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CONTRIBUTIONS TO THE STUDY OF THE MARINE ALGAE OF THE RED SEA

III — Marine Algae from Obhor, in the vicinity of Jeddah, Saudi Arabia

(with 28 plates)

By

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ABSTRACT

A history of marine algal investigations on the Saudi Arabian Red Sea Coast, since the first collection made by Forsskal in 1762, is given. The number of species recorded so far is relatively small.

The present list entails 16 species of blue green algae all of which are new records to the Arabian Coast. The Chlorophyta comprises 27 spp. of which 15 spp. are new records to this coast. Phaeophyta also amounts to 27 spp. of which 19 spp. are new records, while Rhodophyta comprises 35 spp. of which 25 spp. are new to the Saudi Coast.

The following species are new additions to the Red Sea algal flora:

Chroococcus turgidus
Microcoleus chthonoplastes
Symploca muscorum
Tydemania expeditionis
Padina boryana
Dictyopteris delicatula
Asterocyctis ramosa

These are in addition to the species newly recorded for the Red Sea from al-Ghardaqa, Egypt (Aleem, 1978, I & II).

INTRODUCTION

The first to collect marine algae from the Saudi Arabian Red Sea Coast, was the Danish botanist and explorer Pehr Forsskal (1775) who, in the month of November 1762, made a collection of seaweeds from the Sea of Jeddah. Forsskal headed a Danish Expedition of 6 scholars to Egypt and Arabia. They set off from Copenhagen on 4th January 1761 on board a naval ship, visited Constantinople and landed in Alexandria in September 1761. After spending a year in Cairo, they left Suez on 8th October 1762 on board an Arabian ship bound for Jeddah, which they arrived on 29 October 1762. From Jeddah the group boarded another ship bound for Luhaiya, making a brief stop at al Qunfida en route. Forsskal died in Jerim in Yemen on 11 July 1763 at the age of 30 years. The only survivor of this unfortunate group was the German mathematician Carsten Niebuhr, who published the narrative of the journey and the manuscripts of Forsskal. The latter described many new species of algae from the Red Sea including *Ulva reticulata* Forsskal whose type locality was al Qunfida.

In the early years of the 19th century a British admiral Viscount Valentia made collections of algae from the Red Sea and these were described by Turner (1808, 1809, 1811, 1819). The Viscount is commemorated by *Hypnea valentiae* (Turner) Montagne.

The French Expedition to Egypt in 1798 made algal collections both from the Red Sea Coast of Egypt and from Alexandria. These were described by Delile (1813). The importance of these collections and others made before 1869 (the year in which the Suez Canal was opened for navigation), features in connection with discussions of species migrations between the Red Sea and the Mediterranean Sea. (Aleem, 1948).

Furthermore, collections of algae from the Red Sea were also made by Ehrenberg (1828) and Hemprich during a journey they made to Egypt, West Asia and Ethiopia (1820-6). Both men visited Jeddah in November 1824, went to Mecca and then to Qunfida, Gizan, Farasan Islands and then sailed for Luhaiya, Kamaran Islands and then to Massawa. Hemprich is commemorated by the sea-grass *Thalassia hemprichi,* while Ehrenberg by a vareity of *Sargassum.*

Several other workers, including medical doctors and amateurs collected seaweeds from the Red Sea during the rest of the 19th century. We shall only mention those who have collected algae from the Saudi Coast or determined algae and sea grasses collected from the same. Among these mention is made of Decaisne (1834, 1841), Ruprecht (1849), Piccone (1889, 1900) and Zanardini (1858). Decaisne's paper of 1841 is of particular importance, since it describes material collected by Paul Emile Botta of the Natural History Museum of Paris, from Jeddah and Yenbu in 1836 including seagrasses and the beautiful reticulate green alga *Microdictyon agardhianum.* The type locality of this alga is Jeddah. A century later i.e. in 1933 this alga was rediscovered at al-Ghardaqa and speciments of it were sent to Professor Setchell in California for the purpose of his monograph on *Microdictyon* (Setchell, 1929).

In 1924 the Cambridge Expedition to the Suez Canal collected algal specimens which were reported by Lyle in 1926. F. Borgesen (1932) revized Forsskal's algae which were deposited in the Museum of Natural History at Copenhagen.

In 1934 the Egyptian University arranged an Expedition to the Red Sea. Algal materials were examined by Nasr (1939) and later on by Newton (1953). However, the largest single work on the Red Sea algal flora since the time of Zanardini (1858) is Nasr's "Synopsis of the Marine Algae of the Egyptian Red Sea Coast "(1947). Since then, Papenfuss (1968) wrote his comprehensive work entitled "A History, Catalogue and Bibliography of Red Sea Benthic Algae."

Inspite of the large collections of algae made in the Red Sea over a period of two centuries, the number of species recorded from the Saudi Coast, mainly from Jeddah or Yenbu is surprisingly small. Other places in the Red Sea such as al-Tor, Quseir, Suez, Ghardaqa, Hodeida, Massawa and Mocha received greater attention by algologists. Thus, for example, not a single species of blue green algae is mentioned from Jeddah or Yenbu in Papenfuss's Catalogue referred to previously. The green algae are represented by 17 species, 10 of which belong to *Caulerpa.* It is worthwhile mentioning that such a large number of *Caulerpas* does not seem to exist in Jeddah nowadays. Likewise, the Phaeophyta is represented in Jeddah by 18 spp. of which 12 spp. belong to a single genus *Sargassum.*

Excluding some 10 spp of calcareous algae collected by Professor Pierre Drach during the French Expedition "Calypso" in 1952 from Farasan Islands and worked out by Mme Lemoine (1965), the number of Rhodophyta recorded from Yenbo and Jeddah until 1968 is extremely small, namely 12 species only.

In concluding this historical account, reference is made to a more recent work by Mohsen (1972, I-III, p. 113—169). This writer states that he visited Jeddah and made algal collections in 1965, 1966 and 1967. As a taxonomic work, Mohsen's papers serve little purpose. The author refers to species which do not exist in the Red Sea or at least have been doubtful. These such as: *Corallina officinalis, Pterocladia capillacea, Dictyopteris membranacea, Sargassum fluitans, Sargassum natans, Codium elongatum, C. edule, Halimeda tune, Valonia utricularis* and *Caulerpa prolifera.* Most of these misplaced taxa are Mediterranean spp. Altogether they constitute over 33% of his floral list, which includes 2 spp. of Cyanophyta, 14 Chlorophyta, 6 Phaeophyta and 11 Rhodophyta. Besides, this author gives no locality or date for his taxa. There is much confusion also with regards to his figures. The littoral region at Alexandira is evidently richer in algal growth than at Jeddah and this is in contradiction to his major conclusion.

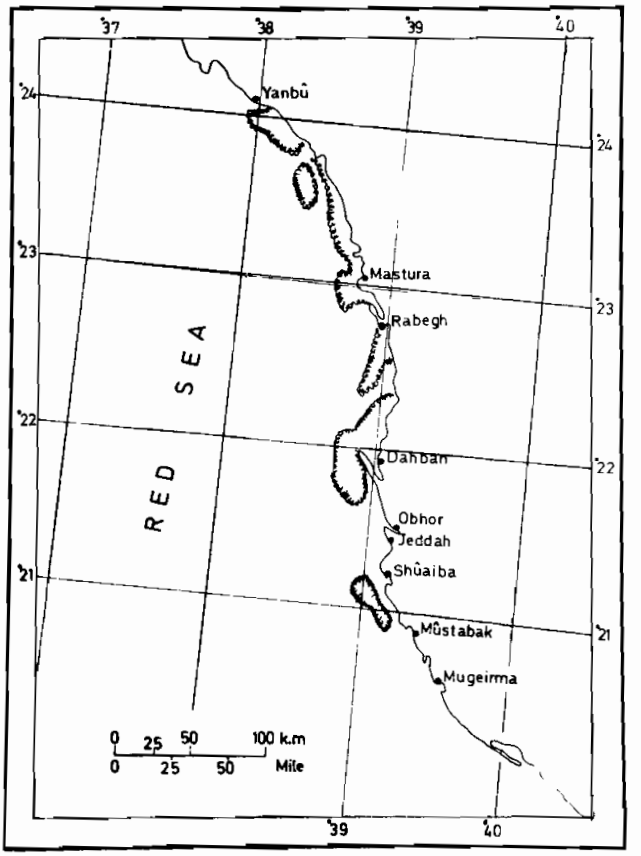

Fig. (1) — Map showing position of Obhor and other localities investigated along the Saudi Arabian Coast.

MATERIAL AND METHODS

Algal collections were made mostly in the area surrounding the Biological Station of King Abdul Aziz University at Obhor during courses taught by the author successively in winter, spring and autumn of the years 1976 — 1978. On a few occasions collections were made from Jeddah Harbour and Mugeirma to the South, as well as from a few sites to the North of Jeddah, towards Dahban (Fig. 1). Material was collected also by skin diving or by "Scuba" in coral reefs to a depth of several meters. On two occasions collections were made in the Mangrove forest of *Avicennia marina* at al Shuayba. All photographs included in this paper are taken from materials collected either at Obhor or in Jeddah Harbour.

Glass surfaces were also immersed is shallow water for a few weeks and examined. Other artificial substrata, met with at random at sea, were also examined. These are such as wooden and polyethylene boats, nylon threads and ropes and floating or wedged wood.

The floral list presented here must be considered as incomplete, since several taxa have been omitted for lack of appropriate literature in Jeddah for identification. It is to be added that the characteristic tidal knot of the Red Sea occurs near Jeddah, so that the vertical tidal component is insignificant. Nevertheless a tidal amplitude of 40-50 cm is noticed at Obhor. Offshore wind and high atmospheric pressure during low tide can further increase this range or prolong the exposure time. The frequency of such spells, however, is small.

The average salinity of coastal waters ranges between 3.8-3.9% in the different months. Average monthly water temperature varies between 27-29°C. A difference of *ca* 3°C from the open sea is noticed in shallow water near the shore due to local climatic changes.

SYSTEMATIC PART

Taxa marked by a single asterisk (*) are new records for Saudi Arabia; those marked by (**) are new records for the Red Sea.

CYANOPHYCEAE

Chroococcales

1 — **Chroococcus minutus* (Kutzing) Fremy, p. 24, pl. 4 fig. 6; Lindstedt, 1943, p. 19 pl. 1 fig. 11. Nageli. Found on glass surface immersed in shallow water below the pier of the Biological Station at Obhor in October 1977. The only previous record of this alga in the Red Sea was made by Rayss (1959) from the Sinai Shore.
Geogr. Distrib.: Cosmopolitan.

2 — ***Chroococcus turgidus* (Kutz.) Nageli in Desikachary 1959 p. 101., pl. 26 fig. 6 — *Gleocapsa turgida* (Kutz.) Hollerbach in Dawson, Aleem and Halstead, (1955), fig. 9. This species was found in silt scraped from pier supports at Obhor in which *Padina* was growing in May 1978. Colour steel blue; the gelatinous sheath is lamellated.
Geogr. Distrib.: Cosmopolitan.

3 — **Gleocapsa crepidinum* Thuret in Lindstedt, 1943, p. 21, pl. 2 fig. 1.
— *Entophysalis deusta* (Meneghini) Drouet et Daily, 1956, p. 103 (pro parte)
— *E. granulosa* Kutz. in Fremy, 1934 p. 32, pk 6 fig. 5.
Found on semi-exposed rocks near high water line in the *Nerita* zone, extending in places to the *Chthamalus* Belt below.
Entrance of Obhor Creek.
The species was recorded before for the first time in the Red Sea by Nasr (1947).
Geogr. Distrib.: Cosmopolitan

Nostocales

4 — **Trichodesmium erythreum* Ehr. ex Gom.
— *Skujaella erythrea* (Ehr.) De Toni in Nasr 1947, p. 7.
Common in the plankton of Jeddah and Obhor almost all the year round.
Geogr. Distrib.: Pantropical.

5 — **Phormidium fragile* Gomont
Fremy, 1934, p.8 6, pl. 22 fig. 6.
Trichomes are 1.5 — 2.5 μ in diameter. This species is rather frequent in the area. It was also collected on glass plates at Obhor, as well as from littoral stones and gravel, where brine water from the Desalination Plant at Jeddah discharges into the sea. In this latter habitat the species was found together with *Microcoleus chthonoplastes.*
The species grew well also in the laboratory in a glass jar, together with *Valonia forbesi, forming an extensive sheet without addition of nutrients.*
The species grew well also in the laboratory in a glass jar together with *Valonia forbesi,* forming an extensive sheet without addition of nutrients.
Geogr. Distrib.: Cosmopolitan.

6 — **Lyngbya confervoides* C. Ag. in Desikashary, 1959, p. 314, pl. 49, fig. 9.
Trichomes olive green, 10-11 μ in diameter; cells 3-7 times shorter than broad.
Found on coral reefs *(Acropora),* together with *Polysiphonia, Herposiphonia and Erythrotrichia spp.* in winter.
Geogr. Distrib.: Cosmopolitan.

7 — **Lyngbya majuscula* Harv.
Fremy, 1934, p. 106 pl. 28 fig. 6.
Trichomes ca 30-40 μ in diameter, cells very short, sheeth thick.
The species was found together with *Microcoleus* and *Phormidium* at the Desalination Plant brine-water discharge pool at Jeddah.
Georg. Distrib.: Widespread.

