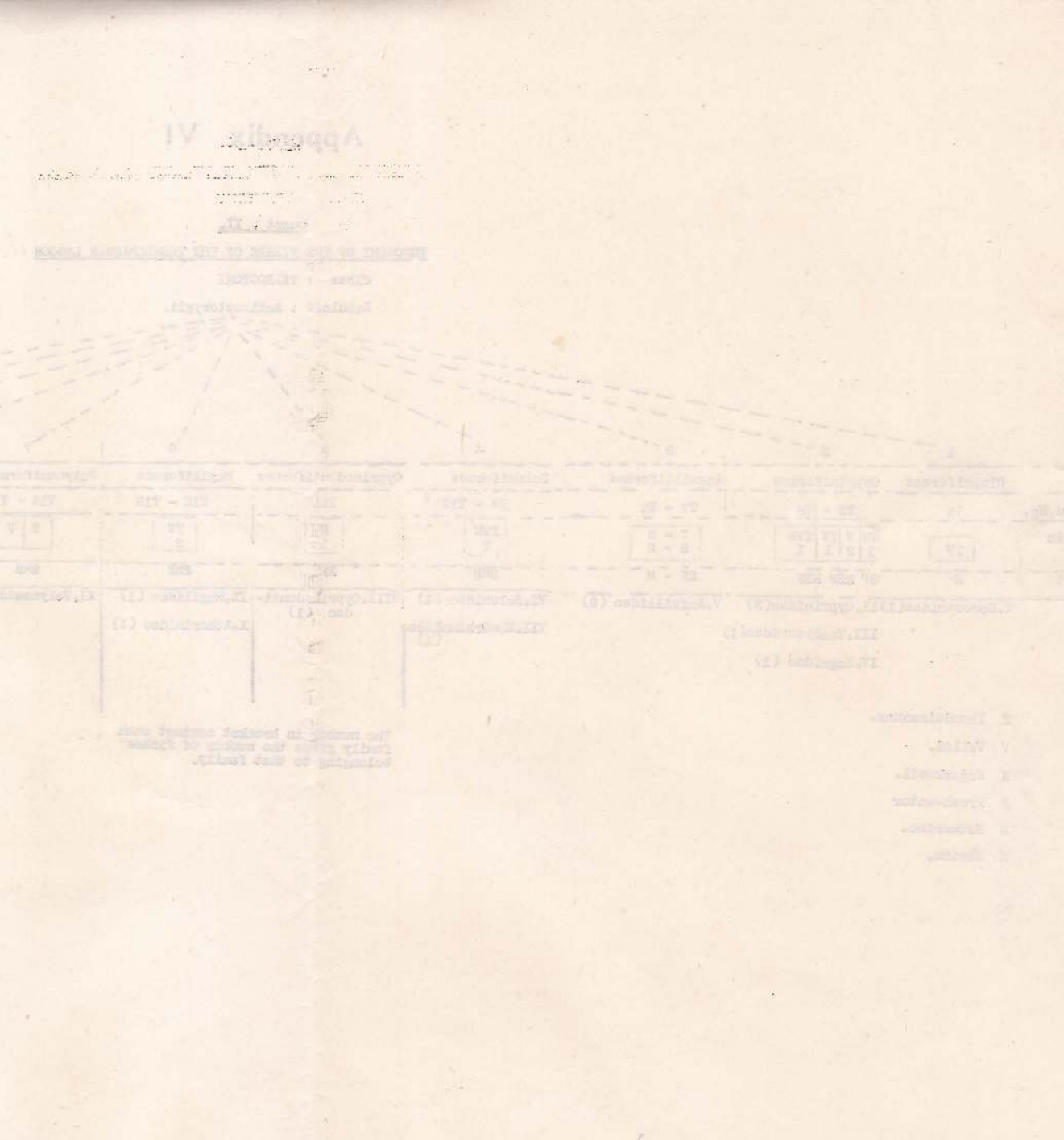
Subclass : Actinopterygii.



os	Cyprinodontiformes	Mugiliformes	Polynemiformes	Porciformes	Pleuronectiformes	Tetradontiformes	Ophiocephaliformes
T10	T11	T12 - T13	T14 - T15	T16 - T40	T41 - T42	T43 - T46	T47
	N 1	TV 2	T | V	T V TVN TV N NV 4 3 3 13 1 1	T 2	TV 3 | T 1	N 1
EF		2ME	2ME	13M 4Mo 3E 2FE 2F	IM IME	3M EM	IF
ae (1)	VIII. Cyprinodontidae (1)	IX. Mugilidae (1)	XI. Polynemidae. (2)	XII. Latrdae (1)	XXVIII. Bothidae (1)	XXX. Triacanthidae (1)	XXXII. Ophiocephalidae (1)
amphidae (1)		X. Atherinidae (1)		XIII. Ambassidae (1)	XXIX. Soleidae (1)	XXXI. Tetradontidae (3)	
				XIV. Serranidae (1)			
				XV. Theraponidae (3)			
				XVI. Sillaginidae (1)			
				XVII. Lutranidae (2)			
				XVIII. Gerridae (2)			
				XIX. Leiognathidae (2)			
				XX. Pomadasyidae (1)			
				XXI. Lethrinidae (1)			
				XXII. Cichlidae (2)			
				XXIII. Siganidae (2)			
				XXIV. Anabantidae (1)			
				XXV. Elostridae (1)			
				XXVI. Gobiidae. (3)			
				XXVII. Platycephalidae (1)			

The number in bracket against each family gives the number of fishes belonging to that family.

