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Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. I. Chlorophyta and Xanthophyta

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This paper assembles and, so far as is possible without extended field and herbarium studies, examines critically the validity of records of marine and brackish-water Chlorophyta and Xanthophyta for the western coast of tropical Africa. The whole mainland coastline from the northern boundary of Spanish Sahara southwards to the southern boundary of South West Africa, the oceanic islands from the Salvage Islands southwards to Ascension, and all islands close to the African mainland coast are included in the area covered. Each species entry includes all traced records for the species, the names which have previously been applied to it in the area, and additional comments or evaluation, where necessary. Comments have also been made at generic level in some difficult cases.

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INTRODUCTION

This list covers the seaweeds found on the west coast of tropical Africa from the northern boundary of Spanish Sahara (Spanish West Africa) southwards to the southern boundary of South West Africa. Fernando Póo, São Tomé, Annobon, Príncipe, St. Helena, Ascension, the Canaries and the Salvage Islands are also included, together with all islands close to the coast of the African mainland. A recent over-all assessment of the 'natural zones' of the Atlantic Ocean (Bogdanov, 1961, 1963) appears to place the Canaries and the Salvage Islands within the northern tropical zone, whereas the Madeira Islands appear within the sub-tropical zone. Since the marine flora of the Canaries has been studied intensively, revealing an apparently strong mainland element amongst the seaweeds, we have followed Bogdanov in placing our northern boundary between the Salvage Islands and the Madeira Islands, the latter thus being excluded

from the list area. The Moroccan coast northward to Tangier has similarly been excluded, since its marine flora includes a number of colder water forms and since published work does not always distinguish clearly between records from the Mediterranean coast and records from the Atlantic coast.

There are already in existence lists of freshwater and brackish-water algae for parts of the area now considered. Examples are provided by the publications of Woodhead & Tweed (1958, 1960) and of Lawson (1960, 1965). It is intended that the present list should fill the gap in marine algal data for the area, so far as is possible at this time.

For subdivision of the area covered, modern political boundaries and names are used, except that the Republic of the Congo (Brazzaville) and the Congo Republic (Kinshasa [=Leopoldville]) appear together under the simple title 'Congo'. The combined coastline remains relatively short and the problem of inadequate localization in older records is thus avoided (see Fig. 1).

This first list, which appears in alphabetical order primarily of generic names and within each genus of specific epithets, includes *Chlorophyta* and *Xanthophyta*. Subsequent parts of the list will cover other major groups of the benthic marine algae. A very few microscopic algae are named in the present list; these forms, unfortunately, have hardly been examined for the coastline of the area.

Each main entry consists of:

(i) *The major bold heading*, representing the accepted species name and authorities.

(ii) *Subsidiary italicized headings, in square brackets.* These represent the different ways in which the species has been cited by authors publishing records relevant to the list area. Unless some form of clarification has been considered necessary for comprehension, the manner of citation by the publishing author has been maintained, even when manifestly incorrect, so that workers who consult the original texts shall not be in doubt as to which record we have attributed to which accepted species in this list.

(iii) *The distributional data*, with countries arranged in alphabetical order and more generalized data appearing after the specified countries. The numbers given in parentheses refer to the corresponding numbers in the references. New records, based either on recent field-observations or on herbarium studies by various workers, appear mostly with the word 'unpublished', in parentheses, following them. An exception has been made in the case of reference number 135; Dr T. A. Norton kindly provided us with many records from his Canary Islands collections.

(iv) *Additional notes* were necessary in the cases of many species; where used, these notes are inset immediately below the entry concerned. Where, in the absence of such a note, a species name is preceded by a question mark, the validity of the inclusion of that species in the list must be regarded with doubt. The citation of references in the explanatory notes takes one of two forms. Where a cited work does not appear in the terminal references, data adequate to locating it are given in the note. Otherwise, the name of the author is followed by two figures, in parentheses and separated by a colon; the first figure is the number in the terminal references and the second represents the relevant page reference(s) in the work.

The nomenclature has been revised as far as possible and the complete author citation is given for each accepted combination. Those discarded combinations under which