8 — **Oscillatoria nigro-viridis* Thwaites
Desikashary, 1959, p. 202, pl. 42, fig. 6.
Identified on glass plates submerged at Obhor, under the pier of the Biological Station in October 1977.
Geogr. Distrib.: Cosmopolitan

9 — **Microcoleus tenerrimus* Gomont
Rayss and Dor, 1963, p.14; Aleem, 1979, I.
Trichomes very thin and tapering at end. They are aggregated in transparent sheaths. The species was found both on glass plates at Obhor as well as on littoral stones at the Desalination Plant of Jeddah.
Geogr. Distrib.: Cosmopolitan.

10 — ***Microcoleus chthonoplastes* Thur. et Gom. in Desikashary, 1959 p. 343, pl. 60 figs. 7-9
This characteristic alga forms a soft sheath, a few millimeters thick covering the substratum, whether on small stones or on compact silty bottom at the Desalination Plant of Jeddah. Salinity of the brine water is *ca.* 5-6%
Trichomes are 7-10 μ wide, 1-2 times as long as broad and tapering at the end. They are found in thick gelatinous sheaths. The species is a new record for the Red Sea.
Geogr. Distrib.: Widespread.

11 — **Calothrix parasitica* (Chauv.) Thur.
Nasr, 1947, p. 12.
Trichomes 7-8 μ broad, sheath thin, heterocyst basal.
The alga was found epiphytic on *Ectocarpus* at Obhor; also on *Avicennia marina* roots at al Shuayba.
Geogr. Distrib.: Cosmopolitan.

12 — **Calothrix scopulorum* C. Ag. ex. Born. et Flah.
Nasr 1939, p. 49; 1947 p. 13, fig. 2.
Forms a thin crust on moistened rocks above high water on the littoral rocks at the entrance of Obhor Creek.
Geogr. Distrib.: Cosmopolitan.

13 — **Calothrix confervicola* (Roth) C. Ag.
Fremy, 1934 p. 140, pl. 35 fig. 1.
This alga is dark greenish in colour; trichomes 10-14 μ wide; cells very short. Filaments slightly thickened at base, with 1-2 basal heterocysts. Trichome ends with a long hair.
The plant was found epiphytic on *Herposiphonia* growing on *Acropora* in shallow water near the Biological Station at Obhor.
Geogr. Distrib.: Cosmopolitan.

14 — **Spirulina major* Kutz. ex Gomont
Desikachary, 1959, p. 196 pl. 36 fig. 13.
Found in sediment deposited from a collection of marine algae at Obhor. Previously known in the Northern Red Sea from Abu Zabed and Eylath (Rayss and Dor, 1963)
Geogr. Distrib.: Cosmopolitan.

15 — **Dichothrix penicellata* Zanardini, 1858, p. 297, pl. 14 fig. 3.
To this species I refer with reservations specimens found growing on the bark of aerial roots of *Aviennia marine* at Shuayba. It is to be noted that Rayss and Dor (1963) described *D. eylathensis* from glass plates at Elath, but our specimens do not seem to belong to the same.
Geogr. Distrib.: Widespread.

16 — ***Symploca muscorum* in Dawson, 1966 fig. 6-3B.

(Pl. 1, Fig. 1)

In this alga the sheaths are agglutinated to form conical spongy tufts 3-4 cm (up to 6) high and 2-4 cm broad. The species is not infrequent in semi exposed sites on reef flats at Obhor.
Geogr. Distrib.: Indian Ocean, Pacific Ocean.

CHLOROPHYTA

Ultotrichales

1 — *Enteromorpha compressa* (L) Greville
Nasr, 1947, p. 21.
Frond much branched, cells small, not arranged in longitudinal series.
Common along the coast in the intertidal region, exposed to air at low tide. It grows easily on various substrata such as pier supports, wedged wood in the littoral, etc.
Geogr. Distrib.: Cosmopolitan

2 — **Enteromopha flexuosa* (Wulflen) J. Ag.
Nasr, 1947, p. 21.

(Pl. 2, Fig. 1)

Frond tubular, simple or with little proliferations at the base. Cells rounded, 10-29 μ in diameter and arranged in longitudinal series. The species is close to *E. intestinalis*. Found on dead corals in the littoral region, at several places including Jeddah, al Shuayba and Mugeirma.

Geogr. Distrib.: Cosmopolitan.

3 — **Enteromorpha clathrata* (Roth) J. Ag.
Forms thin tufts of loose filaments reaching up to 30 cm in length. Filaments filiform, richly ramified. Ramifications are usually of 2-3 rows of cells, often ending with monosiphonous ramules. Cells usually quadrate in shape. Chromatophores do not fill the whole cell cavity. The plant was found in winter forming luxuriant growth on littoral stones at the Desalination Plant, Jeddah. Also found loose among seagrasses in shallow water.

Geogr. Distrib.: Cosmopolitan.

4 — *Ulva lactuca* L. in Nasr, 1947, p. 23.
– *U. latissima* (L) Ag. in Zanardini 1858, p. 86.

(Pl. 2, Fig. 2)

A small form is found attached to fixed barrels, in mid-water at Obhor in May 1978.

Geogr. Distrib.: Cosmopolitan.

5 — *Ulva reticulata* Forssk.
Zanardini, 1858, p. 86; Nasr, 1947, p. 22.

(Pl. 3, Figs. 1, 2)

The thallus forms a characteristic network, attains a length of about 10-20 cm.
The species was found epiphytic on *Laurencia papillosa* in the neighbourhood of the Biological Station at Obhor in a depth of about 0.5 m below water. It grew also among seagrasses in shallow water in April-May. Other localities include al Shuayba (November 1978) Mugeirma (February 1975), Rabegh (March 1979).
A form with much lateral proliferations (Pl. 3 Fig. 2) has also been collected at Obhor. The only previous record of this species on the Saudi Coast was made from al Qunfida by Forsskal (1775).

Geogr. Distrib.: Pacific Ocean (Japan, U.S.A), Indian Ocean, Australia, Red Sea.

Cladophorales

6 — **Chaetomorpha aerea* (Dillwyn) Kutz.
Hamel, 1930 p. 123, fig. 38 A-C.
Fronds are long filaments; fixed to substratum by basal disc extending from a large basal cell. Upper cells are barrel-shaped, 1-2 times longer than broad. Rather frequent in the littoral region.

Geogr. Distrib.: Cosmopolitan.

7 — **Chaetomorpha linum* (Muller) Kutzing.
Hamal, 1930, p. 125, fig. 38 F.

(Pl. 4, fig. 1)

This alga forms a luxuriant growth, reaching a length of about 40 cm, floating among

seagrasses in May in the littoral region at Obhor. Also found drifted in quantities at al Hamra, Jeddah in November 1977.
Geogr. Distrib.. Cosmopolitan.

8 — **Cladophora heteronema* (C. Ag.) Kutz. in Borgesen, West Indies I, p. 25.
The frond is long, setaceous, exceeding 15 cm in length. It was found in shallow, quiet water among seagrasses at Obhor.
Nasr (1947) recorded it for the first time at Quseir, Red Sea.
Geogr. Distrib.: West Indies, Brazil, Atlantic Coast of Europe, Red Sea.

9 — **Rhizoclonium kochianum* Kutz.
Nasr, 1947, p. 37.
Filaments are narrow 10-12 μ broad; cells 1-2 times longer than broad. Entangled among *Cladophora* and *Chaetomorpha* at Obhor; also at al-Hamra, near Jeddah.
Geogr. Distrib. West Indies, Atlantic Ocean, Malayan Archipelago, Red Sea.

10 — *Microdictyon agardhianum* Decaisne
Nasr, 1947 p, 30 fig. 8.
Occurs in crevices in the reef on the north west side of Obhor in spring; rather rare. Type locality Jeddah.
Geogr. Distrib.: Mediterranean Sea, Red Sea, Atlantic Ocean.

Siphonocladales

11 — **Borgesenia forbesii* (Harvey) Feldmann
— *Pseudovalonia forbesii* (Harv.) Iyengar *in* Nasr, 1947, p. 28.
(Pl. 4, fig. 2)
The frond is simple, cylindrical 2-3 cm high and 0.6-1 cm broad.
It grows particularly as undergrowth in the *Sargassum* belt, as well as in crevices among corals in the neighbourhood of the Biological Station at Obhor.
Geogr. Distrib.: Widespread in warm waters.

12 — **Valonia ventricosa* J. Ag.
Nasr, 1947, p. 27.
(Pl. 5, fig. 1)
Thallus globular to subglobular. Mature plants reach a dimension of about 3 x 4 cm. Found among corals in shaded places at Obhor in Winter.
Geogr. Distrib.: West Indies, Malayan Archipelago, Pacific Ocean, Red Sea.

13 — **Valonia aegagropila* J. Ag.
Nasr, 1947, p. 28.
Thallus branched, composed of aggregated articulations. Clumps of this plant reaching about 5-10 cm in diameter were collected among corals at Obhor.
Geogr. Distrib.: West Indies, Mediterranean Sea, Pacific Ocean, Indian Ocean, Red Sea.

14 — **Cladophoropris herpestica* (Mont.) Howe
C. zollingeri (Kutz.) Borg.
Cladophora aegagropila (Zolling.) Kutz.
(Pl. 5, fig. 2)
To this species I refer with reservations a *Cladophoropsis* found growing on *Digenea simplex* in sheltered places in the littoral region at Obhor. However, in *C. zollingeri,* either from Alexandria or from the Suez Canal, the filaments are coarser with thicker walls.
Geogr. Distrib.. Malayan Arehipelago, Indian Ocean, Red Sea, Eastern Mediterranean (Aleem, 1948), Suez Canal (new record).

15 — **Boodlea composita* (Harvey) Brand.
Nasr, 1947, p. 32.
Rather frequent among corals in the area surrounding the Biological Station at Obhor. The alga grows also on barrels and pier supports, as sponge-like, bright green clumps composed of filaments twisted together. The clumps break down easily.
Geogr. Distrib.: Malayan Archipelago, India, Red Sea.

16 — **Struvea anastomosans* (Harvey) Piccone et Grunow
Borgesen, West Indies, I, p. 54, fig. 39.
Thallus small 2-3 cm in length, composed of creeping rhizoidal filaments from which erect stalks grow and bear at their summits regularly branched leaf-like fronds. Branch ends bear clamps which attatch the filaments together as well as with other fronds.
Geogr. Distrib.: In most warm seas.

17 — **Dictyosphaeria cavernosa* (Forssk.) Borgesen
Nasr, 1939, p. 51, 1947, p. 29.

(Pl. 6, fig. 1)

The type locality of this alga is from Mocha. It is common in mid-tide and lower littoral zones, especially in the leeward side of the reefs adjoining Obhor Creek entrance. The species occurs also in Jeddah Harbour, at al-Hamra, Shuayba and Mugeirma as well as along the coast north of Jeddah e.g. at al-Kasr and Um Sudra.
Geogr. Distrib.: West Indies, Red Sea, Indian Ocean, Pacific Ocean.

Caulerpales

18 — *Bryopsis hypnoides* Lamour.
Nasr, 1947, p. 44.

(Pl. 6, fig. 2)

This alga was collected in the lower littoral and infralittoral regions both from the reefs at Obhor, as well as in Jeddah Harbour in November and January.
The plant is rather rare.
Geogr. Distrib.: Atlantic Ocean. Mediterranean Sea, Indian Ocean, Red Sea.

19 — *Caulerpa racemosa* (Forsk.) J. Ag.
Nasr, 1947, p. 55, pl. IV.

(Pl. 7, figs. 1, 2)

This plant is frequent among corals in the infralittoral region. It creeps on sand with long stolons, also attaches itself to dead corals. No attempt is made here to differenciate between the various varieties belonging to this species, which seems to be polymorphic. For example, figure (2) compares favourably with a new variety described by Chapman (1977, p.167 pl. 2) from Fiji Island as var. *disticha.*
The plant occurs all along the coast of Saudi Arabia, as well as in Farasan Islands.
Geogr. Distrib.: Widespread in warm seas.

20 — *Caulerpa lentillifera* J. Ag.
Zanardini, 1858, p. 79.
This species differs from *C. racemosa* by the small size of the vesicles. It was collected also at Obhor and in Jeddah Harbour, but was much less frequent than *C. recemosa.*
Geogr. Distirib.: Red Sea, Indian Ocean, Malayan Archipelago, Japan.

21 — *Caulerpa webbiana* Mont.
Nasr, 1947, p. 5.
Assimilators in this species are narrower than those in *C. serrulata.*
The species is less frequent in the area than *C. serrulata.*
Geogr. Distrib.: Red Sea, Canary Islands.

22 — *C. serrulata* (Forssk.) Borg.
Nasr, 1947, p. 55, pl. III, fig. 2.

(Pl. 8, fig. 1)

The species is common at Obhor as well as in Jeddah Harbour. Plants with spirally twisted fronds are also found. I agree with Nasr (l.c.) that some varieties of this species as well as of *C. racemosa* are only ecological forms.
Geogr. Distrib.: Indian Ocean, Red Sea, Atlantic Ocean, Pacific Ocean.

23 — **Avrainvillea amadelpha* (Mont.) A. et E. Gepp.
Nasr, 1947, p. 48, pl. I. Fig. 2.

(Pl. 8, fig. 2)

This alga grows in shaded places in the infra-littoral.
It has also been collected in winter in a quiet lagoon at al Shuayba at the base of aerial roots of *Avicennia marina.*
Geogr. Distrib.: Red Sea, Indian Ocean.

24 — **Udotea flabellum* (Ellis et Solander) Howe in Borgesen, West Indies, I., p. 10 4.
This species occurs in sheltered places such as in rock fissures and at base of corals at Obhor.
Geogr. Distrib.: Red Sea, Indian Ocean.

25 — *Halimeda opuntia* (L.) Lamour.
Nasr, 1947, p. 50.