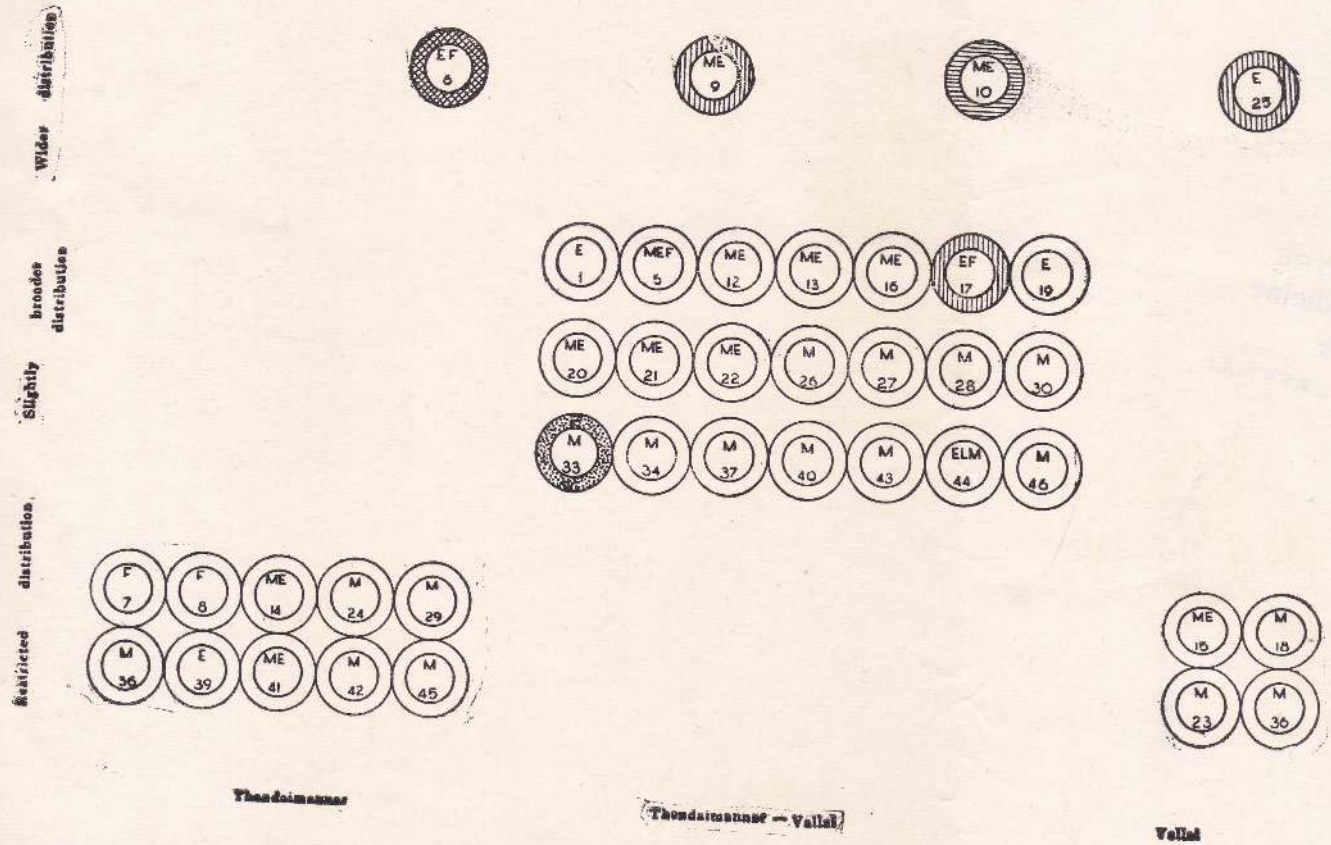




Appendix VII

CHART III

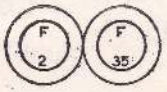
Pattern of Distribution

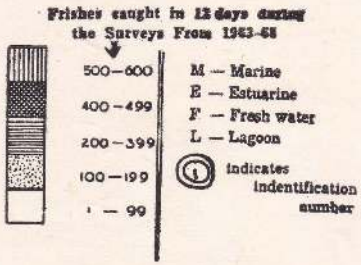


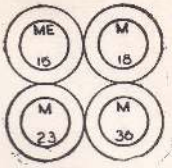
Appendix VII

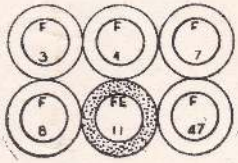
CHART III

Pattern of Distribution









lai)

Vellai

Vellai – Nagarkovil

Nagarkovil

Appendix VIII

Investigating the economic potential of the fishes found in the Thondaimannar Lagoon – 'Lake'

This problem was given to a group of students (four). The background of the problem was explained to the whole class of seven students of the G. C. E. A. L. Second Year. The following points relevant to this problem were explained to them.

1. On a survey made during the last five years the number of fishes collected from the Thondaimannar Lagoon is 47.

2. This is made up of fishes belonging to eleven orders comprising 32 families. (A complete list of fishes with their vernacular names was given to each student and thorough acquaintance was made of each one them. (see appendix i)

3. Some of these fishes are confined to different parts of the lagoon while others are found over a larger area of the lagoon and still few others prevalant all over the lagoon.

4. This lagoon stretches over a distance of nearly 21 miles and holds water during rainy season in an area of 30 sq. miles.

5. During rainy season the water recedes to about five sq. miles.

6. This lagoon could form a potential source of fish.

7. These fishes could be either from the endemic species present in the lagoon or we could introduce suitable fishes and convert it into a fish farm.

8. As a first step to this problem of making use of the fish from the lagoon one must study to what extent the present population of fishes are of economic importance.

Method: –

As to how one can set about collecting facts for this problem was discussed with the whole class and the methods evolved are given below.