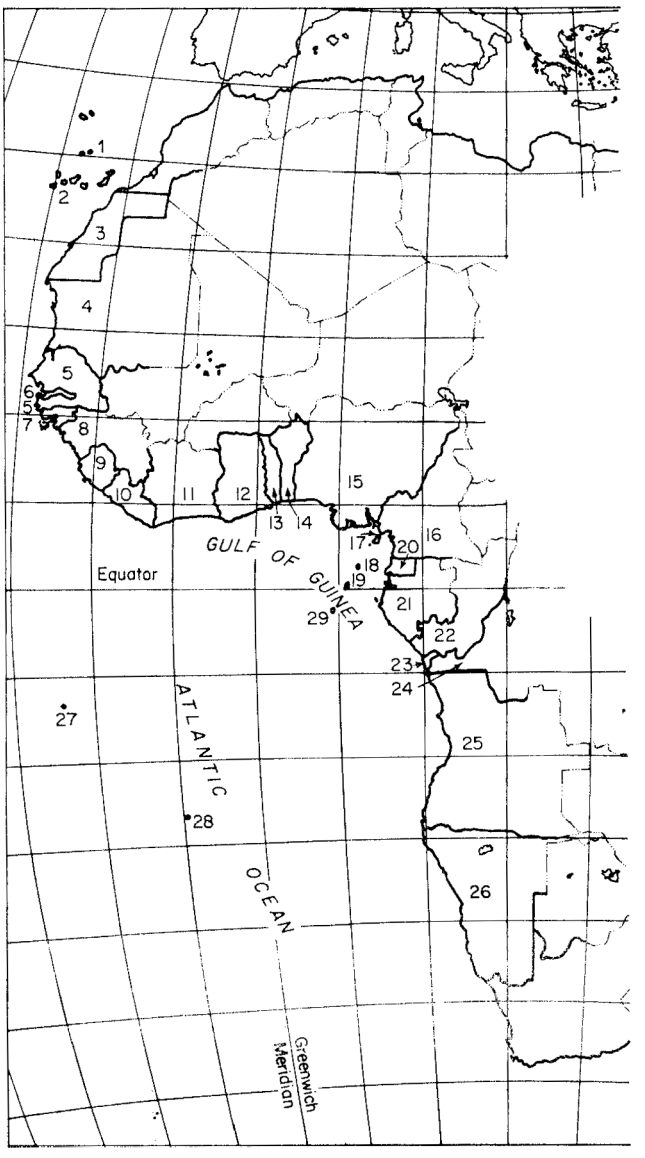

FIGURE 1. The coastline of tropical West Africa.
1, Salvage Islands; 2, Canary Islands; 3, Spanish Sahara [=Spanish West Africa, but excluding Ifni]; 4, Mauritanie; 5, Sénégal; 6, Gambia; 7, Portuguese Guinea; 8, Guinée; 9, Sierra Leone; 10, Liberia; 11, Ivory Coast; 12, Ghana; 13, Togo; 14, Dahomey; 15, Nigeria; 16, Cameroun; 17, Fernando Póo; 18, Príncipe; 19, São Tomé; 20, Spanish Guinea [=Río Muni]; 21, Gabon; 22, Republic of the Congo [Brazzaville]; 23, Cabinda; 24, Congo Republic [Kinshasa]; 25, Angola; 26, South West Africa; 27, Ascension Island; 28, Saint Helena; 29, Annobon. The Cape Verde Islands, which lie immediately to the west of Dakar (Sénégal), have been omitted from this map but are included in the list which follows.

West African records have previously been made are also included in the main list as separate entries; these are simply cross-referenced to the currently accepted names. We would emphasize that the list is a preliminary clarification of records and nomenclature of seaweeds reported from the area. Largely, this list is based on existing published records and will therefore need revision consequent upon future research.

It is difficult to avoid errors and omissions in a publication of this type and scope; we would be very grateful for any amendments or additional data, whether already published or not. Grateful acknowledgement is made to Mr R. Ross, Keeper of Botany, British Museum (Natural History), for the provision of research facilities and for help in matters of nomenclature. The manuscript has also been read critically by Drs P. S. Dixon and W. T. Stearn, to whom we express thanks for their constructive comments.

SPECIES LIST

Acetabularia acetabulum (L.) Silva

[As *Acetabularia mediterranea* Lamour.]

Canaries (15; 62; 65; 102; 135; 138; 161; 182).

[As *Acetabularia integra* Lamour.]

Canaries (111).

Note. This species is most often called by the name *A. mediterranea* Lamour., despite the fact that Silva (*Univ. Calif. Publs Bot.*, **25**: 255, 1952) showed that the correct name is *A. acetabulum*. Børgesen's (15: 77) record is based simply on the reports by Piccone (138) and Vickers (182).

Acetabularia integra Lamour.

See *Acetabularia acetabulum* (L.) Silva.

Acetabularia mediterranea Lamour.

See *Acetabularia acetabulum* (L.) Silva.

Acetabularia sp.

Canaries (102; 135).

Note. Norton (1967, *in litt.*) considers that his material keys out to *A. exigua* Solms-Laubach, but that confirmation is needed.

Aegagropila (sensu Kützing)

See *Cladophora coelothrix* Kütz.; *C. kamerunica* Brand; *C. liebetruthii* Grün.; *C. pellucida* (Huds.) Kütz.; *Cladophoropsis membranacea* (C. Ag.) Børg.

Anadyomene calodictyon Mont.

See *Microdictyon calodictyon* (Mont.) Dcne.

Anadyomene flabellata Lamour.

See *Anadyomene stellata* (Wulf.) C. Ag.

Anadyomene stellata (Wulf.) C. Ag.

Canaries (11; 15; 57; 65; 128; 182).

'Atlantic Ocean . . . African coasts' (57).

[As ***Anadyomene flabellata*** Lamour.]

Canaries (138).

Ascothamnion intricatum (Clem.) Kütz.

Note. Recorded from the Atlantic coasts of Africa by Kützing (104: 508) and De Toni (43: 381), but is actually an animal, *Zoobotrium pellucidum* Hempr. et Ehrenb.

Avrainvillea canariensis A. Gepp et E. S. Gepp

See *Rhipilia tomentosa* Kütz.

Blastophysa rhizopus Reinke

Canaries (65).

Blastophysa sp.

Canaries (15; 157).

Note. Sauvageau (157: 50) simply mentions an alga resembling *Blastophysa* and Børgesen's record (15: 16) is based directly and solely on this.

Blidingia marginata (J. Ag.) P. Dang.

[As *Enteromorpha marginata* J. Ag.]

Sénégal (173; 179).

[As ***Enteromorpha micrococca*** Kütz.]

' . . . Du Spitsberg aux Canaries . . . ' (22).

' . . . ad lapides et algas in limite maris praecipue ad littora calidiora Oceani atlantico . . . ' (43).

[As *Enteromorpha micrococca* Kütz. var. *polyopa* Bornet]

Canaries (22).

[As ***Enteromorpha micrococca*** Kütz. ***β tortuosa*** J. Ag.]

' . . . ad lapides et algas in limite maris, praecipue ad littora calidiora oceani atlantici . . . ' (4).

Note. The synonymy presented here is based on the work of Bliding (12).

Blidingia minima (Näg. ex Kütz.) Kylin.

Canaries (135; 163).

[As ***Enteromorpha (Blidingia) minima*** (Naegeli) Kütz.]

Sénégal (36).

[As ***Enteromorpha minima*** Näg. ex Kütz.]

Canaries (15; 65).

Sénégal (36; 173).

Boodlea composita (Harv.) Brand

Ghana (116; 122).

?***Boodleopsis pusillus*** (Collins) W. R. Taylor, Joly et Bernatow.

Sierra Leone (117).