(Pl. 9, fig. 1)

Common in the reef flats close to Obhor, also in Jeddah harbour.
Geogr. Distrib.: Atlantic, Pacific, Indian Ocean, Red Sea.

26 — *Halimeda macroloba* Decaisne.
Zanardini, 1858, p. 287.

(Pl. 10, fig. 1)

The type locality of this species is Jeddah.
The plant is rather frequent, particularly below low water and as under-growth in the *Sargassum* belt.
Geogr. Distrib.: Red Sea.

27 — ***Tydemania expeditiones* Weber van Bosse.
Sihara, 1975 pl. 43.

(Pl. 11, fig. 1)

Thallus feebly calcified, ca 10-15cm high, composed of coenocytic, prostrate and erect systems.
Colour ash-like on paper.
This alga was obtained from a depth of 10 m in Obhor Creek in front of the Marine Biological Station in winter. It is considered as a new record for the Red Sea. It is to be noted that Nasr (1939) described *T. mabahithae* from Masabi Reef, but we had no access to his specimens.
Geogr. Distrib.: Indo-Pacific.

PHAEOPHYTA

Ectocarpales

1 — **Ectocarpus siliculosus* (Dillwyn) Lyngbye.
Nasr, 1947, p. 60.
Grew on wooden supports of piers at the water level in spring; also as epiphyte on *Sargassum.*
Geogr. Distrib.: Mediterranean Sea, Atlantic Ocean, Red Sea, Pacific Ocean.

2 — **Feldmannia irregulairs* (Kutz.) Hamel.
—Ectocarpus arabicus Figari et De Notaris
Characterized by intercalary growth. Found on dead *Acropora* below water in winter.
Geogr. Distrib.: Atlantic Ocean, Indian Ocean, China Sea, Mediterranean Sea, Red Sea.

3 — **Giffordia indica* (Sonder) Papenfuss et Chihara
—Ectocarpus duchassaingianus Grunow in Nasr 1947, p. 63 Figs. 14, 15.
Thallus very small, hardly reaching 1 cm; plurilocular sporangia sessile with obtuse apex. Found on dead corals, together with *Sphacelaria* in winter and spring.
Geogr. Distrib.: Atlantic Ocean, Indian Ocean, Red Sea.

Sphacelariales

4 — **Sphacelaria furcigera* Kutz.
Hamel, 1931-1939, p. 255, fig. (47, 16).
Filaments 17-20 µ in diameter with 1-3 longitudinal cell walls. Propagule biforked. Grows on *Sargassum, Turbinaria* and other algae.
Geogr. Distrib.: Atlantic Ocean, Mediterranean Sea, Pacific Ocean, Indian Ocean (South Africa).

5 — **Sphacelaria tribuloides* Maneghini
Hamel, 1931-1939, p. 253, fig. (47, 10)
Forms tufts 1-1½ cm high on dead tips of *Acropora,* also found as under-growth of *Sargassum,* together with *Gelidiella.* Propagule trilobed.
Geogr. Distrib.: Cosmopolitan.

6 — *Dictyota dichotoma* (Hudson) Lamour.
Nasr, 1947, p. 79.

(Pl. 11, fig. 2)

The plant is found in crevices among corals in the lower littoral and upper infralittoral regions.
Geogr. Distrib.: Widespread.

7 — **Dictyota dichomota* var. *intricata* (C. Ag.) Grev.
Hamel, 1931-1939, p. 349.
Dictyota dichotoma var *implexa* (Desf.) J. Ag.
Thallus polymorphic, 10-20 cm high, broad at base, becoming smaller and amaller towards apex. Plants are found associated with *Cystophyllum.*
Geogr. Distrib.: Widespread.

8 — **Dictyota ciliolata* Kutz.
—Dictyota ciliata J. Ag. in Zanardini 1858, p. 248

(Pl. 12, fig. 1)

Characterized by subcylindrical marginal teeth.
Found attached to corals at Obhor in January.
Geogr. Distrib.: Indian Ocean, Atlantic Ocean, Red Sea.

9 — **Dictyota divaricata* Lamour.
Nasr, 1947, p. 80.

(Pl. 12, fig. 2)

Thallus 1-2 mm broad near the base, filiform above, it attains a height of about 10 cm. Terminal segment acute. The plant was growing as an epiphyte on *Laurencia papillosa* in January.
Geogr. Distrib.: West Indies, Red Sea.

10 — *Dilophus fasciola* (Roth) Howe
Hamel, 1931-1939, p. 350, fig. (57,7).

(Pl. 13, fig. 1)

Distinguished from *Dictyota* by the presence of two or more cell layers near the basal part of the plant in transverse section.
Terminal segment is acute.
The plant was found epiphytic on *Cystophyllum trinode* in the lower littoral in October
Geogr. Distrib.: Mediterranean Sea, Atlantic Ocean Red Sea.

11 — ***Padina boryana* Thivy
Jaasund 1976, p. 45, fig. 91

(Pl. 14, fig. 1)

In this species one belt of hairs alternates with one belt of sporangia. The frond is much less split than in other *Padina* species.
Geogr. Distrib.: Indian Ocean.

12 — **Padina tetrasromatica* Hauck
Jaasund, 1976, p. 45 fig. 90.

(Pl. 14, fig. 2)

Found in the lower littoral in exposed sites in winter at Obhor.
Geogr. Distrib.: Indian Ocean.

13 — **Spathoglossum variabile* Fig. et De Not.
Nasr, 1947, p. 78.
Found once in the lower littoral region at the entrance of Obhor Creek in December 1977, together with *Valonia ventricosa* and *Avrainvillea amadelpha.*
Geogr. Distrib.: Indian Ocean, Malayan Archipelago, Red Sea.

14 — *Stoechospermum marginatum* (C. Ag.) Kutz.
Nasr, 1947, ⅞. 78
Frond flat, dichotomously branched, with marginal growth like in *Padina.*
Geogr. Distrib.: Atlantic Ocean, Indian Ocean, Red Sea.

15 — ***Dictyopteris delicatula* Lamour.
Jaasund, 1976 p. 43, fig. 87.

(Pl. 15, fig. 1)

This delicate alga reaches 2-4 cm in height. The dichotomous branches are 3-4 mm broad, with a faint midrib that distinguishes the plant from *Dictyota.* The plant was found growing together with *Martensia* in shaded places under piers at Obhor in winter.
Geogr. Distrib.: Indian Ocean.

16 — **Colpomenia sinuosa* (Mertens) Derbes et Sol.
Nasr, 1947, p. 71.
A few specimens occur in winter either on seagrasses or among corals. Later on in spring luxuriant growth occurs in the *Sargassum* zone and the plant reaches a size ca 10 cm in diameter. This species has not previously been recorded from Jeddah.
Geogr. Distrib.: Widespread in warm waters.

17 — **Hydroclathrus clathratus* (C. Ag.) Howe
Nasr, 1947, p. 72.

(Pl. 15, fig. 2)

Forms dark brown net like fronds.
Common on both sides at the entrance of Obhor Creek below water in spring; attains 20-30 cm in length.
Geogr. Distrib.: Widespread.

18 — **Rosenvingia intricata* (J. Ag.) Borgesen, West Indies, p. 182.

(Pl. 16, fig. 1)

Fronds form large clumps 20-30 cm in diameter, 5-10 cm high, which were found floating

under piers at Obhor in April and May. Tubes are hollow, branching are about 3-5 mm in diameter.
Geogr. Distrib.: Indian Ocean, Red Sea.

19 — **Chnoospora implexa* J. Ag.
Zanardini 1858, p. 244.
Found as undergrowth in the *Sargassum* zone at Obhor in May.
The specimens turn black on desiccation.
Geogr. Distrib.: Red Sea.

Fucales

20 — *Cystoseira myrica* (S.G. Gmelin) C. Ag.
Zanardini 1858 p. 243.

(Pl. 16, fig. 2)

Common in mid-and lower littoral zones, particularly in sheltered places.
Geogr. Distrib.: Red Sea.

21 — *Cystophyllum trinode* (Forsk.) J. Ag.
Nasr, 1947, p. 84.

(Pl. 17a, fig. 1)

—*Cystoseira trinodis* (Forsk. C. Ag. in Papenfuss 1968, p. 11.
Rather frequent in sheltered places.
Geogr. Distrib.; Red Sea.

22 — *Turbinaria triquetra* (J. Ag.) Ag.
—*T. decurrens* Bory in Nasr, 1947, p. 84.

(Pl. 17a, fig. 2)

The taxonomy of the Red Sea *Turbinaria* has been revised by Taylor (1964) who found out that the species commonly known as *T. decurrens* should in fact be referred to *T. triquetra* (cf. also Papenfuss, 1968, p.63).
Geogr. Distrib.: Red Sea.

23 — **Sargassum asperifolium* Hering et Martens
Nasr, 1947, p. 87, pl. 7.

(Pl. 17b, fig. 1)

Leaves with dentated margin and elevated cryptostomata, which are arranged in a single row on each side of the inconspicuous midrib.
Geogr. Distrib.: Red Sea.

24 — *Sargassum subrepandum* (Forsk.) C. Ag.
Nasr, 1947, p. 86. pl. 6.

(Pl. 18, fig. 1)

According to Nasr *(l.c.)* leaves are membranceous, coriaceous; vesicles solitary and rare, then numerous and racemose, spherical. Cryptostomata not prominent.
Geogr. Distrib.: Red Sea.

25 — *Sargassum denticulatum* (Forsk.) Borgesen.
Nasr, 1947, p. 88, pl. 9.

(Pl. 18 fig. 2)

Leaves with prominent midrib. margin serrate, vesicles mueronate.
Geogr. Distrib.: Red Sea.

26 — **Sargassum notarisi* Zanardini
Nasr, 1947, p. 87.

Frond sparingly ramified, leaves small, obovate to ellipsoidal with disappearing midrib. Vesicles small, spherical, borne on subfoliceous long petioles.
Cryptostomata inconspicuous.
Geogr. Distrib.: Red Sea.

27 — **Sargassum crispum* (Forsk.) Ag.
Nasr, 1947, p. 86.
Stem rounded, vesicles large, leaves are at one time short and densely imbricate, at other time long with foliar vesicles. Frequent in the infralittoral.
Geogr. Distrib.: Red Sea.

RHODOPHYTA

Goniotrichales

1 — ** *Asterocystis ramosa* (Thwaites) Gobi
Borgesen 1913-1920, II p. 3. fig 1.
This plant was found at the base of *Padina* fronds growing on the pier supports at Obhor in May as epiphyte on *Herposiphonia tenella.* Filaments of *Asterocystis* are one cell thick, have a thick cell wall; branches consisting of a single row of cells arising at wide angle from the main filament. The species is commonly known to occur in brackish water. Its presence in the Red Sea confirms Borgesen's finding in truely marine halitats in the West Indies.
Geogr. Distrib.: Seems to be widely distributed.

2 — **Coniotrichum alsidi* (Zanard.) Howe
- *G. elegans* (Chauv.) Le Jolis in Borgesen, West Indies, II p. 5 fig. 2.
Thallus fixed to substratum by a small disc; reaches a length of about 1 mm.
Main filaments consist mostly of a single row of cells, or less frequently of 2-3 rows.
Occurs as epiphyte on various filamentous algae e.g. *Polysiphonia* and *Sphacelaria.*
Geogr. Distrib.: Cosmopolitan.

Bangiales

3 — **Erthrotrichia carnea* (Dillw.) J.Ag.
Nasr, 1939, p. 63.
Basal cell disc-shaped. The species was found together with *Goniotrichum alsidi* in winter on filamentous algae attached to *Acropora* in the neighbourhood of the Biological Station at Obhor.
Geogr. Distrib.: Cosmoplitan.

4 — * *Erythrotrichia obscura* Berthold
Rayss and Dor, 1963, p. 29.
To this species I refer an alga which grows on tips of dead *Acropora* found close to the Biological Station at Obhor, particularly in winter. The plant forms delicate violet greenish tufts 1-1½ em high, directly attached to the coral. Filaments are one cell thick at the base, then enlarge becoming 3-4 cell broad and narrow again and so on thus forming saussage shaped frond. Opposite branches arize mostly at the constrictions; they are mostly monosiphonous and recurved. Alternate branches also arise from the main filaments.
Rayss and Dor (1963) found detached filaments at Elat.
Geogr. Distrib.: Atlantic Ocean, Mediterranean Sea, Red Sea.

Nemalionales

5 — *Liagora turneri* Zanardini 1858, p. 65.
- *L. viscida* Mont. Decaisne

(Pl. 19, fig. 1)

Occurs in shaded places in the *Sargassum* zone in May.
Previously known from Yenbu.
Geogr. Distrib.: Red Sea.

6 — *Actinotrichia fragilis* (Forsk.) Borgesen
-*Galaxuara rigida* Lamour in Decaisne, 1842, p. 118.

(Pl. 19, fig. 2)

Frond terete, hard, covered with verticellate, articulated filaments. Found in fissures and underrojecting rocks in the reef in winter, rather rare.
Geogr. Distrib.: Red Sea, Indian Ocean, Pacific Ocean.

7 — **Galaxuara cylindrica* (Sol.) Lamour.
Nasr, 1947, p.98
Occurs in crevices in sheltered places at Obhor.
Geogr. Distrib.: Atlantic Ocean, Red Sea.

Gelidiales

8 — * *Gelidiella acerosa* (Forsk) Feldm. et Hamel
Nasr, 1939, p. 66.

(Pl. 20, fig. 1)

Rather common on dead corals, on gastropod shells and as undergrowth in the *Sargassum* zone.
Geogr. Distrib.: Atlantic Ocean, Mediterranean Sea, Pacific Ocean, Indian Ocean, Red Sea.