1. It is imperative that the visit to the fish market should form one of the important methods of collecting information.

1.1. It was decided that the biggest market namely Pt. Pedro

market where fishes from all over come, should form the centre of investigation.

1.2. Thondaimannar market though small, being close to the lagoon was also selected. A third market namely Atchuvely was also selected but later dropped off.

1.3 It was decided to make a preliminary visit to the market and find out the time when the market is at its peak of activity.

1.4. Since in the collection of data a rough count was the only possibility in the case of fishes coming in large numbers. it was agreed that two students should collect data from each market to minimise personal error.

1.5 The data was collected every other day for a period of two weeks. On each data sheet two days data to be entered, signed, and posted immediately on the second day itself.

2. Collection of opinion from various consumers in the area, the fish salesmen and observation and discussion with the fishermen in their areas, were to form another aspect of the data.

2.1 This is also done on the same form planned for first one.

3. It was also agreed that the teacher will also make his independent observation in both these markets and collect the data regarding 1 & 2 (This was meant to make the students to be on their alert and at the same time to cross check the data. It also will make the students feel that the teacher is one with them.)

Execution:—

After the general discussion about the problem and the planning of the methods of collecting data about the problem, volunteers were called and four of them were selected. In selecting, consideration was given to the proximity of the market and a thorough grasp of the variety of fishes. The work was spaced during a school vacation. This was also the time when the lagoon was fairly full and the catch was at its highest. This fact was explained to the students; but they were told that in the collection of data they need not worry as to from where the fishes came for we are only interested in finding out whether the

particular variety is in demand. It is immaterial from where it comes.

Assembling the data

This aspect of the work was done by the four students with the guidance of the teacher.

1. They produced first the histogram of the frequency of the counts that they have taken in the two markets. They had to discard certain data for they were found to be incomplete. This gave them an idea of the frequency of appearance of these fishes in the common markets.

2. The opinions from consumers salesmen and fishermen were translated into a five point scale of impression. The following points were given to each fish after going through the remarks written by their colleagues and the teachers.

2. 1. The fish that is highly valued was given *five* points.

2. 2. The fish that was generally in demand but not so highly valued as a delicacy was given 4 points.

2. 3. The fish that was generally valued but bought because it was comparatively cheap was given 3 points.

2. 4. Fish normally not bought, but bought as a last resort when there are no other fishes in the market and the one that is normally thrown out by the fishermen when he has variety in his catch was given 2 points.

2. 5. Fishes always thrown by fishermen and not recorded as eaten by the population surveyed was given 1 point. Some of those variety of fishes may be of importance in some other section of population and hence 0 was avoided.

2. 6. This was drawn in the form of a polygon across the Histogram to give better picture of the value of fishes.

3, Question was raised whether the absence of some of the fishes in the market was due to non availability in the fishing centres or the poor value they fetch in the market. In the form of a partial answer to this question the data of the catch of each of the fishes collected during 24 hrs., during the survey

carried in the last five years was made available (8 such data was provided for each fish) this was also plotted in the form of a polygon acros the histogram.

Discussion:—

1. Of the 47 fishes 25 fishes had appeared in the market. The rest did not appear at all.

2. These 26 fishes may have been the most popular fishes provid ed all the other fishes were also caught.

3. That is, the other possibility is that the fishes that were not represented in the market may have been not caught during the period of investigation.

4. Another possibility was that the fishes were less popular and were discarded by fishermen.

5. Or not brought to the market in the presence of more popular variety like the 26 fishes.

6. The second line of investigation involving opinions were plotted in the form of graph. (See appendix 2 in dotted lines). This showed that of the 21 fishes that had never been reported in the market, only 7 come under fishes which are categorised as those that are bought because they are cheap and found in abundance and normally not bought in the absence of the other fishes. Further 14 of the 21 fishes are normally not bought even by the second method of investigation the difference between these two numbers is not significant and hence it fairly safe to rely on the information collected by these two methods. Therefore the line of argument postulated in five is is not valued. The fourth may be true because these fishes are being caught at least in the lagoon.

In the second method of investigation 14 fishes were economically unimportant. Therefore the mean value $\frac{(21+14)}{2} = 18.$ $\frac{18}{47} = 0{\cdot}4$

7. If we take the seeond possibility given in para 2, we will find that possibility came because we were counting the number of fishes in the market and making that as the indication of the

popularity. In the second line of investigation numbers were not taken into account and the opinion of various people were based not on the availability of those fishes in the market during the period of investigation but experience over many years.

As shown in para 4, there was no significant difference in the result of these two investigations; further, data on the relative abundance of these fishes in the lagoon (continuous line polygon) showed that they were being caught in the lagoon over a period of five years, at various times, including this period of investigation,

Thus it is highly improbable that the fishes that had not appeared in the market were due to the fact that they were not caught.

Conclusion: –

In our investigations of the economic potential of the fishes of the lagoon, we definitely followed two lines of investigations. (1) Basing on the frequency of the appearance in the common market and the other.

(2) On the opinions collected from their consumers, sellers and producers.

We have seen that one substantiates the other within the degree of freedom statistically allowed in such type of data. We have also made one of the relative abundance of the fishes of the lagoon taken from a stratified random sample to support the assumptions, that emerged from our earlier investigations. This has a limited value because, the fishes from the lagoon does not form the major supply to the market.

The facts thus reveal that we can to a greater extent postulate that fishes coming to the market have a relevance to their economic potential and hence we may be on safer grounds to put forward the fact that about 40% of the fishes of the lagoon are not of economic importance (see table 2.). This does not mean that some of these fishes may not be popular in the interior parts of the Island where fresh marine fishes are rare.