[As ***Dichotomosiphon tuberosus*** (A. Br.) Ernst]

Sierra Leone (114).

Note. Lawson (117: 170) has expressed doubt about even this determination of the material which he collected; aside from that, Taylor (178: 157–158) has stated the

possibility that the plant is a protonemal stage of some more elaborate member of the Codiaceae.

Bryopsis

It is clear from several dubiously based records that the genus *Bryopsis* requires careful collection and revision for this area; this is at least partially true for the whole world. Some of the distinctions employed in taxonomic treatment of the genus are of dubious validity and there may be life-history connexions with the *Derbesia-Halicystis* complex.

Bryopsis balbisiana Lamour. ex C. Ag.

Canaries (15; 22; 28; 62; 65; 73; 135; 163; 182).
Sénégal (173).
[As *Bryopsis balbisiana* Lamour. var. *disticha* J. Ag.]
Angola (88).
[As *Bryopsis balbisiana* Lamour. *β disticha* J. Ag.]
Angola (87).
[As *Bryopsis duplex* De Not.]
Angola (43).

Bryopsis caespitosa Suhr ex Kütz.

Cape Verde Islands (7).
'. . . Afrique méridionale . . .' (7).

Bryopsis corymbosa J. Ag.

Canaries (15; 62; 65; 70; 73; 163).
Sénégal (173).
Note. Sourie's (173: 106) record from Sénégal is given with the qualification '?'.

Bryopsis cupressina Lamour.

Canaries (11; 15; 22; 65; 128; 161).
[As *Bryopsis cupressoides* Kütz.]
Sénégal (173).

Note. J. Agardh (*Algae maris Mediterranei et Adriatici*, . . .: 20–21, 1842) seems to have been responsible for the introduction of the epithet *cupressoides* as an orthographic variant of *cupressina*; he does not explain this and there seems to be no justification for it. There is doubt about the presence of this species in the area; with one exception, all the Canaries records are based on that in (128) which in turn relates to a single specimen that cannot now be traced in the Paris herbarium.

Bryopsis dalmatica Kütz.

See *Derbesia lamourouxii* Solier.

Bryopsis densa Pilg.

See *Bryopsis pennata* Lamour. var. *secunda* (Harv.) Coll. et Herv.

Note. Steentoft (176: 110–111) has stated that an isotype of *B. densa*, in Herb. Børgesen, Copenhagen, is a form of *B. pennata* var. *secunda*; the question of the homogeneity of the original collection remains unsettled.

Bryopsis duplex De Not.

See *Bryopsis balbisiana* Lamour.

Bryopsis hypnoides Lamour.

Canaries (15; 65; 161; 182).

Note. **Vickers (182: 300)** records this species with doubt, as her specimens were not well developed.

Bryopsis myosuroides Kütz.

See *Bryopsis setacea* Hering.

Bryopsis pennata Lamour.

Angola (68; 176).
Annobon (176).
Cameroun (176).
Ghana (68; 176).
Nigeria (68; 176).
São Tomé (176).
Sénégal (36; 68; 173; 176).
Sierra Leone (68; 173; 176).
Pantropical (173).

Note. Records for Angola (176) and Sénégal (36) were published with some doubt.

Bryopsis pennata Lamour. var. ***secunda*** (Harv.) Coll. et Herv.

Annobon (176).
Ghana (176).
São Tomé (176).
[As *Bryopsis densa* Pilg.]
Annobon (148).
[As ***Bryopsis plumosa*** **(Huds.)** C. Ag.]
São Tomé (82; 91; 176).

Bryopsis plumosa (Huds.) C. Ag.

Canaries (15; 65; 161; 182).
South West Africa (unpublished).
'. . . Atlantique, jusqu'en Mauritanie. . . . ' (74).
'. . . an der Westküste Afrikas von den Azoren bis zum Kap der Guten Hoffnung. . . . ' (181).

[As *Bryopsis balbisiana* Lamour.]
Sénégal (36; 130).
[As *Bryopsis plumosa* (Huds.) C. Ag. var. *harveyana* Børg.]
Ghana (unpublished).
[As *Bryopsis plumosa* (Huds.) C. Ag. var. *major*]
Sénégal (173).
[As *Bryopsis plumosa* (Huds.) C. Ag. var. *pennata* Børg.]
Ghana (unpublished).
[As *Bryopsis plumosa* (Huds.) C. Ag. var. *typica* Børg.]
Ghana (unpublished).
[As *Bryopsis ramulosa* Mont.]
Canaries (15; 138).
Sénégal (5; 7; 43; 131).
'Westafrika' (161).
'West coast of Africa' (15).

Bryopsis ramulosa Mont.

See *Bryopsis plumosa* (Huds.) C. Ag.

Bryopsis setacea Her.

[As *Bryopsis myosuroides* Kütz.]
Sénégal (36; 173).

Note. Sourie (173: 106) recorded his material with '?', whilst Dangeard (36: 228) carefully qualified his record. There is need for confirmation of the presence of this species in the area.

Bryopsis stenoptera Pilg.

Cameroun (68; 147; 175).
Nigeria (68; 175).

? ***Bryopsis tenuis*** Levr.

South West Africa (unpublished).

Bryopsis spp.

Cameroun (115).
Cape Verde Islands (133).
Ghana (116).
Guinée (124; 173).
Sénégal (36).
Sierra Leone (117).

Caulerpa

The morphological and nomenclatural complexity of this genus makes a meaningful statement of the situation in West Africa very difficult. An excellent summary of the difficult situation in another tropical area has been given by W. R. Taylor (178: 134).

Caulerpa ambigua Okam.

See *Caulerpa vickersiae* Børg.

Caulerpa chemnitzia (Esp.) Lamour.

See *Caulerpa racemosa* (Forsk.) J. Ag. var. *turbinata* (J. Ag.) Eubank.

Caulerpa clavifera (Turn.) C. Ag.

See *Caulerpa racemosa* (Forsk.) J. Ag. var. *racemosa*.