Cryptonemiales

9 — * *Peyssonelia squamaria* (Gmelin) Decaisne
Nasr, 1947, p. 104.
Rare in the infralittoral.
Geogr. Distrib.: Atlantic Ocean, Mediterranean Sea, Red Sea.

10 — **Peyssonelia involvens* Zanardini, 1858 p. 61.
Characterized by its deep blood-red colour. Frond rolled up. Found attached to corals in the infralittoral at Obhor rare.
Geogr. Distrib.: Atlantic Ocean, Red Sea.

11 — * *Corallina tenella* (Kutz.) Heydrich
Jania tenella in Piccone 1889 p. 319.
Grows on Gastropod shells in the lower littoral.
Geogr. Distrib.: Red Sea.

12 — **Jania rubens* (L) Lamour.
Nasr, 1939, p. 67.

(Pl. 21, fig. 1)

Common on *Digenea simplex.*
Geogr. Distrib.: Atlantic Ocean, Mediterranean Sea, Indian Ocean, Red Sea.

13 — **Amphiroa fregillissima* (L.) Lamour.
Jaasund 1976, p. 79, fig. 158.
Forms loose cushions 3-5 cm high in rock crevices at Obhor. Not infrequent.
Geogr. Distrib.: Indian Ocean, Red Sea.

14 — *Lithophyllum kaiseri* (Heydr.) Heydr.

(Pl. 21, fig. 2)

Common in the littoral and infralittoral zone. Thallus forms small balls bearing blunt or pointed branch endings.
Geogr. Distrib.: Red Sea, Indian Ocean, Polynesia

15 — **Fosliella farinosa* (Lamour.) Howe
-*Melobesia farinosa* Lamour, in Zanardini, 1858, p. 269.

Frequent on Fucales as well as on leaves of seagrasses.
Geogr. Distrib.: Mediterranean Sea, Indian Ocean, Red Sea.

Gigartinales

16 — **Gracilaria arcuata* Zanardini 1858, p. 57, pl. 3 fig. 2

(Pl. 22, fig. 1)

Plants purple in colour, 5-10 cm long, branching irregular, but with a tendency to form unilateral arcuate branches.
Geogr. Distrib.: Red Sea, Indian Ocean.

17 — *Gracilaria cacalia* (J. Ag.) Dawson.
–*Corallopsis cacalia* J. Ag. in Zanardini, 1858, p. 267.
–*C. salicornia* Decaisne, 1841, p. 184.
Rather frequent at the base of brain corals and pier supports near Obhor; also in Jeddah Harbour.
Geogr. Distrib.: Red Sea, Malayan Archipelago.

18 — *Hypnea musciformis* (Wulfen) Lamour.
Epiphytic on *Laurencia* and *Cystoseira.*
Geogr. Distrib.: Widespread in warm seas.

19 — *Hypnea valentiae* (Turn.) Mont.
Nasr, 1947, 113, pl. 13.

(Pl. 23, fig. 1)

Rather frequent on *Sargassum* and *Turbinaria.*
**Geogr. Distrib.:* Most warm seas.

20 — *Hypnea esperi* in Rayss & Dor, 1963, p. 36.

(Pl. 23, fig. 2)

This small and slender species is devoid of spines. It has previously been recorded from al Ghardaqa (Aleem, 1979 — II)
Geogr. Distrib.: Atlantic Ocean, Pacific Ocean, Red Sea.

Rhodymeniales

21 — **Botryocladia leptopoda* (J. Ag.) Kylin in Nasr, 1939, p. 69.

(Pl. 22 fig. 2)

Found in crevices between corals at Obhor in spring.
Rare. Plants bear numerous globular or pyriform vesicles, 2-5 mm in diameter.
Geogr. Distrib.. Indian Ocean, Malayan Archipelago, Pacific Ocean (Australia, Japan).

22 — **Champia irregularies* (Zanard.) Piccone
Nasr, 1947, p. 118.
Found in rock crevices in sheltered places at Obhor.
Geogr. Distrib.: Red Sea, Suez Canal (Nov. 1953).

Ceramiales

23 — **Centroceros clavulatum* (C. Ag.) Mont.
Zanardini, 1858, p. 282.
Found epiphytic on roots of *Avicennia marina* at al-Shuayba in winter.
Geogr. Distrib.: Cosmopolitan.

24 — **Ceramium gracillimum* var. *byssoideum* (Harvey) Mazoyer in Nasr, 1939 p. 70, pl. 1, figs. 4-5.
Epiphytic on *Padina*.
Geogr. Distrib.: Atlantic Ocean, Indian Ocean, Red Sea.

25 — **Spyridia filamentosa* (Wulfen) Harvey
Nasr, 1947, p. 128.
Found under piers as epiphyte on *Laurencia* and other algae in spring.
Geogr. Distrib.: Widespread in warm seas.

26 — **Hypoglossum spathulatum* (Sonders) Kutz.
Nasr, 1947, p. 145, fig. 25.

(Pl. 24, fig. 1)

To this speeies I refer with reservations a delicate alga found only once in crevices in the infralittoral at Obhor.
Geogr. Distrib.: Indian Ocean, Malayan Archipelago, Red Sea.

27 — **Martensia elegans* Hering
Piccone, 1900, p. 260.

(Pl. 24, fig. 2)

This delicate and beautiful alga was apparently found only once in the Red Sea before *viz.*, in Mandola Islet (Ethiopia). In the vicinity of the Biological Station at Obhor it was frequent from December to May in shaded places under piers and on brain coral. Two forms exist together in winter *viz.*, thalli with narrow "lace" and others with coarse "lace". The former is the tetrasporic plant, while the latter is the cystocarpic plant.
Geogr. Distrib.: Red Sea.

28 — *Acanthophora najadiformis* (Delile) Papenfuss
–*Acanthophora delilei* Lamour. in Zanardini, 1858, p. 256.

(Pl. 25, fig. 1)

Frequent in the *Padina-Laurencia-Digenea* community on reef flats in winter and spring.
Geogr. Distrib.: Mediterranean Sea, Indian Ocean, Red Sea.

29 — **Chondria seticulosa* (Forsk.) C. Ag.
Papenfuss, 1968, 97 –*Laurencia hypnoides* Borg. 1932, p. 4.
This cocspitose alga was found together with *Laurencia papillosa* and *Acanthophora* in the littoral region in spring.
Geogr. Distrib.: Red Sea.

30 — *Digenea simplex* (Wulfen) C. Ag.
Zanardini, 1858, p. 258.

(Pl. 26, fig. 1)

Very common between tide marks on dead corals and in crevices, on the flats before reaching Obhor Creek.
Geogr. Distrib.: Widespread in warm waters.

31 — **Herposiphonia tenella* (C. Ag.) Ambronn
Nasr, 1947, p. 138.
Rather common on *Acropora* close to the pier of the Biological Station, together with *Erythrotrichia carnea;* also on vertical supports of piers in shaded places. Another form of this species seems to grow in *Avicennia* mangrove at al-Shuayba.
Geogr. Distrib.: Atlantic Ocean, Indian Ocean, Malaya, Red Sea.

32 — **Leveillea jungermannioides* (Mert. et Hert.) Harvey.
Falkenberg, 1901, p. 392, pl. 6 f. 1-13.

(Pl. 27, fig. 1)

Common in the *Sargassum* zone. This species grows luxuriantly in shletered places under piers, forming loose filaments entangled in masses. It also occurs attached to *Sargassum* in the lower littoral.

Geogr. Distrib.: Red Sea, Indian Ocean, Pacific Ocean.

33 — *Laurencia obtusa* (Hudson) Lamour.
Zanardini 1858 p. 261.

(Pl. 28, fig. 1)

Frequent on coral reefs close to the Biological Station.

Geogr. Distrib.: Atlantic Ocean, Mediterranean Sea, Red Sea.

34 — *Laurencia papillosa* (Forsk.) Grev.
Nasr, 1947, p. 134.

(Pl. 28, fig. 2)

Common between tide marks in association with *Digenea simplex* and *Padina.*

Geogr. Distrib.: Atlantic Ocean, Mediterranean Sea, Pacific Ocean, Indian Ocean, Red Sea.

35 — **Polysiphonia-figariana* Zanardini, 1858, p. 49.

This delicate species was found attached to leaves of *Halodule uninervis,* growing in shallow water. Tetrapores and cystocarps are found in winter.

Geogr. Distrib.: Red Sea.

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ADDENDA

* While this paper was in press *Acetabularia calyculus* Quoy et Gaimard has been recorded from the lagoon of Rabegh (cf. Baeshin and Aleem, this Bulletin, vol. 2)

Fig. 1— Symploca muscorum, inhabiting semi-exposed sites at Obhor.

Fig. 1— Enteromorpha flexuosa X1½

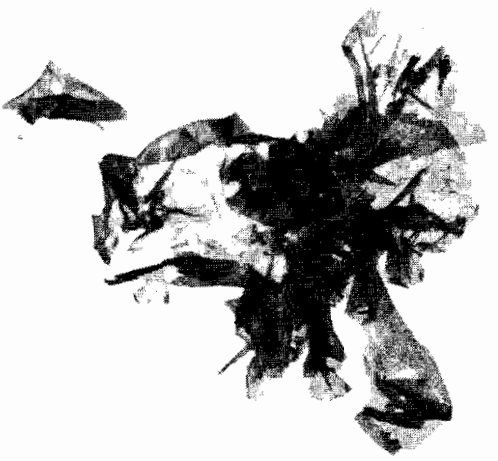

Fig. 2— Ulva lactuca X 1

Fig. 1— Ulva reticulata X 1

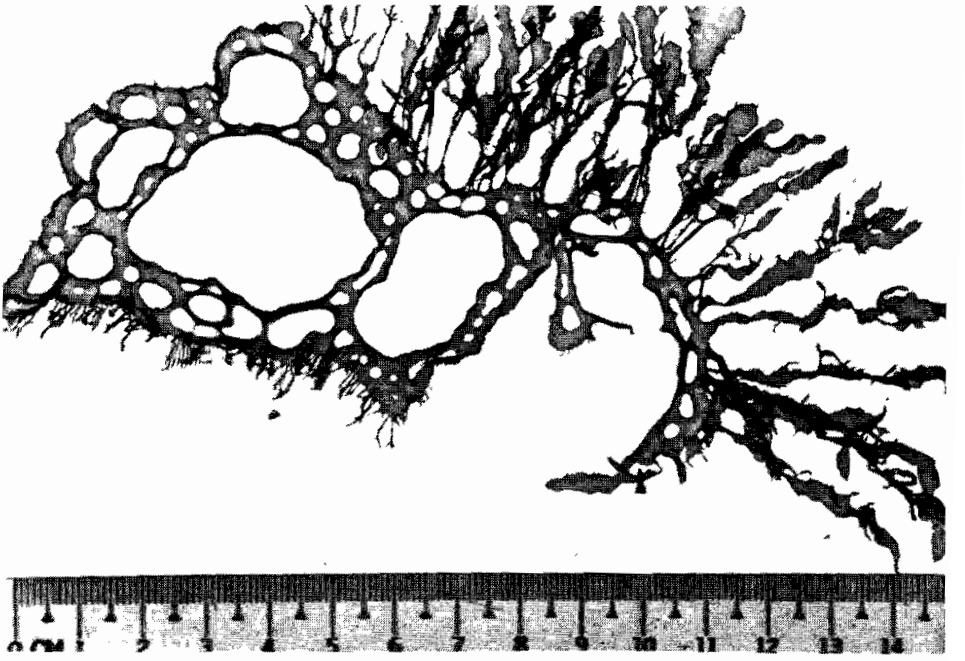

Fig. 2— Ulva reticulata, a form with proliferations

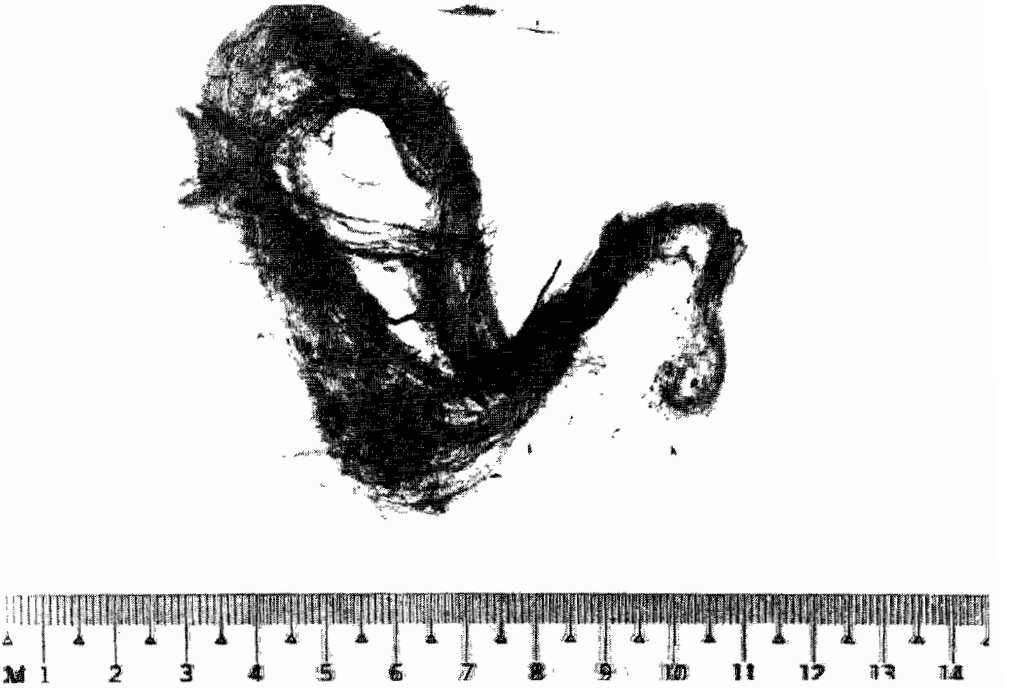

Fig. 1— Chaetomorpha linum

Fig. 2— Borgesenia forbesii X1
(from living specimens)