This takes us to the problem of the possibility of exploitation of the fishes of the lagoon as a source of fishes for the popu-

lation. Only two of the popular variety (that is those that are above the average in their frequency of appearance) of fishes are found among the nine varieties that are abundant in the lagoon. (These are the forms above the average in our frequency counts).

In thinking of introducing fishes one may have to look into problems among others.

(1) The elimination of undesirable varieties.
(2) The cause of the increase in population of such varieties.
(3) The food habits of the introduced varieties.
(4) The type of habitats available in the lagoon.

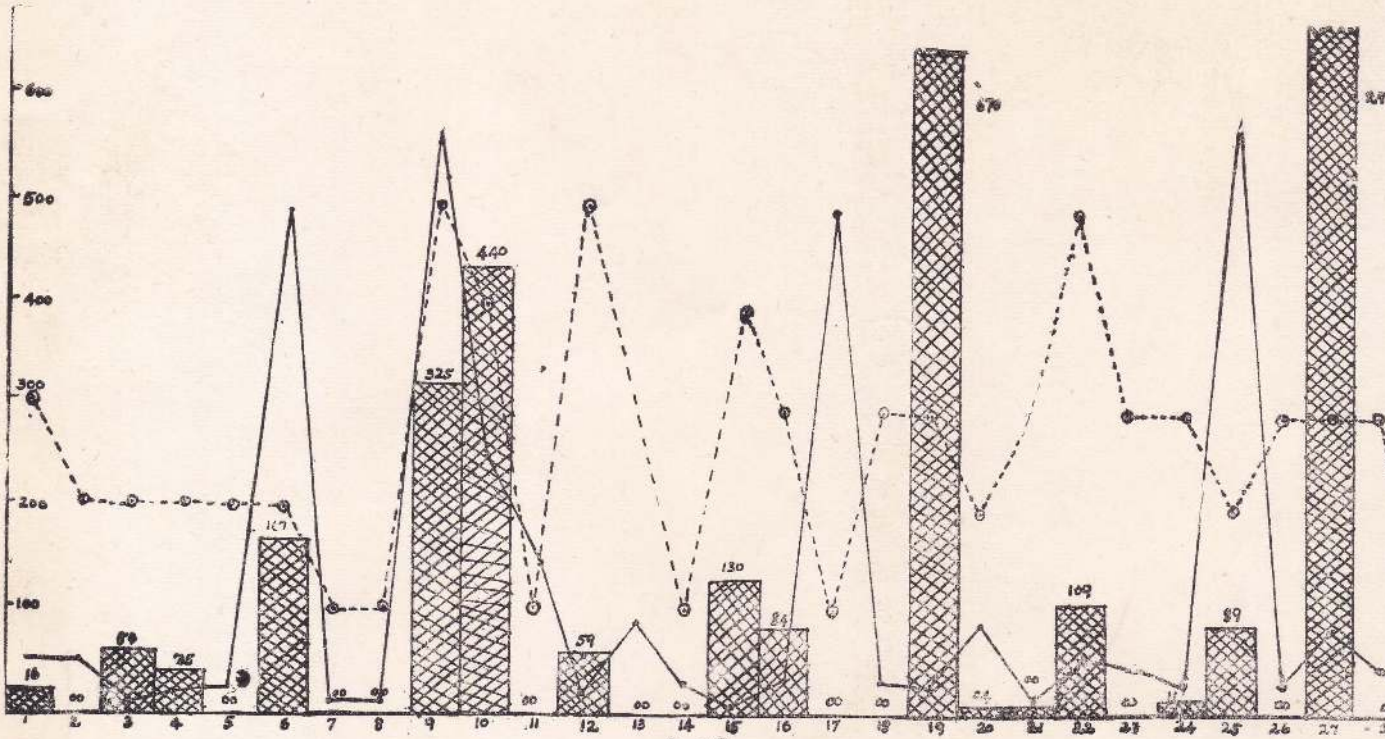
Appendix VIII (1)