Caulerpa crassifolia (C. Ag.) J. Ag.

See *Caulerpa taxifolia* (Vahl) C. Ag.

Caulerpa crassifolia forma ***typica*** (Weber van Bosse) Børg.

See *Caulerpa taxifolia* (Vahl) C. Ag.

Caulerpa cupressoides (West ex Vahl) C. Ag.

Cameroun (176).

'. . . Kamerun nebst den Guinea-Inseln. . . . ' (92).

Canaries (135).

Mauritanie (66).

São Tomé (82; 91; 119; 176).

[As *Caulerpa cupressoides* (Vahl) Weber van Bosse var. *mamillosa* Weber van Bosse]

Canaries (155).

[As *Caulerpa cupressoides* (Vahl) Weber van Bosse var. *mamillosa* Weber van Bosse forma *canariensis* Weber van Bosse]

Canaries (183).

[As *Chauvinia cupressoides* Kütz.]

São Tomé (89; 90).

Note. Hieronymus (92: 4–7, 30) gives the distribution as noted above. The implication is 'Cameroun including the Gulf of Guinea Islands', which can only refer to Fernando Póo, Príncipe, São Tomé and Annobon. Hence, these must be considered as within the recorded distribution of the species until further study has established the veracity of the records. It may be that the records from these islands and from Cameroun will finally have to be discounted as Steentoft (176: 111) was unable to trace specimens to substantiate them. See also *C. lessonii* Bory.

Caulerpa denticulata (Forsk.) Dcne

See *Caulerpa scalpelliformis* (R. Br. ex Turn.) C. Ag.

Caulerpa lamourouxii C. Ag.

See *Caulerpa racemosa* (Forsk.) C. Ag. var. *racemosa*.

Caulerpa lessonii Bory

Annobon (148).

Note. Pilger (148: 2) actually records the entity as *Caulerpa* cf. *lessonii* Bory, on the basis of a letter from Weber van Bosse which he quotes in his text (' . . . Die

Caulerpa gehört zur Gruppe der *Thuyoideae* und hat grosse Ähnlichkeit mit *Caulerpa Lessonii* Bory . . . '). Steentoft (176: 111) considers that it is difficult to distinguish between some forms of *C. lessonii* and of *C. cupressoides*.

Caulerpa mexicana Sond. ex Kütz.

See *Caulerpa taxifolia* (Vahl) C. Ag.

Caulerpa obtusa Lamour.

See *Caulerpa taxifolia* (Vahl) C. Ag.

Caulerpa pectinata Kütz.

See *Caulerpa taxifolia* (Vahl) C. Ag.

Caulerpa peltata Lamour.

See *Caulerpa racemosa* (Forsk.) J. Ag. vars. *racemosa* and *peltata* (Lamour.) Eubank.

Caulerpa pinnata (L.) Weber van Bosse

See *Caulerpa taxifolia* (Vahl) C. Ag.

Caulerpa plumaris (Forsk.) C. Ag.

See *Caulerpa sertularioides* (Gmel.) Howe.

Caulerpa prolifera (Forsk.) Lamour.

Canaries (11; 15; 22; 28; 57; 102; 119; 128; 135; 138; 161; 163; 182).

Cape Verde Islands (156).

' . . . atlantico calidiore ad littora . . . Africae . . . ' (3; 43; 65).

[As *Phyllerpa prolifera* (Forsk.) Kütz.]

'In mari atlantico subtropico . . . ad oras . . . Africae . . . ' (104).

Note. Reinbold (156: 188) establishes the record for the Cape Verde Islands on the basis of a fragment of material only and the data therefore need confirmation. This is a very variable species in which formae have been variously recognized. It seems very probable that morphological variation is clinal and that it is largely a function of the environment.

Caulerpa racemosa group

There are a large number of divergent opinions regarding the status of this species and of its varieties; it has therefore been necessary arbitrarily to select one of the more recent systems and adhere to it. For the sake of clarity and simplicity, we have followed the limits set out by Papenfuss and Egerod (*Phytomorphology*, **7**: 88–89, 1957) and this results in the recognition of three varieties thus far recorded in the list area. W. R. Taylor has commented cogently on this most difficult group (178: 151).

Caulerpa racemosa (Forsk.) J. Ag. var. ***racemosa***

[As *Caulerpa racemosa* (Forsk.) J. Ag.]

Canaries (102; 135).

Ghana (119; 122).

São Tomé (91; 119).
Sénégal (13; 36; 119; 122; 173).
Sierra Leone (117; 119; 122).
' . . . tropical West African mainland . . . ' (119).
Pantropical (173).

[As *Caulerpa racemosa* (Forsk.) J. Ag. var. *clavifera* (Turn.) Weber van Bosse]
Annobon (148; 176).
São Tomé (82).
Sénégal (36; 176).
Sierra Leone (114; 176).
Note. (114) records the entity as ' . . . nearest to var. *clavifera* . . . ', whilst (176) records it with ' ?'. According to Steentoft (176: 112) the Sénégal record relates, in (36), *pro parte* to var. *occidentalis*.

[As *Caulerpa racemosa* (Forsk.) J. Ag. var. *occidentalis* (J. Ag.) Børg.]
Cape Verde Islands (176).
Ghana (54; 176).
São Tomé (176).
Sénégal (176).
' . . . Warm Atlantic coasts. . . . ' (176).

[As *Caulerpa racemosa* (Forsk.) J. Ag. forma *occidentalis* (C. Ag.) Børg.]
Ghana (134).
Note. This record is a mis-citation of rank, based on the record in (54) above.

[As *Caulerpa racemosa* (Forsk.) J. Ag. var. *uvifera* (Turn.) Weber van Bosse]
Sénégal (36).

[As ***Caulerpa clavifera*** (Turn.) C. Ag.]
Cape Verde Islands (8; 9).
São Tomé (82).
Note. Steentoft (176: 112) states that the Welwitsch specimens recorded by Barton (8: 370) are more likely to be *C. racemosa* var. *occidentalis*; probably, therefore, this also applies to those recorded in (9). The point is of only minor importance here.