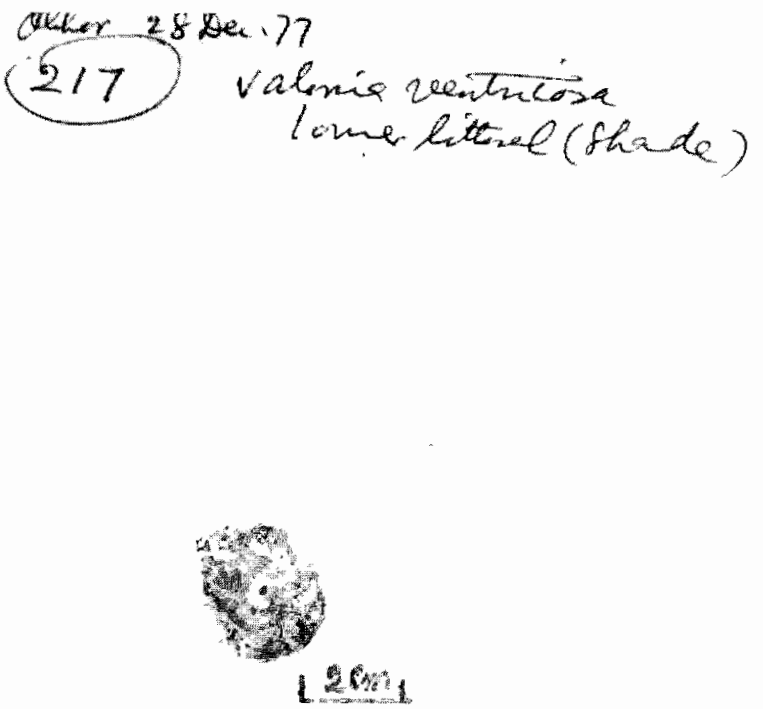

Fig. 1— Valonia ventricosa (pressed)

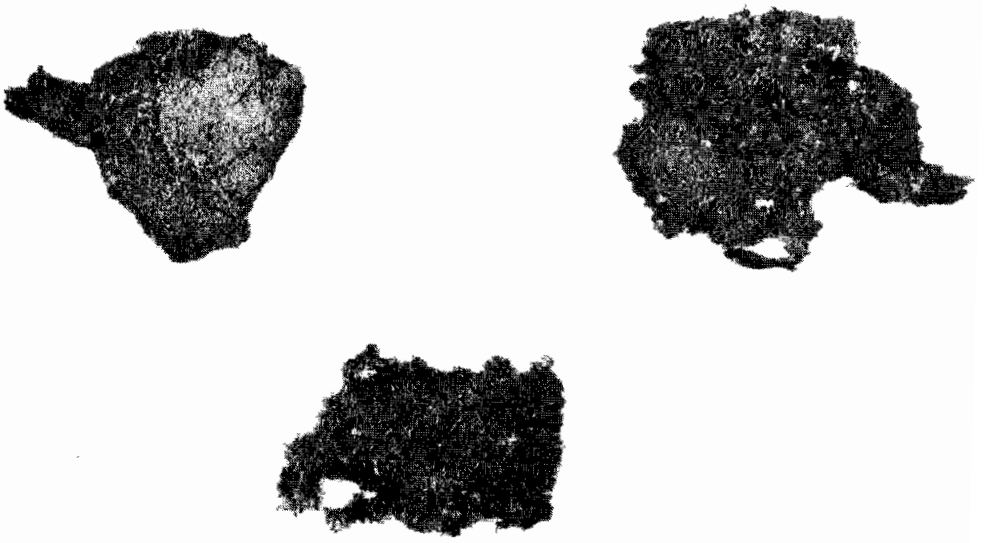

Fig. 2— Cladophoropsis herpestica X 1

Fig. 1— Dictysophaeria cavernosa X 1

Fig. 2— Bryopsis hypnoides

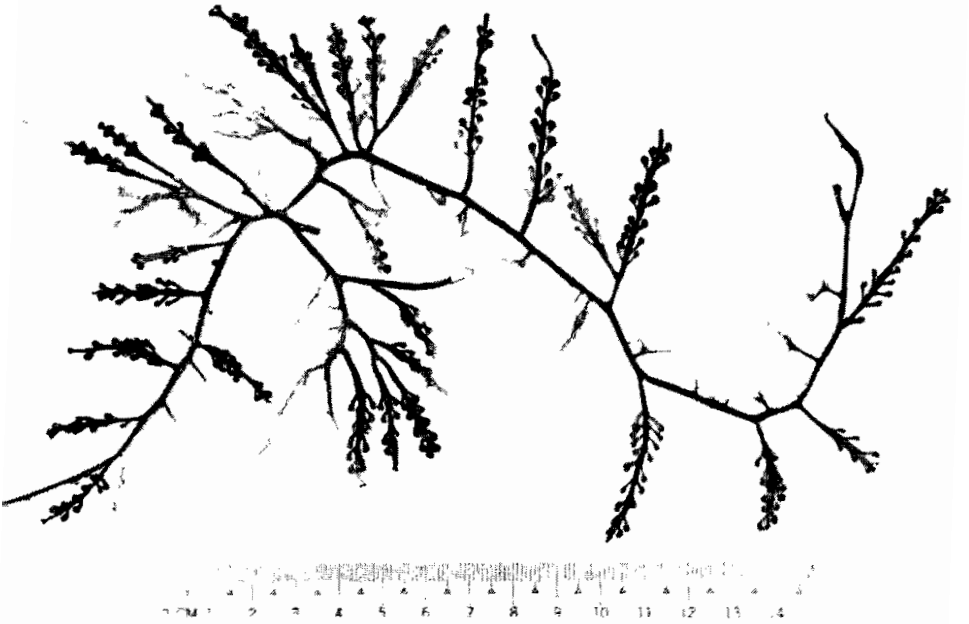

Fig. 1— Caulerpa racemosa

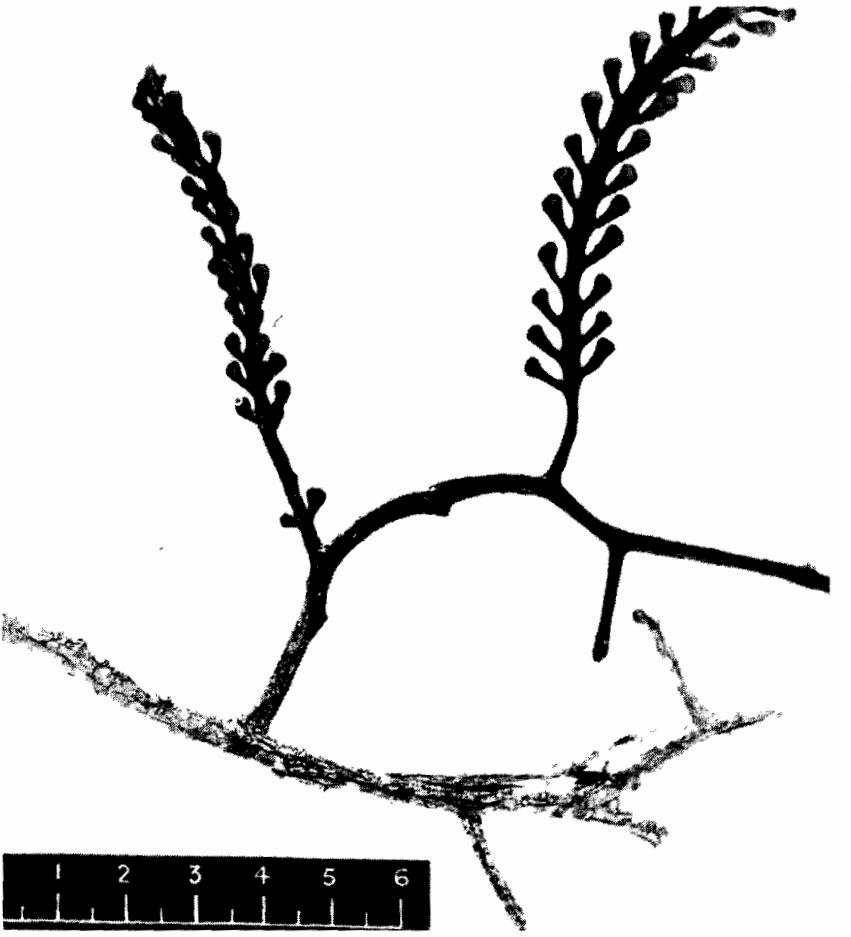

Fig. 2— Caulerpa racemosa (cf. var. disticha Chapman 1977)

Fig. 1— Canlerpa serrulata

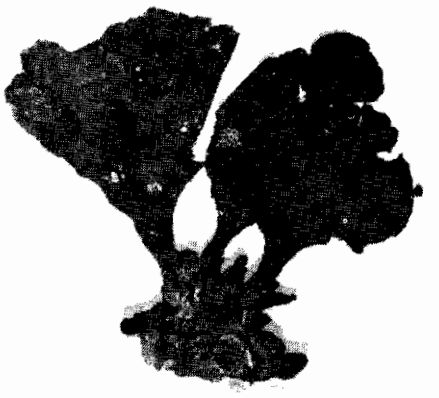

Fig. 2— Avrainvillea amadelpha X1

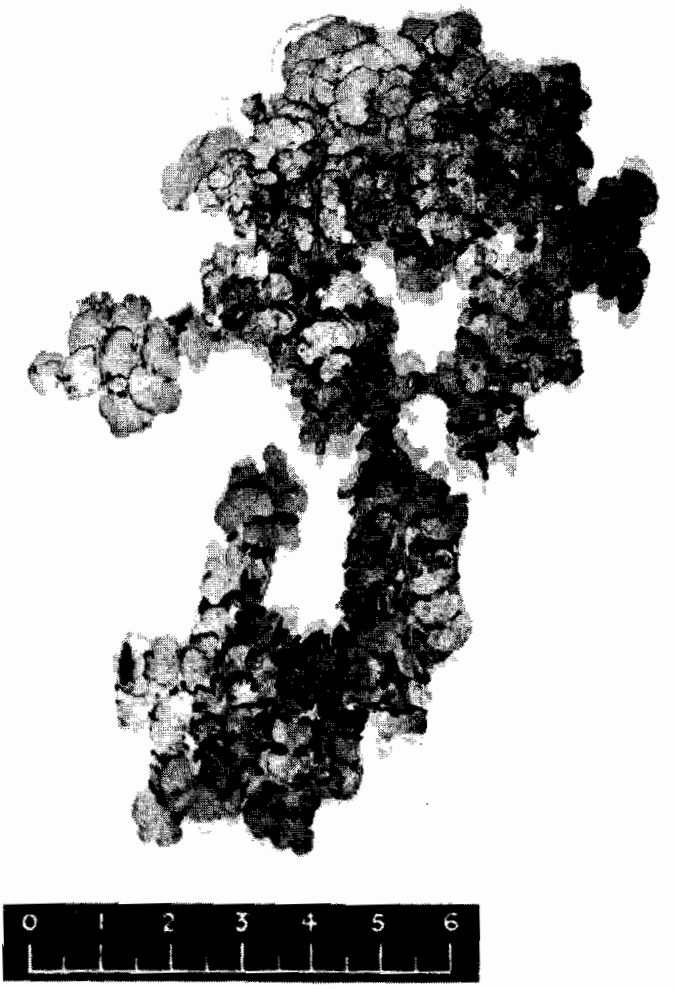

Fig. 1— Halimeda opuntia (Jeddah Harbour)

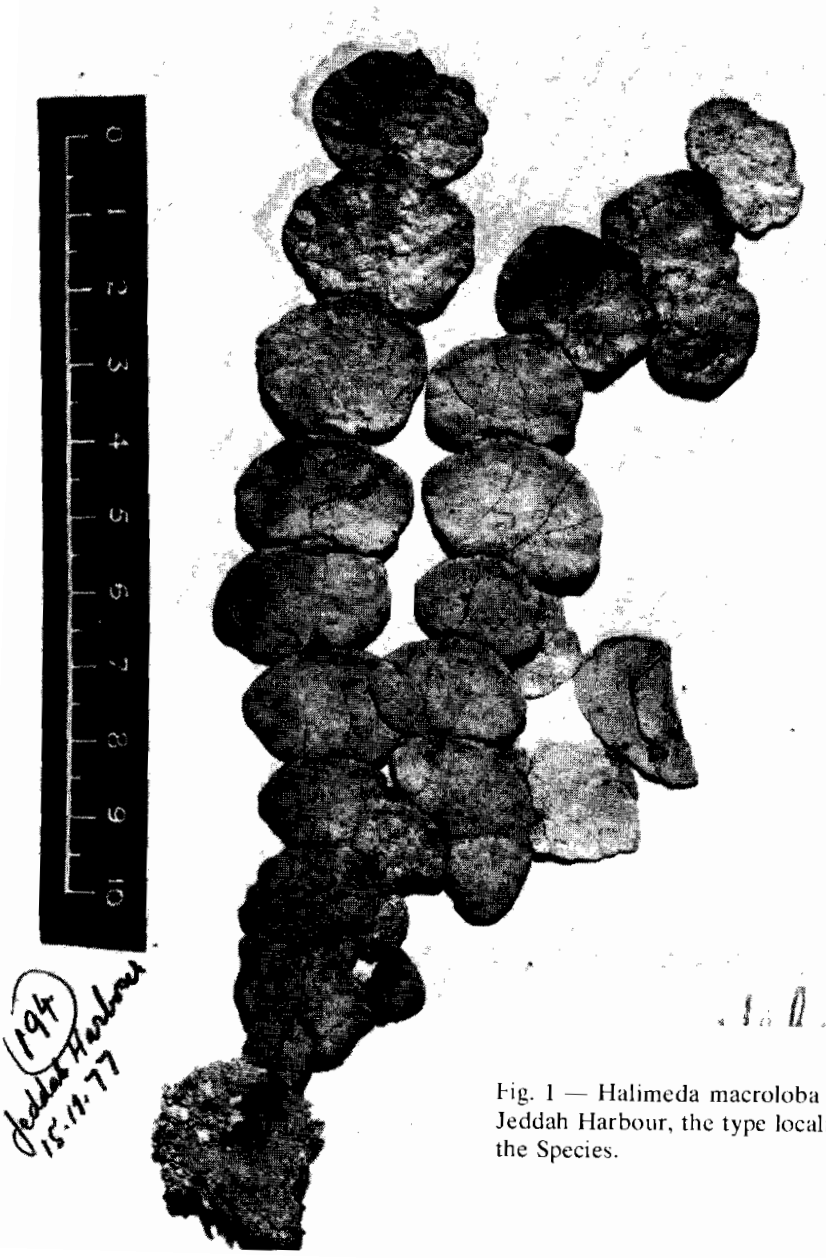

Fig. 1 — Halimeda macroloba from Jeddah Harbour, the type locality of the Species.

