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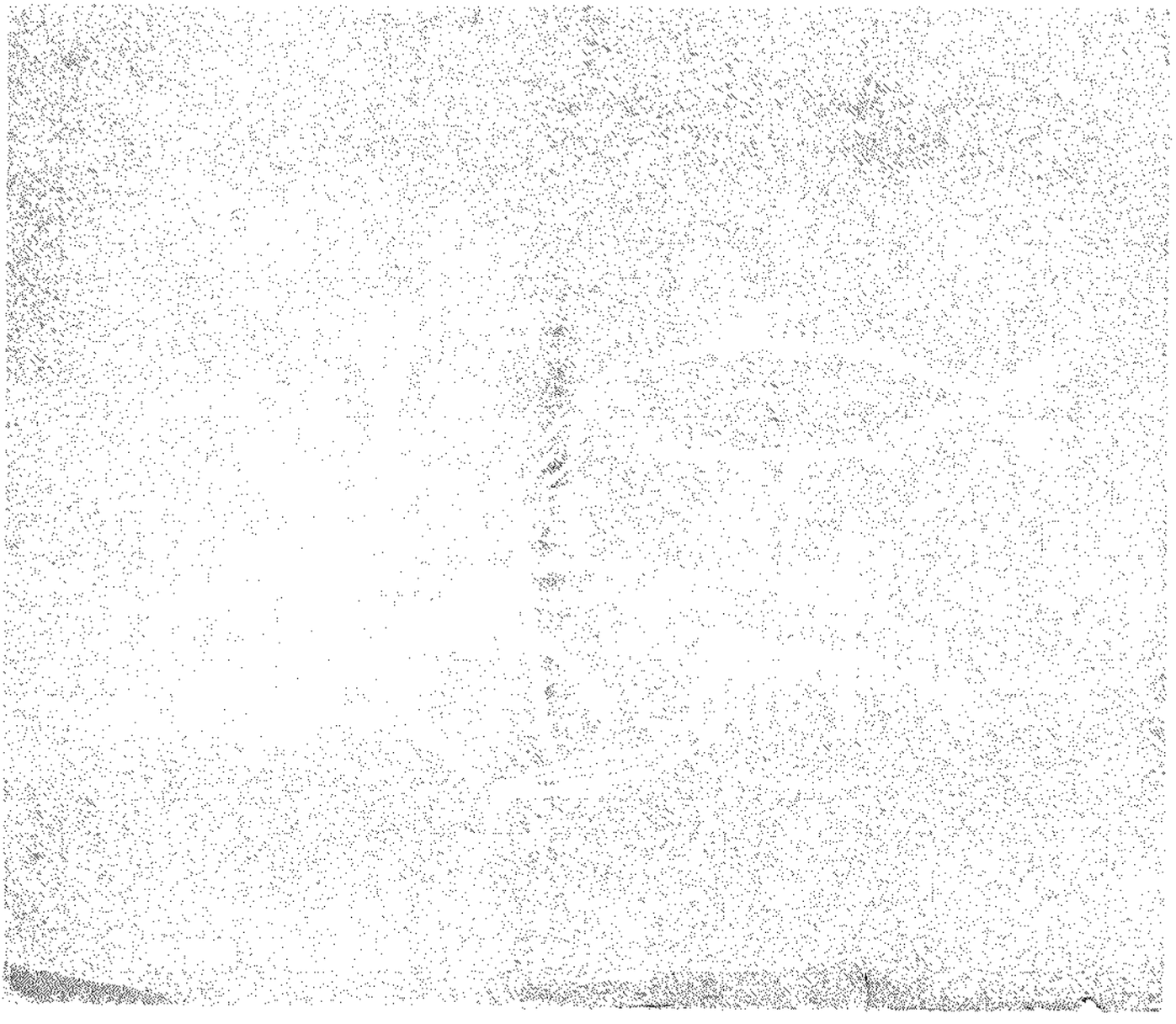

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SPECIAL PUBLICATION
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
COCHIN-11
1973

THE *BECHE-DE-MER* RESOURCES OF INDIA

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ABSTRACT

Beche-de-mer or the cured holothurian is considered a delicacy in some of the South-East Asian countries. The entire quantity of about 30,000 kg produced annually at present in the country is exported since it is not consumed locally.

Holothuria scabra is the species almost exclusively used in this country for this purpose. It is comparatively large growing to about 300 mm in length and weighing over half a kilogram in fresh condition. The holothurians are collected by divers in 2 to 6 fathoms depth of waters from February to September, the peak season being in June to August. They are also brought in appreciable numbers in trawls.