[As *Caulerpa lamourouxii* C. Ag.]
Sénégal (100).
Note. It is possible that this record relates to *C. racemosa* var. *peltata*.

[As *Chauvinia clavifera* (Turn.) Kütz.]
Canaries (11; 51; 52; 86; 89; 90; 104; 128).
São Tomé (89; 90).
' . . . in oceano calidiore . . . atlantico. . . . ' (3; 43).

[As *Chauvinia clavifera* (Turn.) Kütz. forma *vulgaris*]
Canaries (109).

Caulerpa racemosa (Forsk.) J. Ag. var. ***peltata*** (Lamour.) Eubank

[As *Caulerpa peltata* Lamour.]
Canaries (15; 16; 18; 21; 65; 102; 119; 134; 135; 138; 182).
Sénégal (173).
'African shores . . . ' (48).

'. . . In mari Altantico, ad oras Africae. . . . ' (1).

Pantropical (173).

[As *Caulerpa peltata* Lamour. var. *typica* Weber van Bosse forma *imbricata* (Kjellman) Weber van Bosse].

Canaries (183).

[As *Chauvinia peltata* (Lamour.) Kütz.]

'In mari . . . atlantico, ad oras Africae . . . ' (104).

Caulerpa racemosa (Forsk.) J. Ag. var. ***turbinata*** (J. Ag.) Eubank

[As *Caulerpa chemnitzia* (Turn.) Lamour. forma *minor*]

Canaries (138).

Note. On the basis of the synonymy given by Papenfuss and Egerod (*Phytomorphology*, **7**: 89, 1957) we have placed this record here, provisionally. However, Børgesen (15: 115) examined a specimen of the Piccone collection and concluded that it represents *Caulerpa peltata*, so that the record may more correctly be placed under *C. racemosa* var. *peltata*.

Caulerpa scalpelliformis (R. Br. ex Turn.) C. Ag.

Angola (8; 9; 16; 57; 176).

'. . . Angola und unterer Kongo . . . ' (92).

Canaries (57).

São Tomé (8; 9; 27; 82; 91; 119; 176; 177).

Senegambia (92).

'Ad oras Africae occidentalis . . . ' (104).

Note. Hieronymus (92: 6) defines 'Angola und unterer Kongo' as 'Das Kongogebiet bis zum Stanley-Pool aufwärts, Angola westlich von Koango und das Land zu beiden Seiten des Kuanza.' For the present purposes, therefore, this represents Angola, Cabinda, Congo. Edelstein (57) quotes Canary Islands in the distribution list which she gives for the species; since there is no further literature record of *C. scalpelliformis* from that island group, it would be interesting to know the basis of Edelstein's statement. Senegambia, as recorded in (92: 24), may be taken to cover Sénégal and Gambia, as now recognised; Steentoft (176: 112) comments that the Senegambia record is somewhat doubtful, even though a specimen labelled 'Senegambia' exists in the herbarium of the Riksmuseet, Stockholm.

[As *Caulerpa scalpelliformis* (R. Br.) C. Ag. forma *denticulata* (Dcne) Weber van Bosse]

Angola (134).

São Tomé (27).

[As *Caulerpa scalpelliformis* (R. Br.) C. Ag. var. *intermedia* Weber van Bosse]

São Tomé (82).

[As *Caulerpa denticulata* (Forsk.) Dcne]

Angola (43).

'. . . in atlantico ad oras Africae (ad Angolam, Hb. Binder!). . . . ' (3).

São Tomé (82; 89; 90; 91; 119).

West coast of Africa (48; 109).

Note. Recognition of formae and varieties in this species does not seem meaningful. Nizamuddin (134: 214) has stated the need for detailed knowledge of locations and environmental conditions before establishment of new formae or varieties and has indicated that characteristics at present used to distinguish such taxa are often clinal in variation.

Caulerpa selago (Turn.) C. Ag.

Cape Verde Islands (8; 9; 119).

Note. From data given by W. R. Taylor (178: 145) it is possible that this taxon may represent a form of *Caulerpa sertularioides* (Gmel.) Howe.

Caulerpa sertularioides (Gmel.) Howe

Angola (176).
Cameroun (119; 176).
Cape Verde Islands (65; 119; 176).
Ghana (54; 116; 119; 134; 176).
[Portuguese] Guinea (43; 176).
São Tomé (82; 119; 176).
Senegambia (176).
' . . . tropical West African mainland . . . ' (119).
Pantropical (176).

Note. There is some doubt about the record given for Portuguese Guinea by (43) and (176); see (176: 113) for data.

[As ***Caulerpa sertularioides* (Gmel.)** Howe forma *brevipes* (J. Ag.) Sved.]
Cape Verde Islands (61).

[As ***Caulerpa plumaris* (Forsk.) C. Ag.**]
Cameroun (147; 161).
São Tomé (82; 89; 90; 91).
' . . . in oceano atlantico ad oras . . . Guineae . . . ' (3).

[As *Caulerpa plumaris* J. Ag.]
Portuguese Guinea (100).

[As *Caulerpa plumaris* (Forsk.) C. Ag. forma *farlowii* (Weber van Bosse) Børg.]
Cap Vert [Sénégal ?] (183).

Note. There is some doubt about the last record. Weber van Bosse gives it fully as ' . . . Cap vert! l'île de Florès (A. Weber, Van Bosse). . . . ', leaving it uncertain whether Sénégal, the Açores, or Flores island, Indonesia are intended. In view of Weber van Bosse's connections, it seems likely that Indonesia is the correct attribution and the record is here noted for completeness only. With regard to the formae variously recognized in this species, Nizamuddin (134: 208) comments that the features used for distinguishing such taxa are very variable and of minor importance.

Caulerpa taxifolia (Vahl) C. Ag.