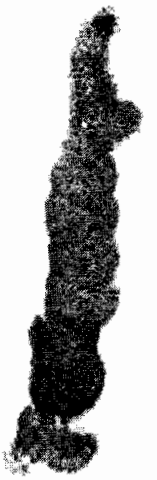

Fig. 1— Tydemania expeditionis from Obhor Creek (—10m)

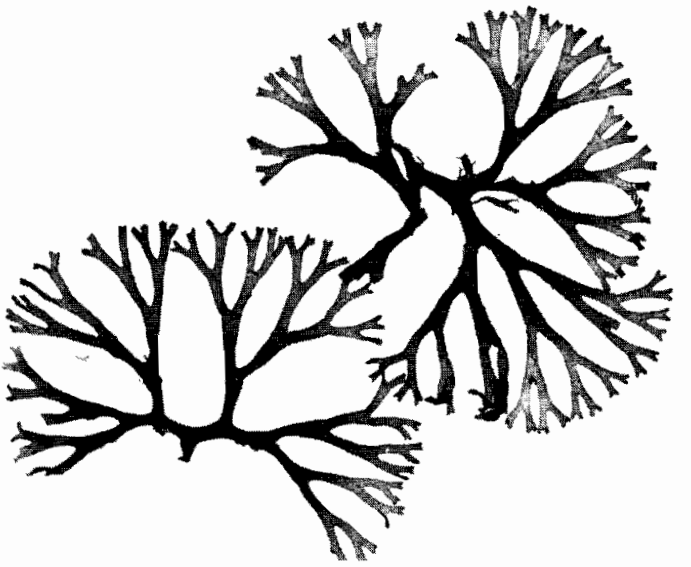

Fig. 2— Dictoyta dichotoma

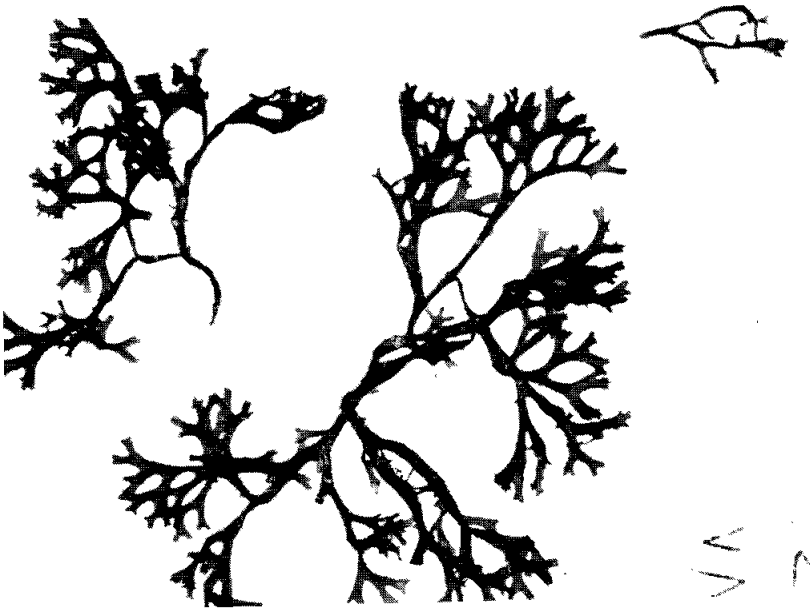

Fig. 1— Dictyota ciliolata

Fig. 2— Dictyota divaricata

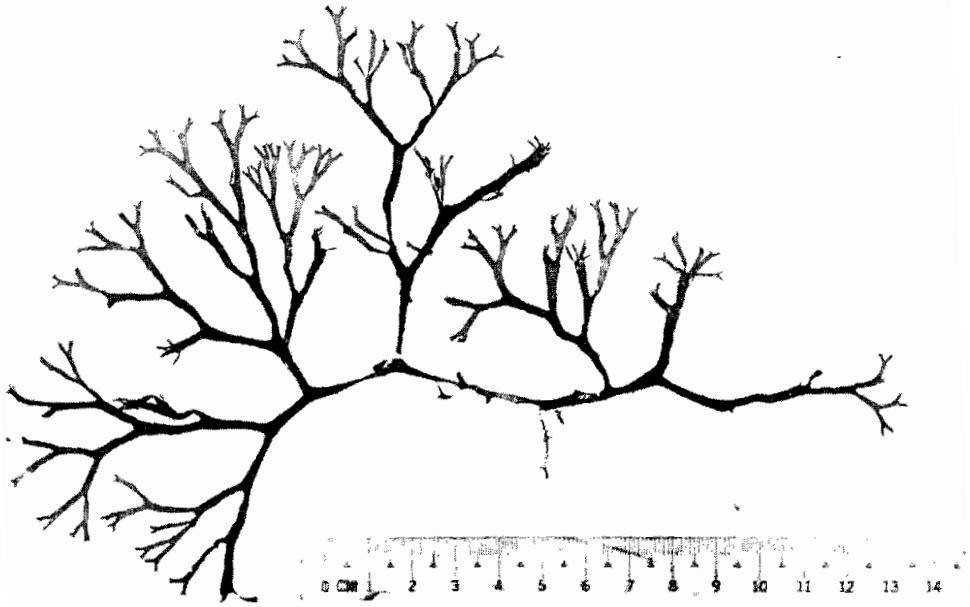

Fig. 1— Dilophus fasciola

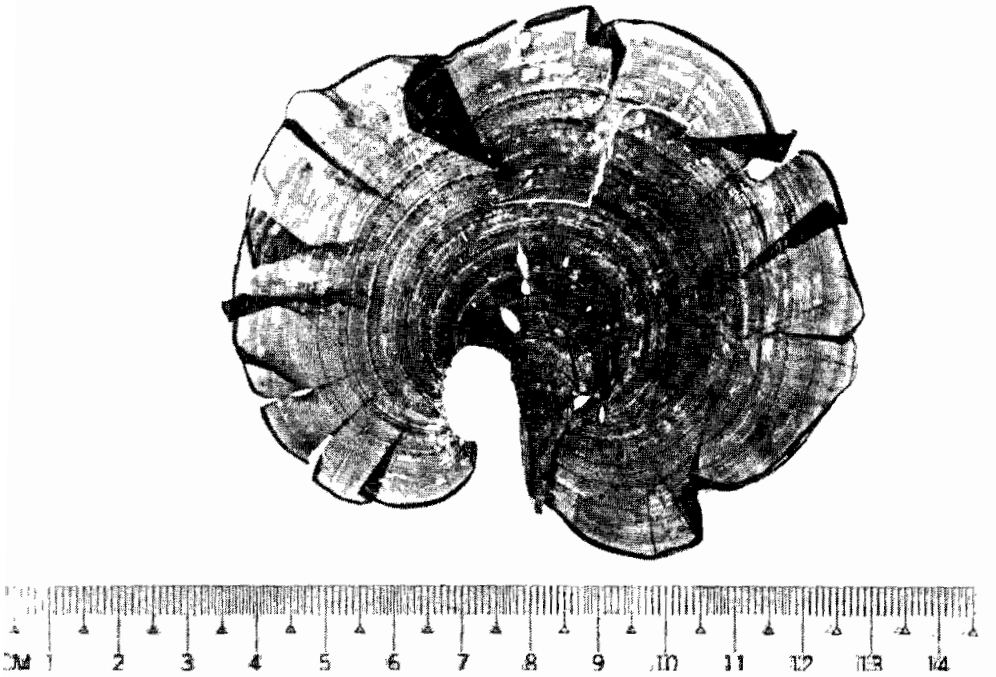

Fig. 1— Padina boryana

Fig. 2— Padina tetrastromatica

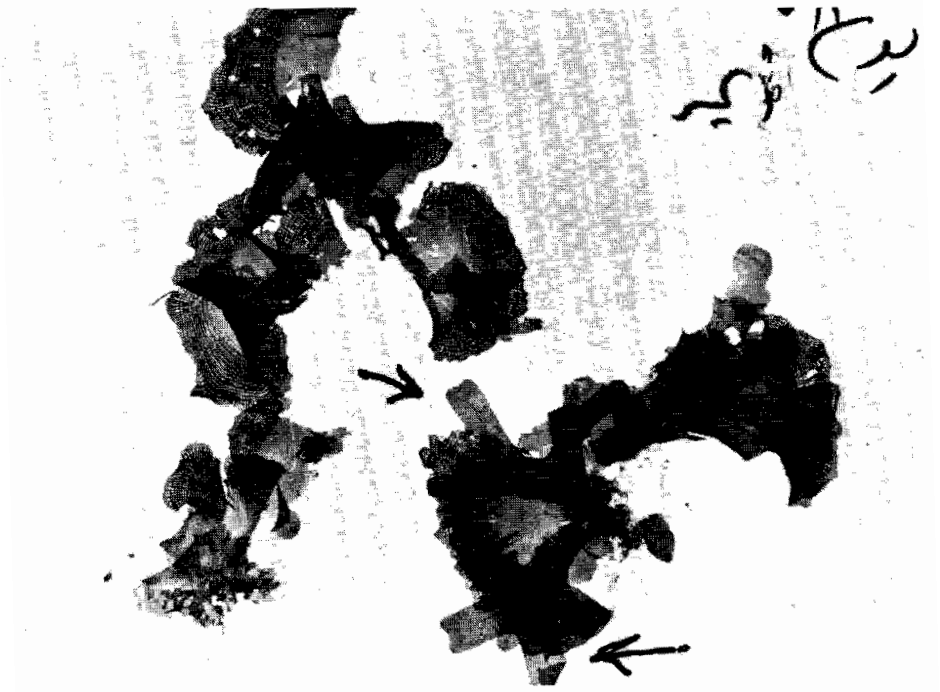

Fig. 1— Dictyopteris delicatula (indicated by arrow) growing on Martensia. (x 2)

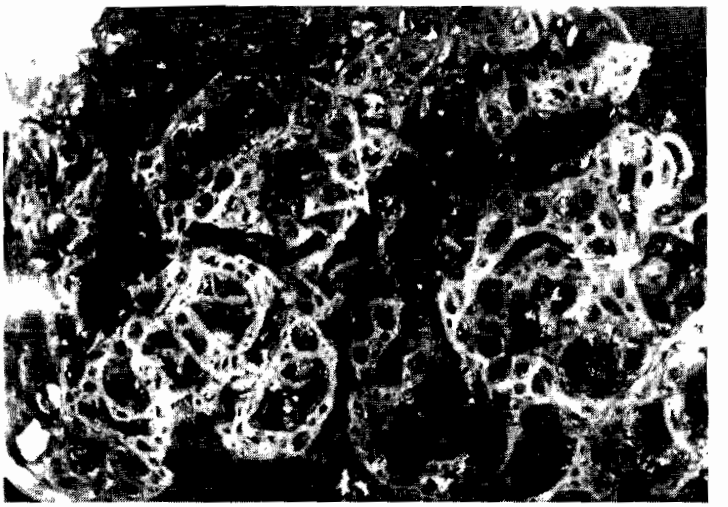

Fig. 2— Hydroclathrus clathratus (XI)