Along the Indian coasts holothurians occur in large numbers in the Gulf of Kutch and along the south-east coast. The holothurians are more abundant in the Palk Bay than in the Gulf of Mannar. In the Laccadive Islands and the Andaman group of Islands which have coral reefs and lagoons the large sized species of holothurians like *Thelenota ananas*, *Holothuria marmorata* and *Actinopyga mauritiana* are well suited for this purpose. With proper exploitation of the totally unexploited grounds, the annual production of *beche-de-mer* can be increased substantially.

Beche-de-mer is the commercial name given to the cured holothurians which is considered a delicacy in some of the South-East Asian countries. It is prepared from the body walls of certain species of large holothurians belonging to the families Holothuriidae and Stichopodidae. This product is of some economic importance in India; it is completely exported and not consumed locally. There is a good scope to develop this industry because of the vast variety of holothurians which occur in large numbers in the seas around India. There are about twenty species of shallow water holothurians suitable for making *beche-de-mer*. In the Indian region the south-east coast of India, the Laccadives and the Andaman group of Islands are very rich in holothurian fauna. The Andaman group of Islands and the Laccadives are particularly very important from the exploitation point of view since these have not so far been tapped and also because of the occurrence of large species of holothurians which go into the preparation of high quality of *beche-de-mer*.

The *beche-de-mer* industry is an age old one and has been introduced by the Chinese into India. It is also prepared in other countries like Japan, Australia, Palau, Caroline and Mariana Islands, New Guinea, New Calendoia, Samoa, Tahiti, Hawaii, Indo-China, Somalia, Kenya, Zanzibar, Madagascar and Mauritius. Panning (1944) has reviewed the industry on a world basis. Clark (1921) has given an account of the *beche-de-mer* industry from the Torres Strait. A detailed account of this industry and its revival in India is given by Hornell (1917). Krishnamurthi (1957) and Chari (1964) have made some remarks on the industry in India.

The Indian industry is restricted to the south-east coast and 65,743 kg of *beche-de-mer* was exported in the period 1898 to 1910 giving an average of 5,479 kg per annum. After 1910 the annual Indian export has diminished considerably but in the recent years from 1965 over 20,000 kg of *beche-de-mer* was exported annually (Tables I and II).

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Thelenota ananas (Prickly-red fish) (Fig. 1, K, Pl. I, A), *Actinopyga mauritiana* (Red fish) (Fig. 1, A, Pl. I, B), *Microthele nobilis* (Mammy fish) (Fig. 1, L, Pl. I, D), *Holothuria marmorata* (Sand fish) (Fig. 1, C, Pl. I, C), *H. argus* (Tiger fish), *H. scabra* (Sand fish) (Fig. 1, J., Pl. I, E), *H. spinifera* (Pl. I, F), *H. mobei* (Fig. 1, E), *H. edulis, H. arenicola, H. impatiens, H. leucospilota* (Fig.. 1, F), *H. atra* (Lolly fish) (Fig. 1, D), *Stichopus chloronotus* (Fig. 1, I) and *Stichopus variegatus* (Fig. 1, H) are some of the common holothurians used for *beche-de-mer* in different parts of the world. All the above species occur in good numbers in the seas around India which indicates the richness of the holothurian fauna in the region. Of these at present only *Holothuria scabra* and *H. spinifera* are the two species used for *beche-de-mer* at a few places along the south-east coast of India.

TABLE I

Export of beche-de-mer from Madras Presidency, 1898–1916

Year	Weight of *beche-de-mer* (Kg)	Value of *beche-de-mer*
1898–1899	25,601	15,380·00
1899–1900	1,260	1,140·00
1900–1901	..	..
1901–1902	..	..
1902–1903	..	..
1903–1904	..	..
1904–1905	14.528	15,203·00
1905–1906	30,845	24,300·00
1906·1907	3,125	3,100·00
1907–1908	9,992	8,460·00
1908–1909	12,758	7,020·00
1909–1910	8,609	5,039·00
1910–1911	1,222	655·00
1911–1912	2,820	800·00
1912–1913	504	596·00
1913–1914	1,360	600·00
1914–1915	..	..
1915–1916	2,167	1,426·00
TOTAL	1,14,793	83,719·00

Source: *Madras Fisheries Bulletin*, 4 (1917).