Ghana (134).
Mauritanie (66).
São Tomé (27; 82; 89; 90; 91; 176).
Sénégal (13; 14; 36; 100; 176).

Note. Steentoft (176: 113) has stated that São Tomé is the only known locality for this species on the Atlantic coast of Africa, since the records in (100) and (179) [below] are for drift material. She appears to have overlooked the other records noted above, which, however, will clearly need substantiation; a wider distribution than yet known is probable and this would correlate with Steentoft's '. . . Probably pantropical.'

[As *Caulerpa taxifolia* (Vahl) C. Ag. forma *asplenioides* (Grev.) Weber van Bosse]

São Tomé (179).

Sénégal (179).

[As *Caulerpa mexicana* Sond. ex Kütz.]

Canaries (119; 176).

Cape Verde Islands (49; 85; 86; 119; 176).

Ghana (119; 176).

? Príncipe (176).

São Tomé (119; 176).

Sénégal (119; 176).

'. . . tropical West African mainland . . . ' (119).

'. . . probably occurs on other parts of the little-explored West African coastline. . . . ' (119).

Note. Steentoft (176: 113) states '. . . Newton's plant from Príncipe, listed as *C. taxifolia* var. *crassifolia* in Henriques (1885[87]: 133) has not been traced, but presumably belongs rather in *C. mexicana*. . . . '. The puzzling thing about this statement is that Henriques, who certainly describes the algae collected by F. Newton, makes no mention whatsoever of Príncipe under the entry concerned; the alga is very simply listed as '. . . Ilha de S. Thomé—março 1881.' Whether there is any other basis for a record from Príncipe is not yet clear.

[As *Caulerpa crassifolia* (C. Ag.) J. Ag.]

Canaries (15; 16; 20; 65; 135; 138; 182).

Cape Verde Islands (65).

Ghana (53; 116).

São Tomé (27).

Sénégal (36).

Senegambia (3).

[As *Caulerpa crassifolia* (C. Ag.) J. Ag. forma *typica* (Weber van Bosse) Børg.]

Canaries (15).

Sénégal (173).

[As ***Caulerpa crassifolia*** C. Ag. var. *crassifolia* C. Ag.]

São Tomé (43; 87; 88).

[*As* ***Caulerpa crassifolia*** J. Ag. var. *mexicana* J. Ag.]

Cape Verde Islands (7).

São Tomé (7).

[As *Caulerpa pectinata* Kütz.]

Cape Verde Islands (7; 49).

[As *Caulerpa pinnata* (L.) Weber van Bosse]

Cape Verde Islands (156).

Sénégal (30).

[As *Caulerpa pinnata* (L.) Weber van Bosse formae *typica* and *mexicana* (Sond. ex Kütz.)]

Canaries (183).

[As ***Caulerpa taxifolia*** (Vahl) C. Ag. ***β crassifolia*** **C. Ag.**]

São Tomé (87).

Note. The synonymy for this species has been established by reference to the following works: Papenfuss (*Jl S. Afr. Bot.*, **22**: 65–66, 1956); Eubank (*Univ. Calif. Publs Bot.*, **18**: 417–418, 1946); Nizamuddin (134: 209–210). From these, it emerges that although *Caulerpa crassifolia* has been generally used as the name of the taxon, at species level the name *Caulerpa mexicana* antedates it. Both Eubank and Nizamuddin agree that *C. crassifolia* and *C. taxifolia* are conspecific, or most probably so on present data, and that of these names the earlier at specific level is *C. taxifolia*. Hence, we have the taxonomic situation in which there is a strong likelihood on present grounds that *Caulerpa crassifolia* = *Caulerpa mexicana* = *Caulerpa taxifolia*. Without widespread monographic treatment, no firmer statement than this can be made. Accordingly, we have accepted the name *Caulerpa taxifolia* (Vahl) C. Ag. as being the earliest applicable to the taxon as delimited in the above-mentioned works.

Caulerpa vickersiae Børg.

Ghana (54; 119).

'. . . tropical West African mainland . . . ' (119).

Note. There is disagreement as to the conspecificity of the taxa *Caulerpa ambigua* Okam. and *C. vickersiae* Børg. See, for the basis of the disagreement, Eubank (59: 413); Egerod (58: 368); Taylor (178, alterations sheet); Papenfuss (*Jl S. Afr. Bot.*, **17**: 167–168, 1951); Nizamuddin (*Botanica mar.*, **10**: 160–165, 1967). Since this disagreement exists and since the specimens were originally reported from this area under the name *C. vickersiae*, we have retained that name pending further work on the problem.

Caulerpa vitifolia Lamour.

See *Udotea petiolata* (Turra) Børg.

Caulerpa webbiana Mont.

Canaries (3; 11; 15; 31; 43; 50; 59; 65; 86; 119; 126; 127; 128; 129; 131; 138; 157; 182).

[As *Caulerpa webbiana* Mont. forma *disticha* Weber van Bosse]

Canaries (15; 182).

[As ***Caulerpa webbiana*** Mont. forma *tomentella* (Harv.) Weber van Bosse]

Canaries (183).

[As ***Caulerpa webbiana*** Mont. forma *typica* Weber van Bosse]

Canaries (15; 183).

[As ***Chauvinia webbiana*** (Mont.) Kütz.]

Canaries (104; 109).

Caulerpa spp.

Canaries (22; 65; 102; 157).
Cape Verde Islands (133).
Sénégal (34).
Sierra Leone (117).

Chaetomorpha aerea (Dillw.) Kütz.

See *Chaetomorpha linum* (O. F. Müll.) Kütz.

Chaetomorpha antennina (Bory) Kütz.

Cameroun (68; 113; 115; 122).
Canaries (21; 36; 65; 68; 123; 135).
Cape Verde Islands (68).
Ghana (68; 112; 113; 116; 118; 122).
Guinée (122).
Ivory Coast (unpublished).
Nigeria (68; 122; 175).
São Tomé (176).
Sénégal (36; 68; 113; 122; 173; 174).
Sierra Leone (68).