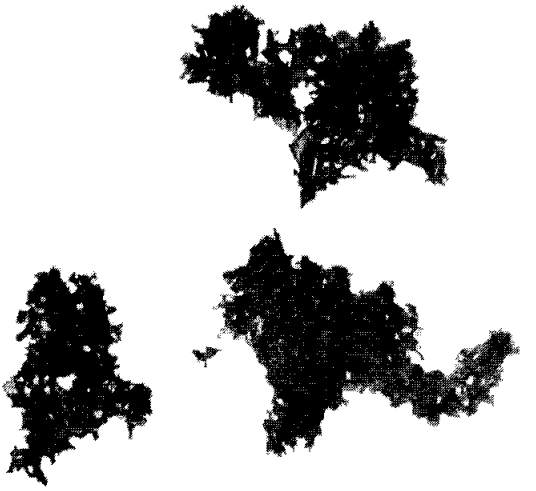

Fig. 1— Rosenvingia intricata

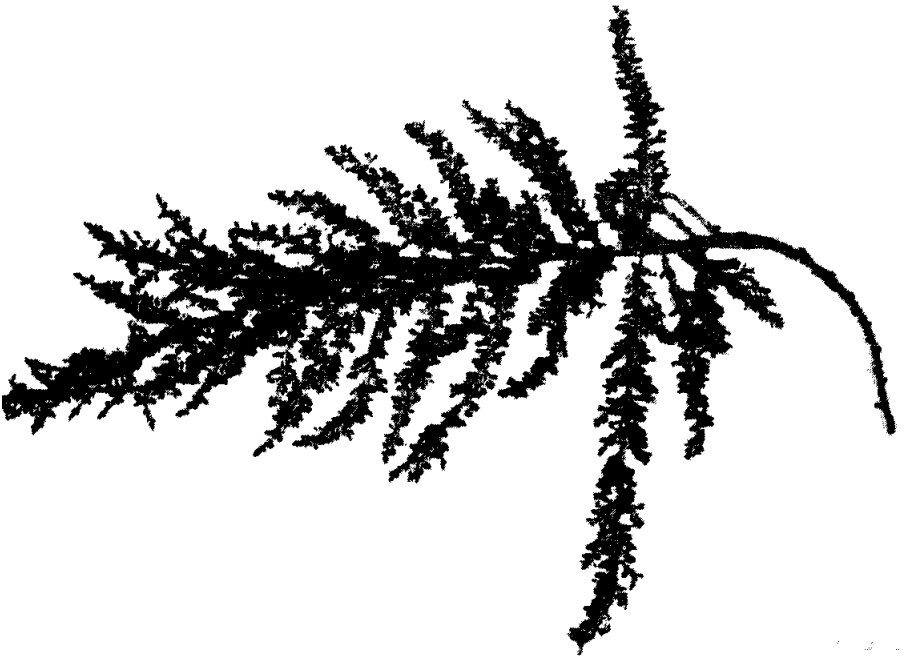

Fig. 2— Cystoseira myrica

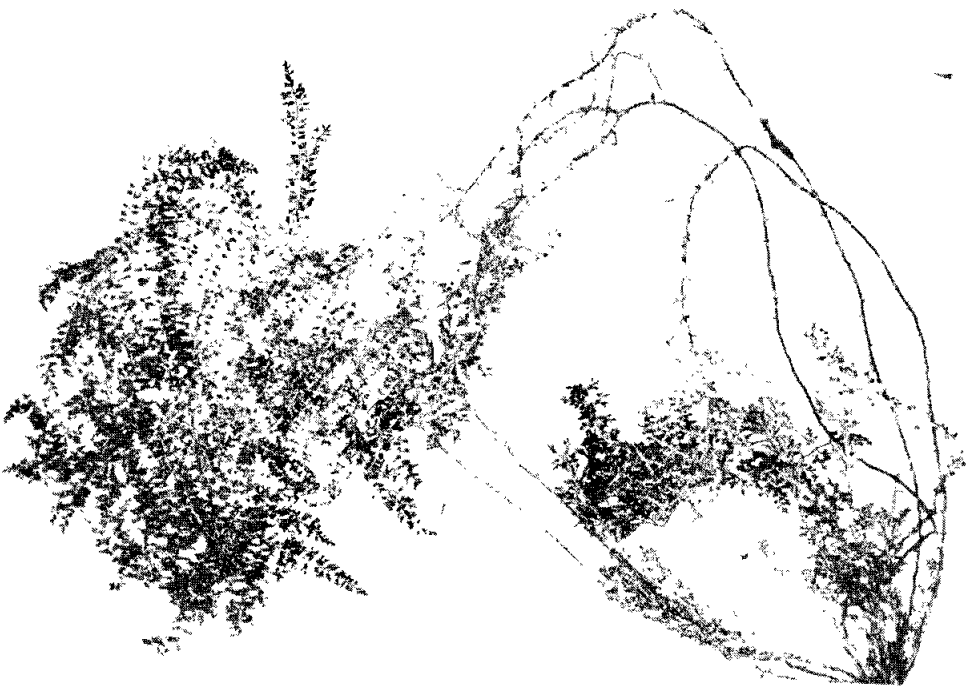

Fig. 1— Cystophyllum trinode

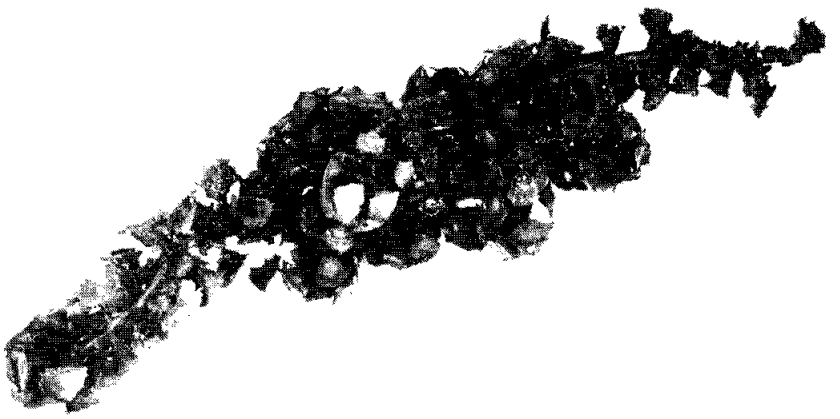

Fig. 2— Turbinaria triquetra

Fig. 1— Sargassum asperifolium

Fig. 1— Sargassum subrepandum

Fig. 2— Sargassum denticulatum

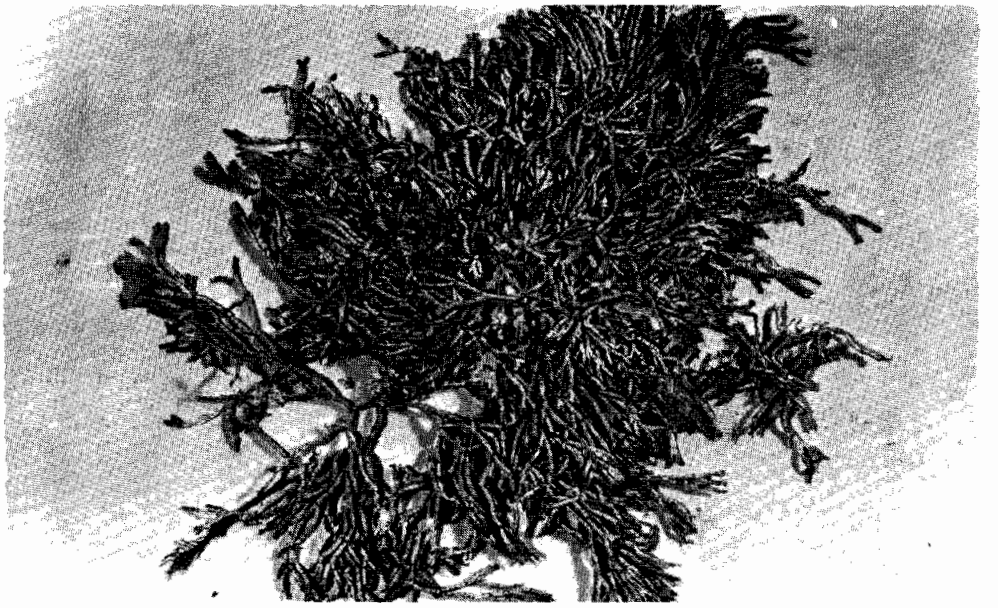

Fig. 1— Liagora turneri

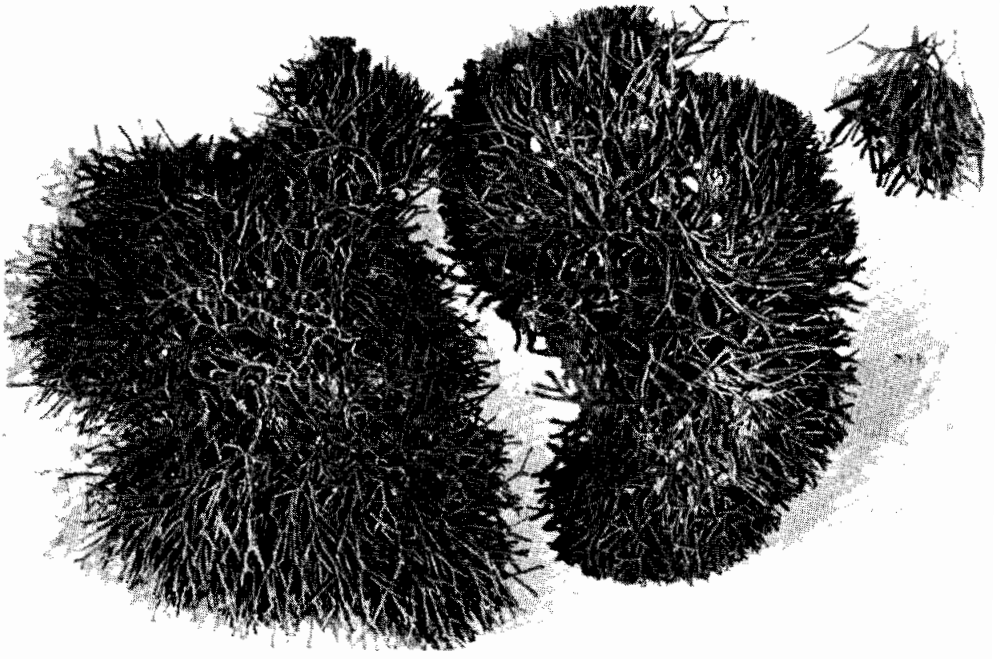

Fig. 2— Actinotrichia fragilis

Fig. 1— Gelidiella acerosa (agarophyte)

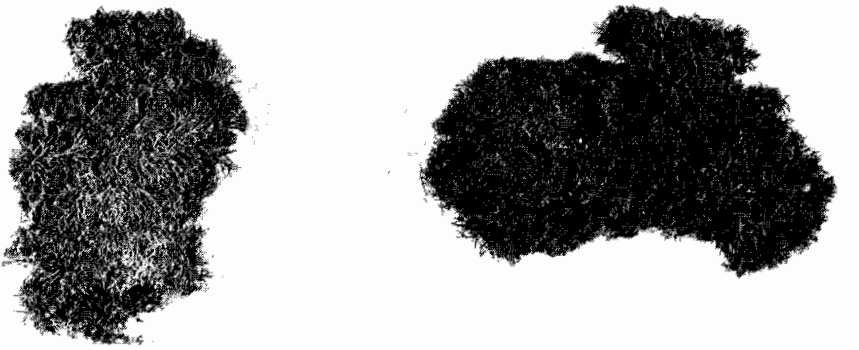

Fig. 1— Jania rubens (dense growth on Digenea simplex)

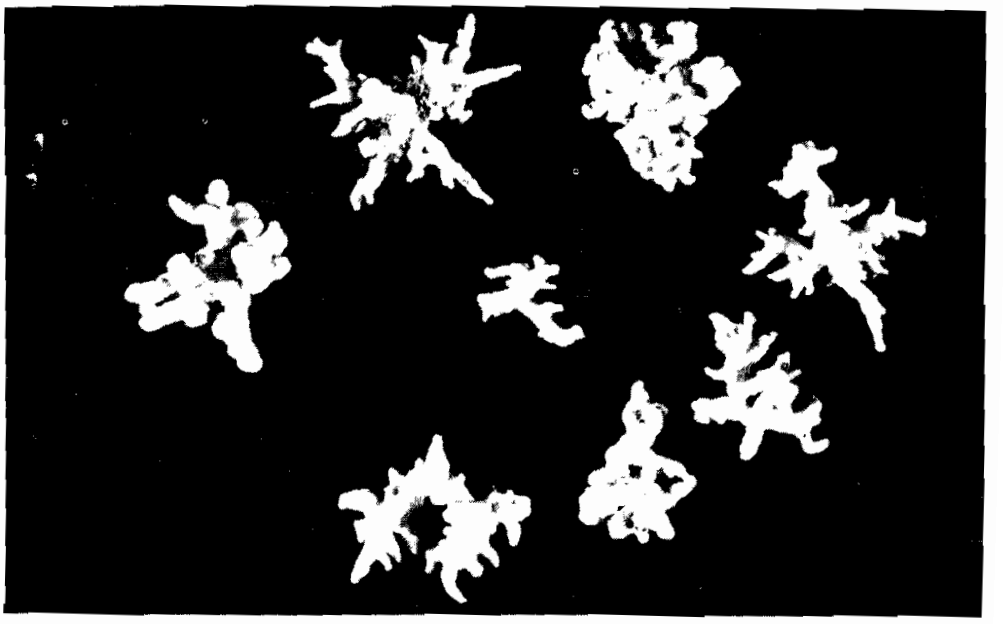

Fig. 2— Lithophyllum kaiseri (form with pointed branches)