Species like *Thelenota ananas, Actinopyga mauritiana, A. echinites, Microthele nobilis, Holothuria marmorata, H. argus* and *H. scabra* are preferred for preparing *beche-de-mer* because of their large size and thick body walls. *Holothuria impatiens* and *H. arenicola* which have lot of chalky deposits in the body walls are not well suited for this purpose because of the difficulty in making the product free from the chalky deposits.

TABLE II

Export of beche-de-mer from India, 1963–69

Year	Weight of *beche-de-mer* (Kg.)	Value of *beche-de-mer*
1963	3,049	7,529·00
1964	1,275	2,550·00
1965	24,974	21,125·00
1966	21,886	39,631·00
1967	38,422	43,672·00
1968	64,535	10,3,820·00
1969	69,051	5,77,898.00
TOTAL	2,23,191	7,96,225·00

Source: *Indian Seafoods*, 2 (1964); 3 (1965); 5 (1967); 6 (1969).

Calm shallow waters with sandy or slightly muddy bottoms and coral reefs with lagoons are the most suitable habitats for the holothurians. They are sluggish creatures with restricted movements and hence sheltered waters and calm bays are the best places for their living. However there are a few species on rocky shores where there is heavy wave action but as a rule holothurians avoid such conditions.

The Andaman group of Islands ranks first for its richness of holothurians in the Indian region. Next in importance is the Laccadive Archipelago where the large sized holothurian, *Thelenota ananas* which is most sought after by the curers, occurs. Along the south-east coast of India, the Madras State ranks first for the rich holothurian fauna. In other states the holothurian fauna is poor with the exception of Kerala on the south-west coast. In the Gujarat state *Holothuria atra* is the only species that can be commercially used and it is found in the Gulf of Kutch and the surrounding Islands. In Maharashtra State none of the species seem to be commercially important. In the Mysore State *Holothuria atra* and *H. leucospilota* are the two species of commercial importance. In Kerala State at places like Vizhingam and Kovalam *Holothuria moebi* and *H. cinerascens* are found in large numbers anchored to rocks and live in the supralittoral zone. The commercial value of *Holothuria cinerascens* remains to be studied and finally this may prove to be a potential source for *beche-de-mer*. This species grows to a large size of 300 mm and has fairly thick body wall which is well suited for this purpose. The collection of this species is also not difficult since they are anchored to the rock and lie almost exposed during the low tide. In general the bottom along the Kerala coast is muddy and this accounts for the rarity of holothurians in the area. *Holothuria scabra, H. atra, H. spinifera* and *Stichopus variegatus* are found in good numbers in Madras State along the Palk Bay and Gulf of Mannar. Commercially important species are rare along the Andhra and Orissa coasts due to muddy bottoms. The occurrence of holothurians in West Bengal near Calcutta and other places is highly restricted due to the estuarine conditions.

Along the south-east coast of India the *beche-de-mer* industry extends from Rameswaram (Ramnad District) to Kollukadu (Tanjore District) along the Palk Bay and at a few places along the Gulf of Mannar. Rameswaram, Mandapam, Devipattinam, Tirupalakudi, Karangadu, Mullimunai, Pudupatnam, Somanathpatnam and Kollukadu are the main centres along the Palk Bay and Mandapam, Pamban, Vedalai and Kilakarai are the four centres along the Gulf of Mannar. The industry does not exist south of Tuticorin because of the non-availability of commercially important holothurians. In this connection it is significant to note that Mahadevan and Nagappan Nayar (1967) during their underwater ecological observations in the Gulf of Mannar off Tuticorin