HYDRO–BIOLOGICAL–SURVEY, RESEARCH COUNCIL

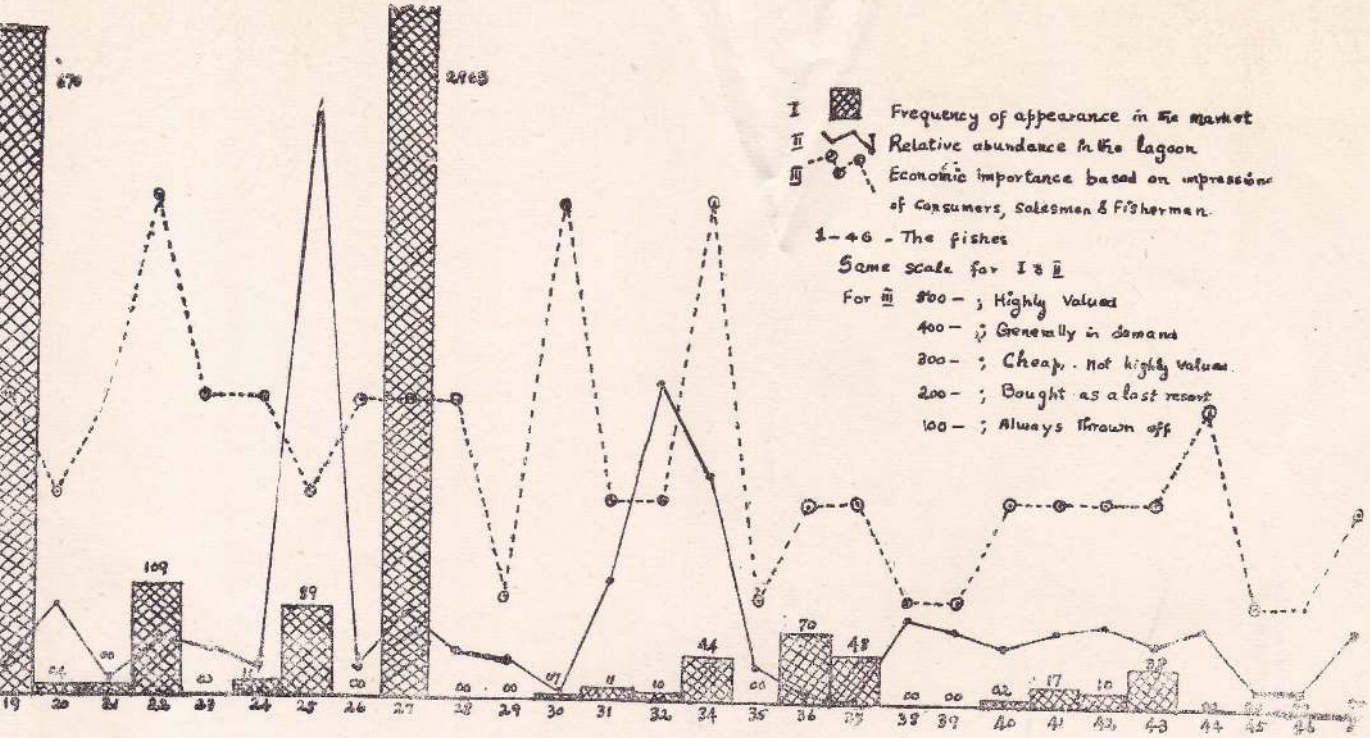
Identification No.	NAME OF THE FISHES திகதி	எண்ணிக்கை	எண்ணிக்கை	மதிப்பீடு செய்பவரின் குறிப்புகள்	For office use only	
T 1	NEMATOLOSA NASUS கொய் மீன்					
T 2	RASBORA DANDICONIUS					
T 3	PUNTIUS FILAMENTOUS					
T 4	PUNTIUS SARANA					
T 5	TACHYSURUS CAELATUS					
T 6	MACRONES GULIO சுங்கன்					
T 7	ANGUILLA BICOLOR BICOLOR விலாங்கு					
T 8	ANGUILLA NEBULOS NEBULOSA புள்ளி விலாங்கு					
T 9	TYLOSURUS STRONGILURUS பாப்பு முரல்					
T 10	HYPORHAMPHUS GAIMARDI முரல்					
T 11	PANCHAX PANCHAX BLOCHII					

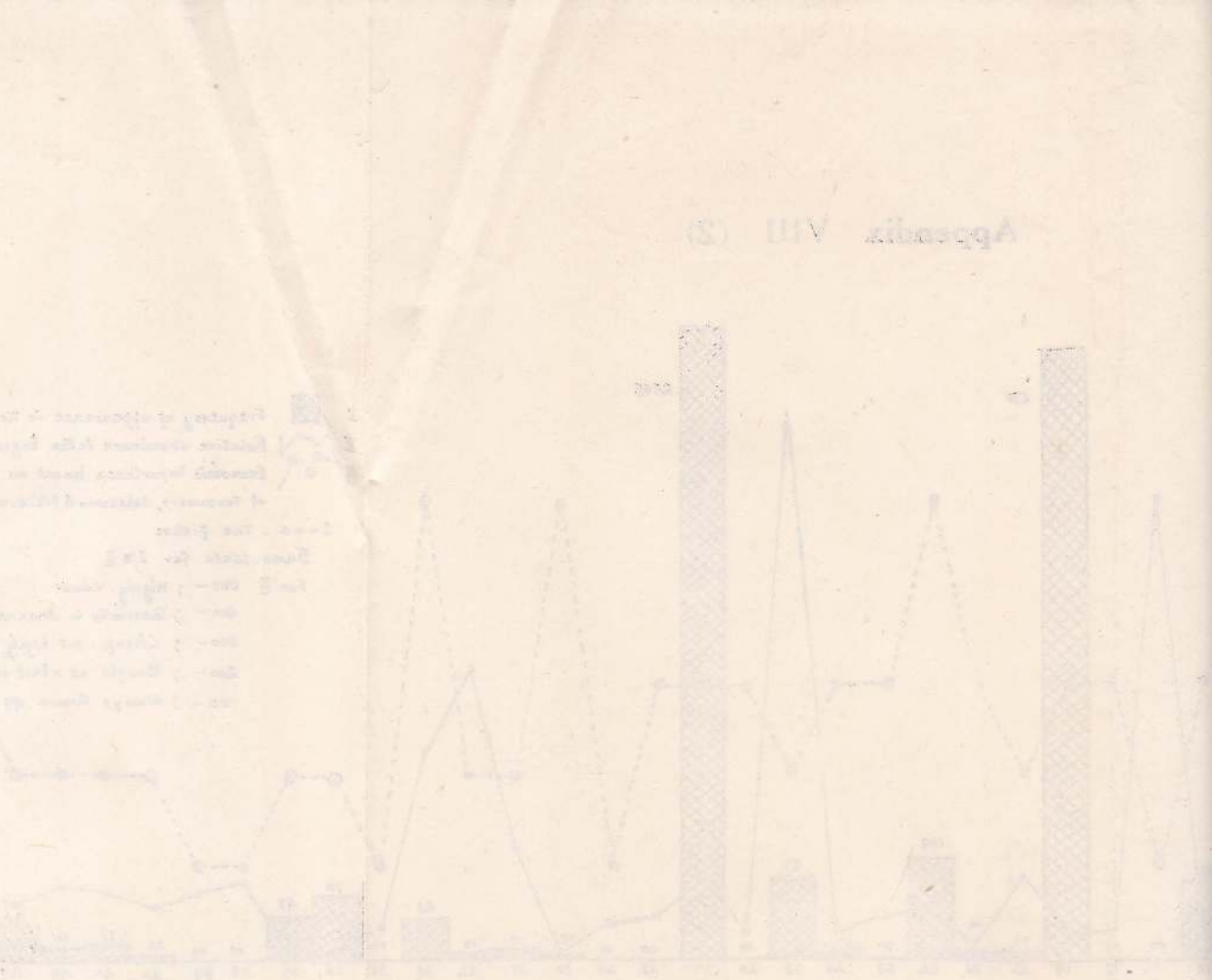
மதிப்பீடு செய்பவரின் கையொப்பம்:

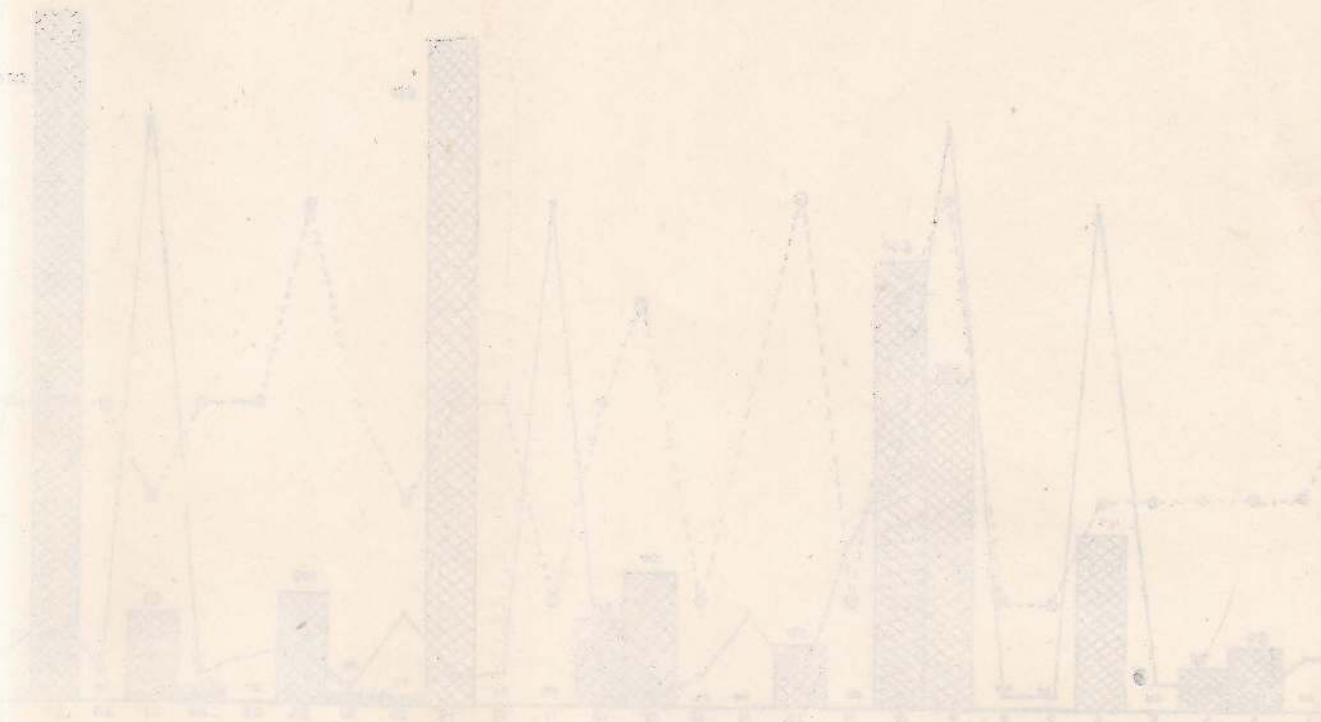
Appendix VIII (2)



Appendix VIII (2)