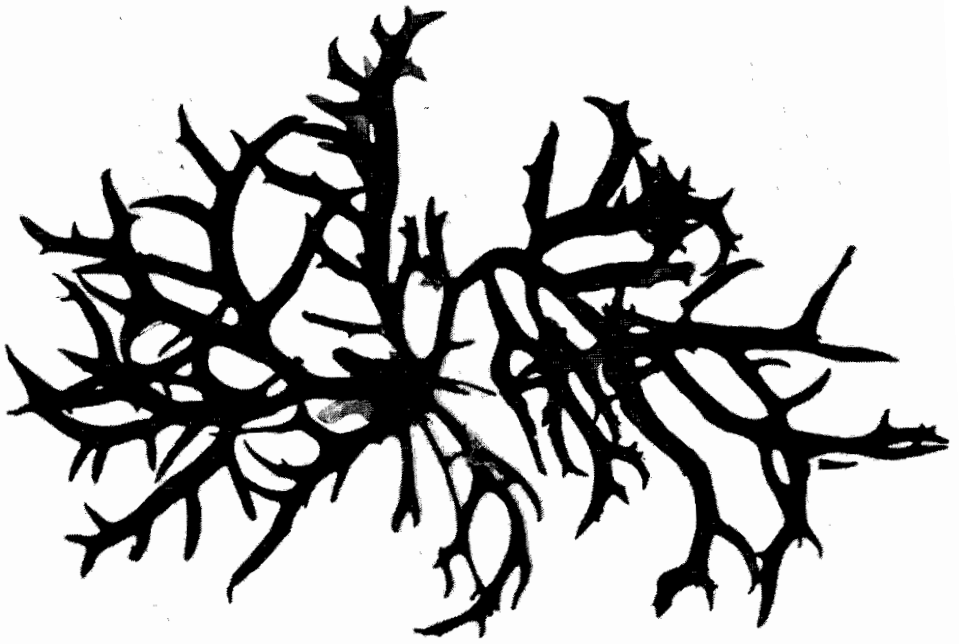

Fig. 1— Gracilaria arcuata

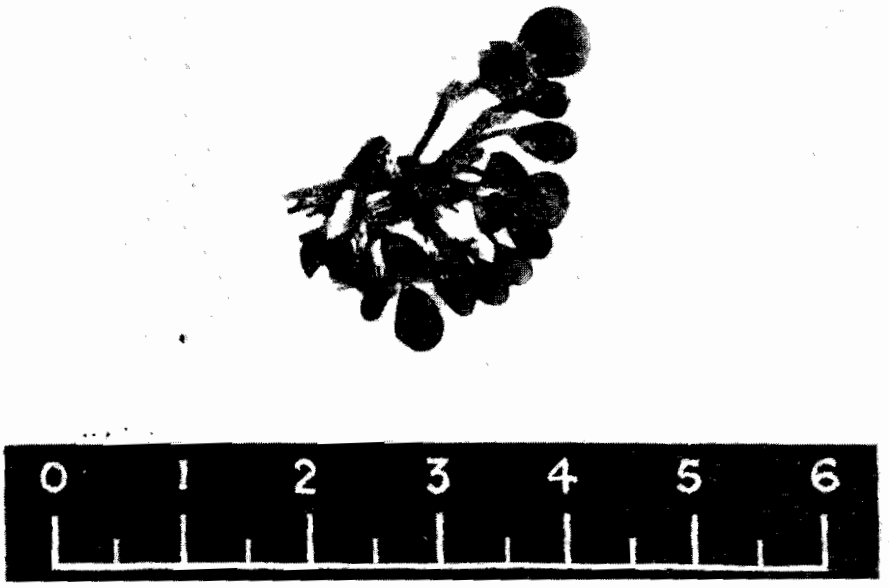

Fig. 2— Botryocladia leptopoda

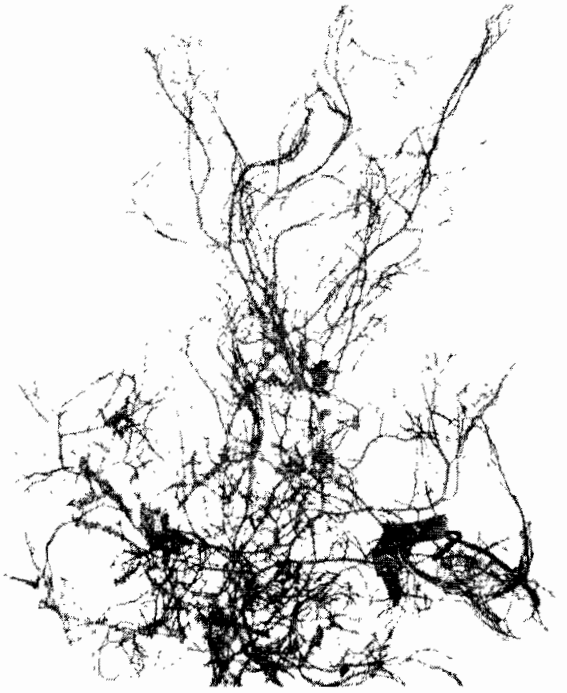

Fig. 1— Hypnea valentiae

Fig. 2— Hypnea esperi

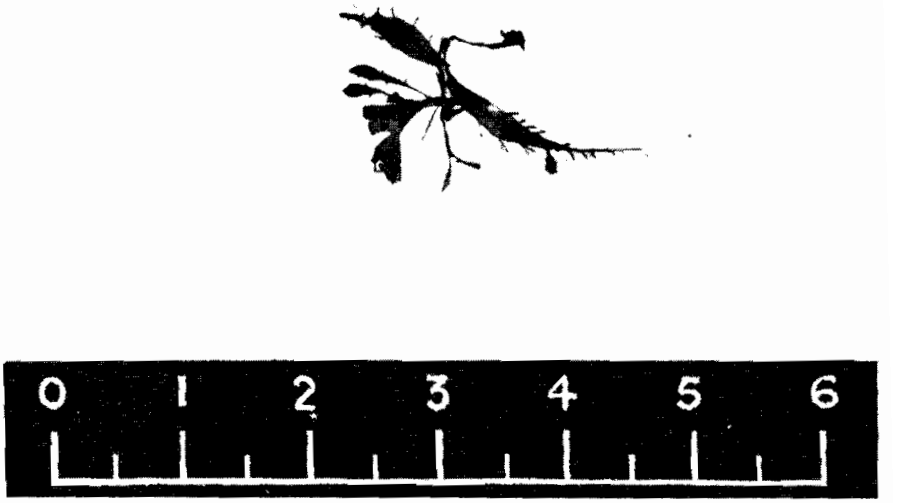

Fig. 1— Hypoglossum spathulatum

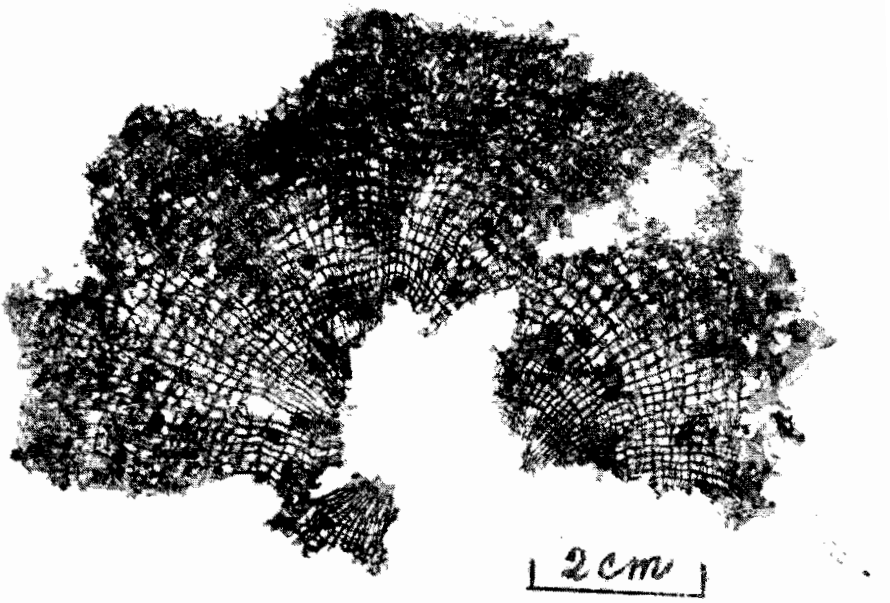

Fig. 2— Martensia elegans, form with coarse lace

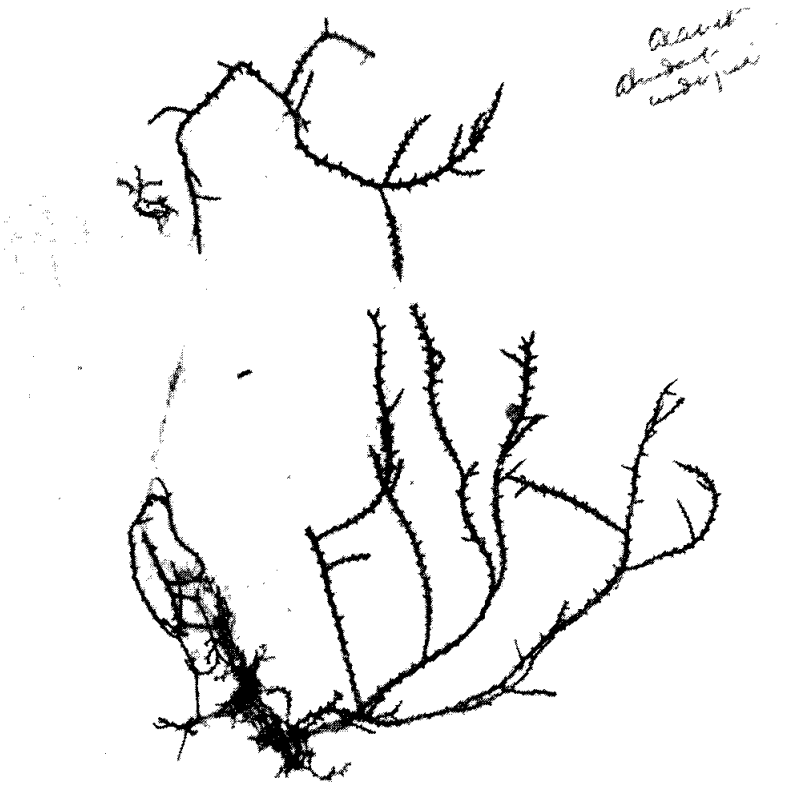

Fig. 1— Acanthophora najadiformis

Fig. 1— Digenea simplex

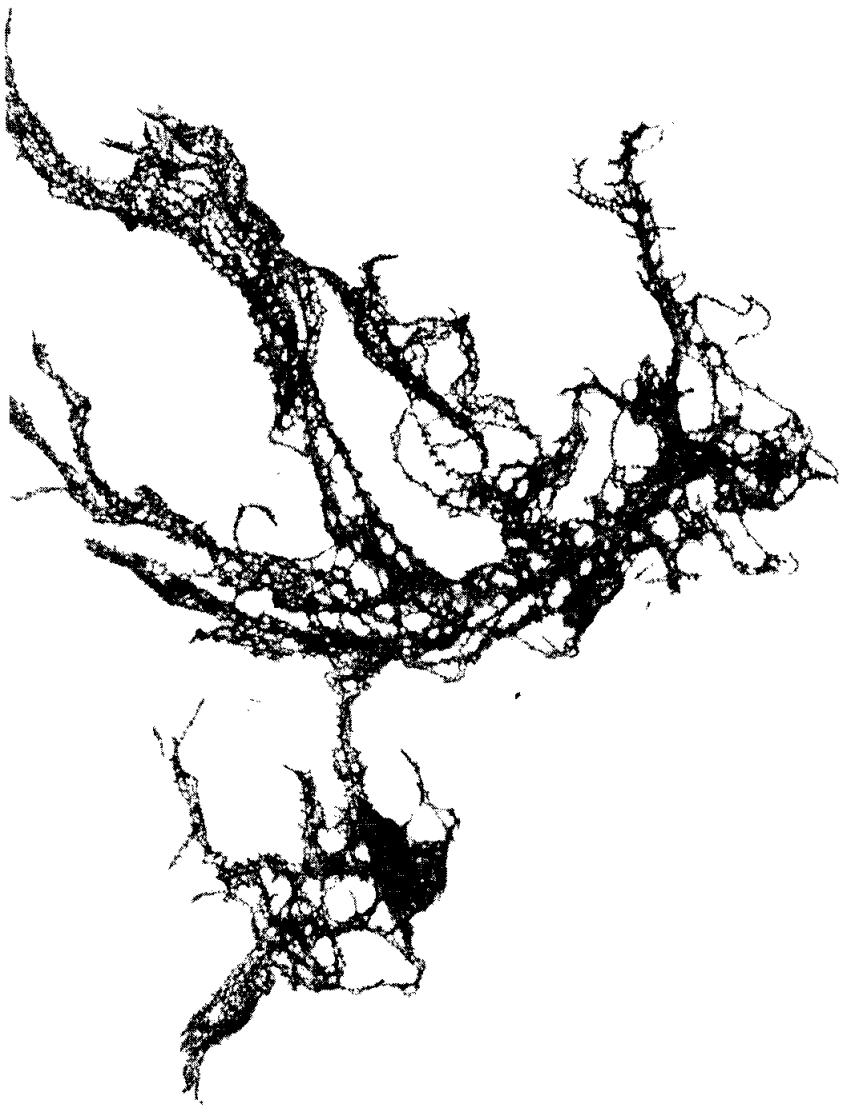

Fig. 1— Leveillea jungermannioides

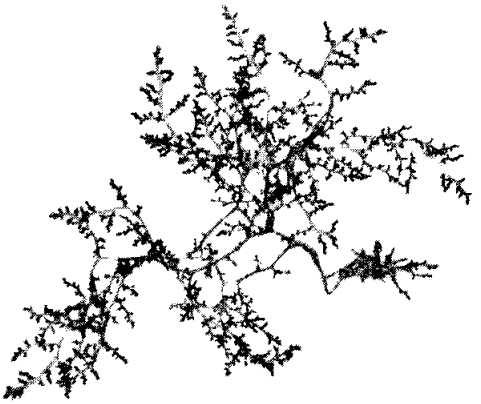

Fig. 1 — Laurencia obtusa

Fig. 2— Laurencia papillosa