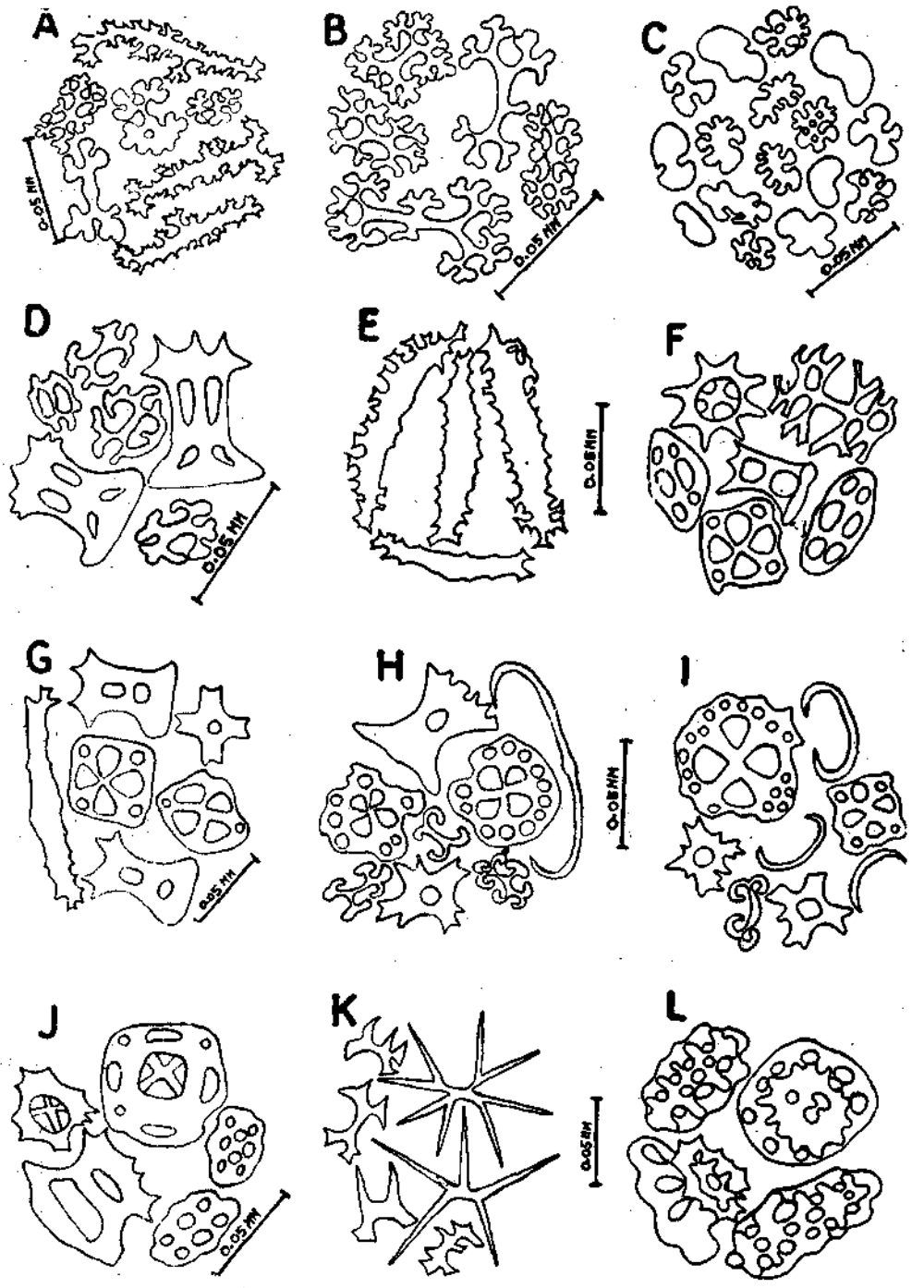

FIG. 1. Spicules of: A. *Actinopyga mauritiana*; B. *Actinopyga echinites*; C. *Holothuria marmorata*; D. *Holothuria atra*; E. *Holothuria moebi*; F. *Holothuria leucospilota*; G. *Holothuria cinerascens*; H. *Stichopus variegatus*. I. *Stichopus chloronotus*; J. *Holothuria scabra*; K. *Thelenota ananas*; L. *Microthele nobilis*.

reported the absence of *Holothuria scabra* which is commercially the most important species on the south-east coast of India. Because of the more centres for *beche-de-mer* along the Palk Bay and also due to the greater landing of holothurians the Palk Bay appears to be richer than the Gulf of Mannar in regard to holothurians.