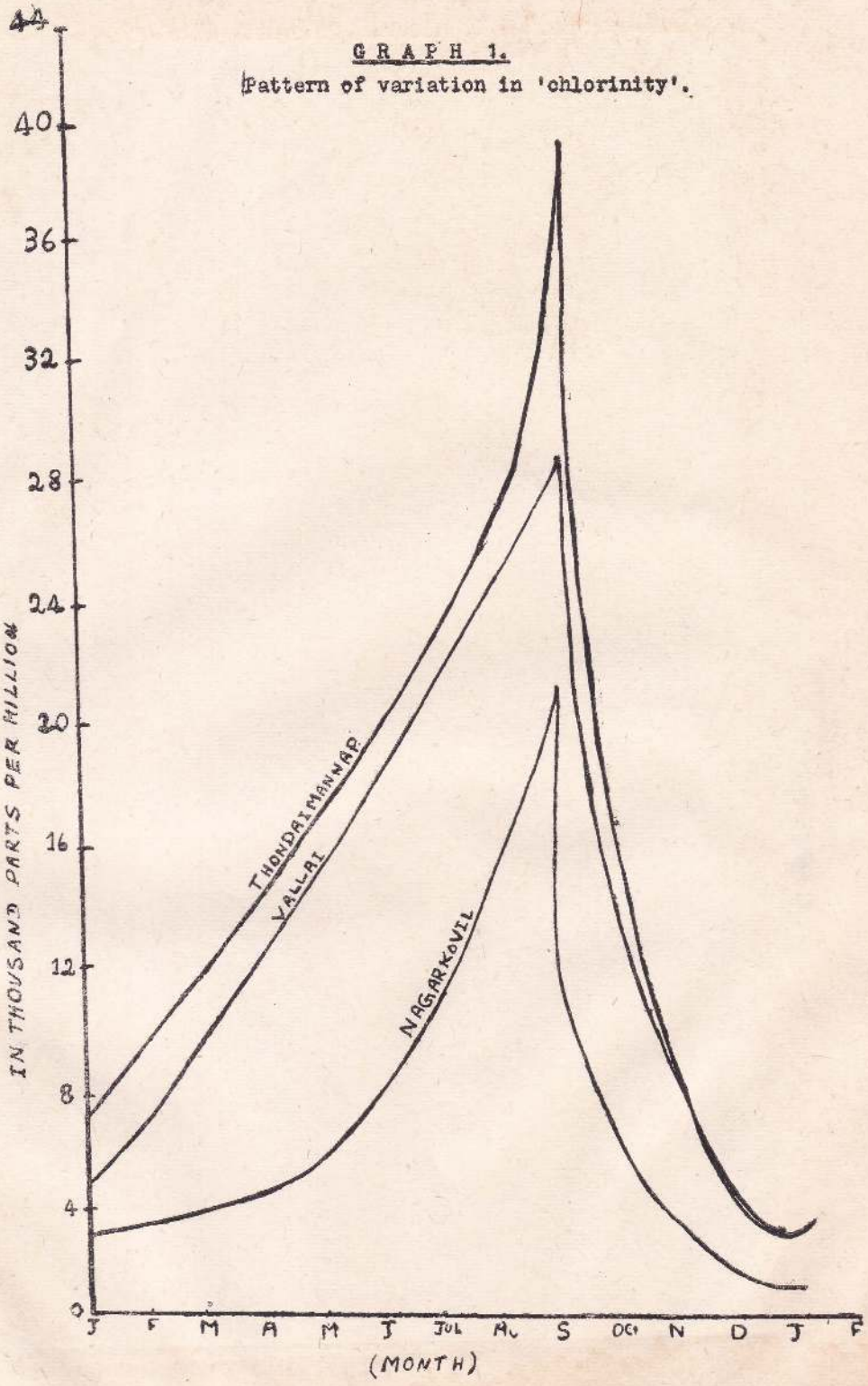




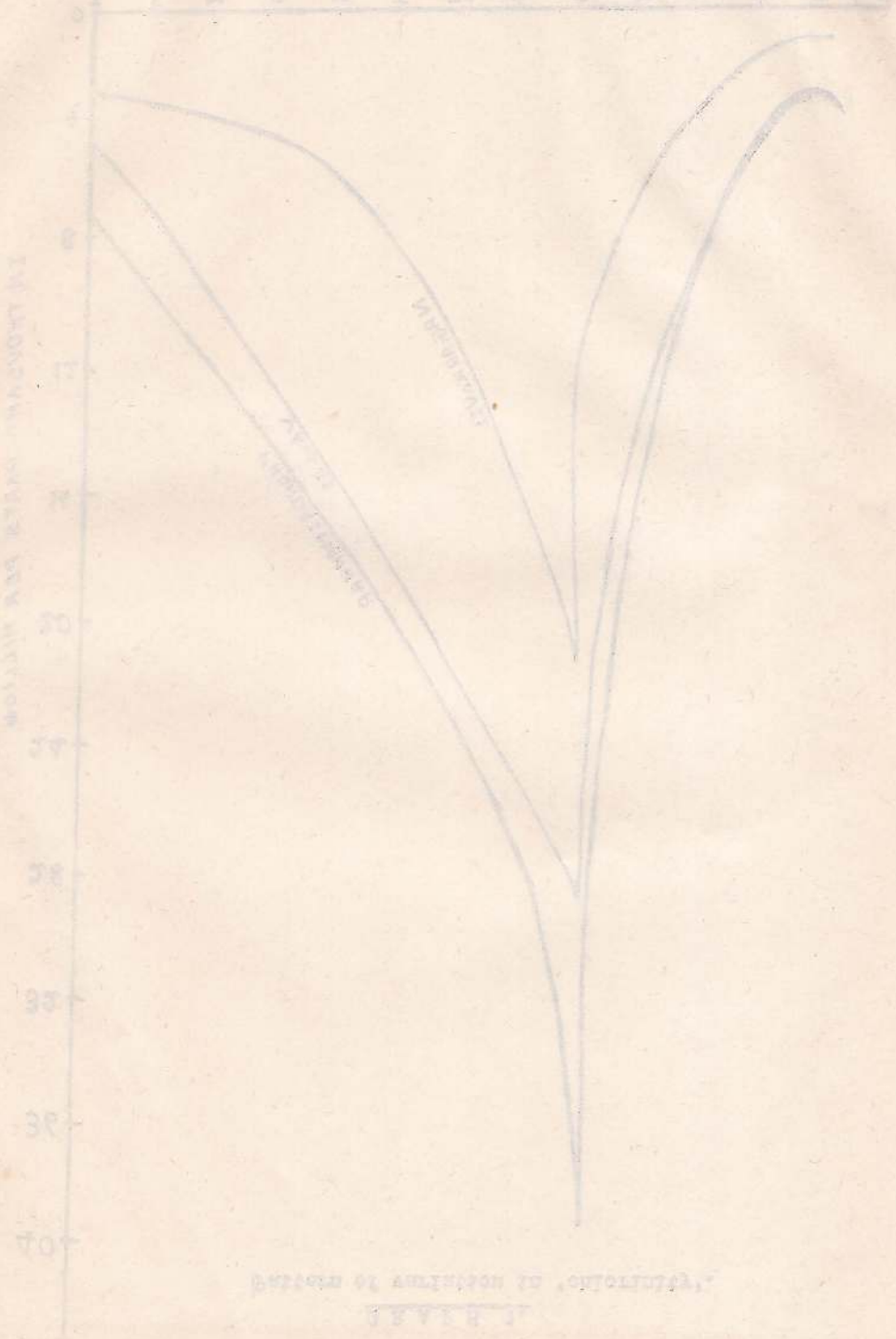
Appendix IX

GRAPH 1.