[As *Chaetomorpha media* (J. Ag.) Kütz.]
Canaries (15; 16; 19).

Note. Steentoft's (176: 108) comment that ' . . . The species would appear to be a constant and probably conspicuous one on the Atlantic coast of Africa. . . . ' is certainly justified on the basis of the above records.

Chaetomorpha brachygona Harv.

Ghana (unpublished).
Mauritanie (36; 63; 179).

Note. W. R. Taylor (178: 74) indicates the possible conspecificity of the present taxon with *Chaetomorpha linoides* Kütz.; however, he did not at that time examine the type of *C. brachygona* Harv. If the latter also agrees with the Kützing concept, the correct name of the species will be *Chaetomorpha linoides* Kütz.

Chaetomorpha capillaris (Kütz.) Børg. (*'capillare'*).

Canaries (15; 20; 62; 65).

[As *Chaetomorpha capillaris* (Kütz.) Børg. var. *crispa* J. Feldm.]
Sénégal (173).

[As *Conferva implexa* Dillw.]
Canaries (11; 128).

Note. This record, which is simply repeated from (128) by (11), is placed here in accordance with the view expressed by Børgesen (15: 46).

[As *Lola tortuosa* (Dillw.) Chapman]
Nigeria (68).

Note. For details regarding the change in orthography, see Chapman (*Rhodora*, **41** (481): 23–25, 1939).

Chaetomorpha clavata (C. Ag.) Kütz.

São Tomé (176).

Note. Steentoft (176: 108–109) indicates that, apart from the broadening of filaments from base to apex, the plants recorded as this species do not differ much from those generally recognized as *C. antennina*. Taking into account the information given by Papenfuss (*Bot. Notiser*, **1940**: 200, 1940) and by W. R. Taylor (178: 73) it seems that there may be grounds for the re-assessment of the limits of taxa *C. antennina*, *C. clavata* and *C. robusta*.

Chaetomorpha crassa (C. Ag.) Kütz.

São Tomé (176).

Note. The validity of this record and even of the species is in doubt. Steentoft (176: 109) indicates that too little material from the area has been available and suggests that the taxon is perhaps cosmopolitan. The latter point would correlate well with the studies of Miss W. Price, of Liverpool University; she has indicated (pers. comm.) that, at least for Great Britain and therefore probably in general, *Chaetomorpha crassa* is likely to be nothing more than an aegagropilous form of *Chaetomorpha linum* (O. F. Müll) Kütz. She has not yet examined the type material of *C. crassa*.

Chaetomorpha implexa Kütz.

See *Rhizoclonium implexum* (Dillw.) Kütz.

Chaetomorpha linoides Kütz.

See *Chaetomorpha brachygona* Harv.

Chaetomorpha linum (O. F. Müll.) Kütz.

Cameroun (unpublished).
Canaries (15; 17; 65; 163).
Sénégal (36).

[As *Conferva linum* Roth]
Canaries (11; 128).

[As *Chaetomorpha aerea* (Dillw.) Kütz.]
Canaries (15; 22; 43; 47; 48; 52; 65; 72; 131; 163; 181; 182).
Ghana (116).
Salvage Islands (71; 72).
Sénégal (173).
Spanish Sahara (152).

[As *Conferva aerea* Dillw.]
Canaries (11; 84; 103; 128).

[As *Rhizoclonium linum* Thuret]
Canaries (157).

Chaetomorpha media (C. Ag.) Kütz.

See *Chaetomorpha antennina* (Bory) Kütz.

Chaetomorpha nodosa Kütz.

Cameroun (25).

Chaetomorpha pachynema (Mont.) Mont.

Canaries (7; 15; 22; 43; 49; 73; 79; 104; 105; 114; 129; 131; 135; 157; 178).
Cape Verde Islands (7; 22; 49; 65; 130; 161).
Sierra Leone (114).
'Westafrika' (161).

[As *Conferva pachynema* Mont.]
Canaries (11; 128).

[As *Chaetomorpha pachyderma* Mont.]
Canaries (65).

Note. This seems to have been an orthographic or typographic error for the correct *Chaetomorpha pachynema*.

Chaetomorpha spp.

Cameroun (115).
Cape Verde Islands (133).
Ghana (149).
Guinée (124; 149; 162; 173).

Chara gymnopus A. Br.

Sénégal (179).

[As ***Chara gymnopus*** A. Br. forma *senegalensis* Migula]
Sénégal (179)

Note. See also *Chara zeylanica* Willd. It appears strongly possible, from the work of Pal, B. P., Kundu, B. C., Sundaralingam, V. S. and Venkataraman, G. S., 1962 (*Charophyta*, pp. x + 130, New Delhi: I.C.A.R. Monographs on Algae; pp. 105–110 refer), that this record should appear under *Chara zeylanica*. In any case, the authority for the forma *senegalensis* should be Migula and not as stated by Trochain elsewhere in his text; it is clear from (179 : 386) that the taxon was erected, described and named by Migula, the data simply being published as part of the whole work of Trochain.

Chara zeylanica Willd.

Ghana (120; 121).

[As ***Chara gymnopus*** A. Br. forma *hildebrandtiana* A. Br.]
Sénégal (179).

Note. See also *Chara gymnopus* A. Br. Pal, Kundu, Sundaralingam and Venkataraman, (*op. cit.*, p. 109) recognize the forma recorded by Trochain for Sénégal, but under the name *Chara zeylanica* forma *hildebrandtiana* (A. Br.) Sundaralingam.

Chauvinia clavifera (Turn.) Kütz.

See *Caulerpa racemosa* (Forsk.) J. Ag.

Chauvinia cupressoides (West ex Vahl) Kütz.

See *Caulerpa cupressoides* (West ex Vahl) C. Ag.

Chauvinia peltata (Lamour.) Kütz.