Holothuria scabra, H. spinifera, H. atra and *Stichopus variegatus* are the four species of commercial importance along the south-east coast of India. Of these only *Holothuria scabra* and to a lesser extent *H. spinifera* are used at present. *Holothuria scabra* grows to 350 mm in length and weighs over 500 gm in the fresh condition. The collection of holothurians starts in February and lasts till October. The peak season is from April to August. The collection is stopped with the onset of the north-east monsoon because of the turbulent sea which results in poor visibility for the divers. It is also seen that during the rainy season it is difficult to dry the holothurians and most of it is smoke-dried. The finished product is highly hygroscopic and during the rainy days it becomes soft and is often attacked by fungus thereby losing the commercial value. These have to be again boiled and smoke-dried to make them marketable a process which involves additional expenditure. Tirupalakudi on the Palk Bay is the most important centre for *beche-de-mer* where ten boats are engaged in collecting holothurians. In each boat ten people go for collecting chanks and holothurians. In the peak season about 30,000 holothurians are collected daily at this centre. At Karangadu about 100 people are engaged in this industry and daily 20,000 holothurians are collected during the peak season. At Pamban the fishery extends barely for over a month from March to April and at Rameswaram it is fished for four months from May to August. At Mandapam the fishery is supported to a large extent by the holothurians collected by trawls. The season starts in April and lasts till August. Fresh specimens are sold at the rate of 4 to 6 paise depending on the size. On processing they become half in size and the weight is reduced to one-seventh. *Holothuria spinifera* which is collected along with *H. scabra* is also used for this purpose. This species grows to a large size like the previous one and the product prepared out of this is said to be of superior quality. It is difficult to collect this species in large numbers to cure them separately though it will fetch good price. *Holothuria atra* is exceedingly abundant and grows to a size of 300 mm. The body wall is thin and shrinks greatly during curing and the cured product becomes very small. This may be the reason why it is not cured in India at present though it is processed in other countries. The fourth species of commercial importance is *Stichopus variegatus* which grows to a large size of 300–400 mm. in length. The body wall is soft and dissolves into gelatinous mass soon after death hence it is not very suitable for this purpose. The average catch of *H. scabra* per boat per day at Mandapam during the period April to August, 1968 is shown in Table III.

TABLE III

Average catch per day per boat of Holothuria scabra *by trawl nets landed at Mandapam during the period April–August,* 1968

Month	Average No. of boats per day	No. of days of observation	No. of boats observed in the month	Average catch (kg) per boat per day
April ..	31	4	26	3·5
May ..	35	5	34	2·7
June ..	52	10	61	2·6
July ..	53	12	78	2·4
August ..	51	14	89	3·2

Source: Survey data of C.M.F.R.I. (unpublished).