Pattern of variation in 'chlorinity'.

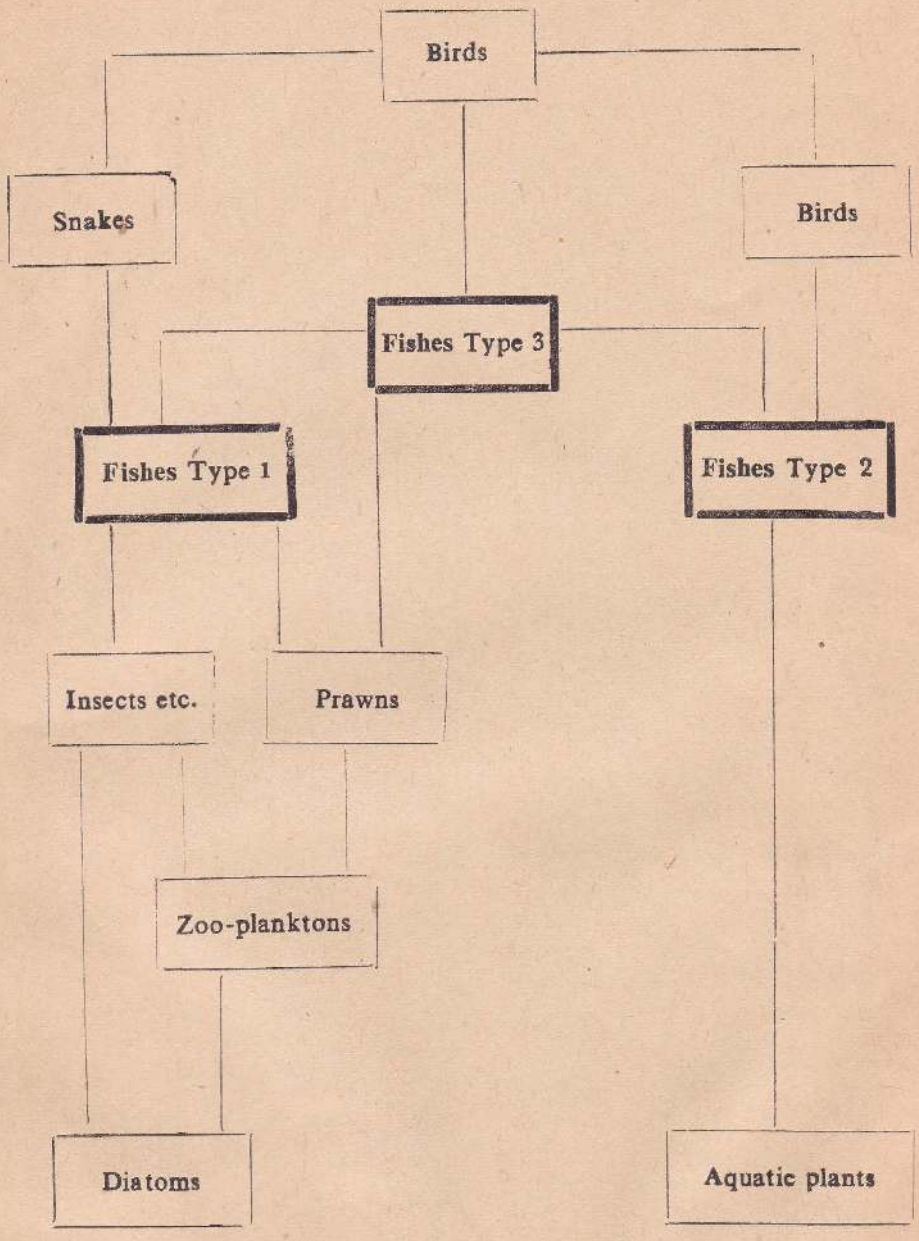


(1962 & 1968)



Appendix X

Probable food--web in relation to the Fish population in the lagoon.



Note :

Type 1 Fishes are those that feed mainly on prawns and other small organisms.

Type 2 Fishes are those that feed mainly on aquatic plants.

Type 3 Fishes are those that feed mainly on other fishes.

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INDEX OF FISHES

The number after T indicates the identification number. the other number refers to the page.

Participating Schools

1. American Mission College, Uduppiddy.
2. Chithambara College, Valvettithurai.
3. Gnanasaria College, Karaveddy.
4. Hartley College, Point-Pedro.
5. Holy Family Convent, Jaffna.
6. Mahajana College, Tellipallai.
7. Methodist Girls' High School, Point-Pedro.
8. Nelliady M. M. V., Karaveddy.
9. Puloly Boys' English School, Point-Pedro.
10. Thondaimannar M. V., Thondaimannar.
11. Uduppiddy Girls' High School, Uduppiddy.
12. Urumpirai Hindu College, Uduppiddy.
13. Vada-Hindu Girls' College, Point-Pedro.
14. Vaideswara Vidyalayam, Jaffna.
15. Vathiry Sacred Heart College, Karaveddy.
16. Vigneshwara College, Karaveddy.

BULLETINES OF THE

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(THONDAIMANNAR LAGOON)

OF THE NORTHERN PROVINCE

SCIENCE TEACHERS' ASSOCIATION

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OF THE RESEARCH COUNCIL

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