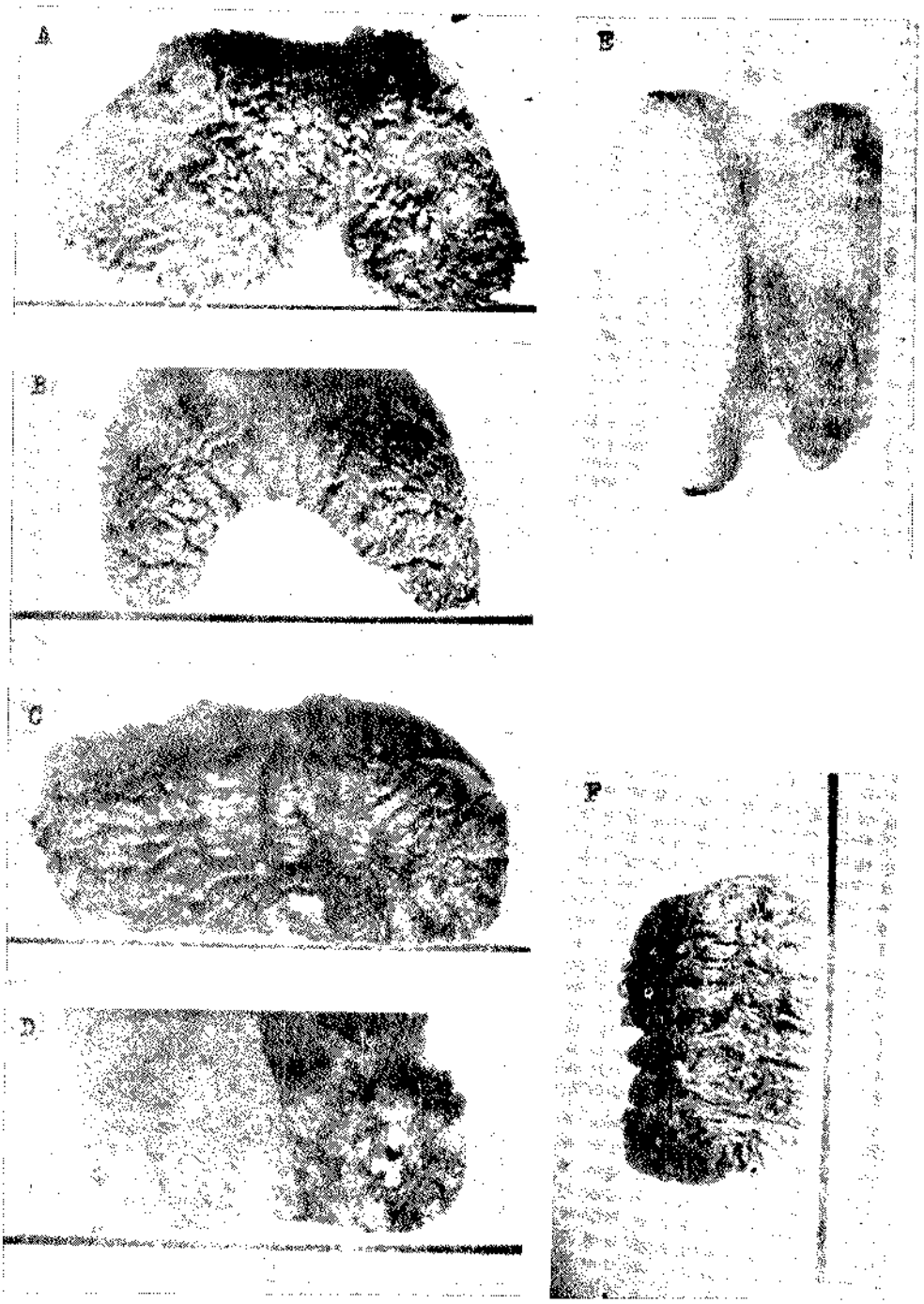

PLATE I. Commercial species of holothurians: A. *Thelenota ananas*; B. *Actinopyga mauritiana*; C. *Holothuria nobilis*; D. *Microthele nobilis*; E. *Holothuria scabra*; F. *Holothuria spinifera*.

The Andaman group of Islands are the most important from the exploitation point of view because of the occurrence of large species of holothurians best suited for *beche-de-mer*. *Holothuria marmorata*, *Actinopyga mauritiana* and *A. echinites* are the commercially important species at Andamans and these are not found in the coastal waters of India. It is interesting to note in this connection that the species *Holothuria scabra* which is chiefly used in the Madras State does not occur in appreciable numbers either at Andamans or Laccadives. India can capture better overseas market by processing different species of quality holothurians.

The Laccadive Islands are also very important from the exploitation point of view. Perhaps the best suited and most valued holothurian, *Thelenota ananas* occurs in these islands. It has a very thick body wall and grows to a very large size of 600 mm. Next in importance mention may be made of *Actinopyga echinites*, *A. mauritiana*, *Holothuria marmorata* and *Microthele nobilis* all of which grow to a large size and are found in the lagoons of the coral reefs. Hornell (*op. cit.*) has reported the processing of small quantities of holothurians at Kilton Island (Laccadive Archipelago). There appears to be no industry in the Laccadives today.

The intensification of mechanised fishing in the Gulf of Mannar and Palk Bay where a good fishing already exists will improve the landings considerably. At Andamans and Laccadives the holothurians can be collected by divers along with shells like *Trochus niloticus* Linnaeus, *Turbo marmoratus* Linnaeus and *Cypraecassis rufa* (Linnaeus). The introduction of the larger and the commercially important species from the Laccadives and the Andamans in the Gulf of Mannar and the Palk Bay will go a long way to step up production of *beche-de-mer* in this country. If artificial breeding of the important species is investigated and the production and development of the fishery is conducted in a scientific and systematic manner, it will give a further boost to the present-day industry.

Acknowledgement

I am grateful to Dr. S. Jones, Director, Central Marine Fisheries Research Institute for the interest evinced in the present investigation and the kind encouragement given to me.

References

Chari, S. T. 1964. The Indian *beche-de-mer* industry. *Indian Seafoods*, **1** (4): 11–13.

Clark, H. L. 1921. The echinoderm fauna of Torres Strait, its composition and its origin. *Pap. Tortugas. Lab.*, **10**: 1–223.

Hornell, J. 1917. The Indian *beche-de-mer* industry, its history and recent revival. *Madras Fish. Bull.*, **11**(4): 119–150.

Krishnamurthi, B. 1957. Fishery resources of the Rameswaram Island. *Indian J. Fish.*, **4** (2): 229–253.

Mahadevan, S. and K. Nagappan Nayar 1967. Underwater ecological observations in the Gulf of Mannar off Tuticorin. VII. General topography and ecology of rocky bottom. *J. Mar. biol. Ass. India*, **9** (1): 147–163.

Panning, A. 1944. Die Trepangfischerei. *Mitt. hamb. zool. Mus. Inst.*, **49**: 1–76.