See *Caulerpa racemosa* (Forsk.) J. Ag. var. *peltata* (Lamour.) Eubank

Chauvinia vitifolia (Lamour.) Kütz.

See *Udotea petiolata* (Turra) Børg.

Chauvinia webbiana (Mont.) Kütz.

See *Caulerpa webbiana* Mont.

Cladophora

This most difficult genus really requires revision on a world basis, but the magnitude of the nomenclatural and taxonomic problems is appalling. The most complete work available on the subject at present (95) is largely restricted to Europe and Mediterranean North Africa. The list which follows can therefore only be regarded as a statement of the problem for tropical West Africa, in the light of recent work on other areas.

Cladophora albida (Huds.) Kütz.

Cameroun (68).
Ghana (68).
Nigeria (68).
[As *Cladophora tenuis* Kütz.]
Cameroun (25).
[As ***Cladophora neesiorum*** (C. Ag.) Kütz.]
Canaries (15; 72; 161; 182).
Salvage Islands (71; 72).

Note. See also ***Cladophora flexuosa*** (O. F. Müll.) Harv. The note at *Cladophora neesiorum* (C. Ag.) Kütz. has some relevance here.

Cladophora battersii Hoek

See *Cladophora* sp. sensu Sauvageau.

Cladophora boodleoides Børg.

See *Cladophora liebetruthii* Grun.

Note. Neither Söderström (170: 135) nor Van Den Hoek (95: 59) consider this taxon to be a separate species. Söderström examined a Børgesen specimen in Herb. Mus. Brit. and concluded that it may represent *Cladophora crispula* Vickers. Van Den Hoek examined the lectotype in Copenhagen and assigned it to *Cladophora liebetruthii* Grun. We have followed the latter.

Cladophora catenata (C. Ag.) Hauck

Note. See Steentoft (176: 109) for an explanation of the attribution of records under this name to *Cladophora prolifera* (Roth) Kütz.

Cladophora ceratina Kütz.

See *Cladophora crystallina* (Roth) Kütz.

Cladophora coelothrix Kütz.

[As *Cladophora repens* (J. Ag.) Harv.]
Canaries (138).
Guinée (162; 173).
[As *Cladophora* (*Aegagropila*) *repens* (J. Ag.) Kütz.]
Ascension (6).
Canaries (77).
St. Helena (77).
São Tomé (77).
Sénégal (36; 173).

Note. Van Den Hoek (95: 40–43) discusses this taxon and places the type of *Conferva repens* J. Ag. in synonymy with *Cladophora coelothrix*. See also the note at *Cladophora inclusa* Børg.

Cladophora conglomerata Kütz.

[As *Cladophora conglomerata* Kütz. var. *pusilla* Brand]
Cameroun (147).

Note. Van Den Hoek (95: 147) was unable to trace the type material, from Belt, of this species. Other European material supposedly of the species, including a specimen from Heligoland, is apparently representative of *Cladophora vagabunda* (L.) Hoek. The record from Cameroun therefore needs clarification.

Cladophora contexta Levring

South West Africa (unpublished).

Cladophora crispula Vickers

See *Cladophora boodleoides* Børg.

Cladophora crystallina (Roth) Kütz.

Canaries (15; 65).
[As *Conferva crystallina* Roth]
Canaries (11; 128).
[As *Cladophora ceratina* Kütz.]
Canaries (138).

Note. According to Van Den Hoek (95: 148) many European species of *Cladophora* have on occasion been mis-identified as *C. crystallina* (Roth) Kütz. Initially (1961) Van Den Hoek considered *C. crystallina* to be conspecific with *Cladophora dalmatica* Kütz., but later (*loc. cit.*), after culture studies, he thought it more probable that at least in Europe *C. crystallina* may be conspecific with either *Cladophora glomerata* (L.) Kütz. var. *glomerata* or *Cladophora vagabunda* (L.) Hoek. The type of *Cladophora ceratina* Kütz. (L. 937/155/65, from Livorno) is placed in synonymy with *Cladophora*

vagabunda (L.) Hoek, without qualification, by Van Den Hoek (95: 147). Clearly, the specimens on which the present records are based need critical re-examination. The records have been maintained here now, since Børgesen (15: 67–68) collected a single specimen and also examined a Montagne specimen of *Conferva crystallina*, concluding that both were of the present species and therefore identical. He also states of the Piccone (138) *Cladophora ceratina* from the Canaries '. . . most probably this [present] species.'

Cladophora cymopoliae Børg.

Canaries (15; 65; 161).

Cladophora dalmatica Kütz.

?Sénégal (173).

[As ***Cladophora lutescens*** Kütz.]

Salvage Islands (138).

[As ***Cladophora oblitterata*** Söderström]

?Canaries (176).

São Tomé (176).

?Sénégal (176).

?'. . . perhaps most Atlantic coasts . . . ' (176).

Note. Van Den Hoek (95: 186) considers *Cladophora oblitterata* Söderström to be a synonym of *Cladophora dalmatica*. Steentoft (176: 109) continues to recognize Söderström's species, whilst mentioning Van Den Hoek's opinion. Söderström has subsequently (171: 176–177) maintained that *C. dalmatica* (Mediterranean) and *C. oblitterata* (North Sea and Channel) can certainly be separated on the basis of greater apical-cell diameters in the former. Van Den Hoek (95: 187) also examined the lectotype of *C. lutescens* Kütz. (L. 937/155/84) and concluded that it represents a dilapidated, acropetally arranged plant of *C. dalmatica* Kütz. The lectotype was collected at Livorno; a plant from Menorca, determined by Grunow as *C. lutescens*, also appears to be *C. dalmatica*. Unfortunately, another plant from Menorca, also determined by Grunow, seems to be *C. vagabunda* (L.) Hoek; this complicates the picture in that Grunow certainly corresponded with Piccone (138) regarding the Liebetruth and Bolle collections, including *Cladophora*, and may well have been asked for comments on other material. Even though no such comments or acknowledgements appear in (138: 17), the presence of *C. dalmatica* in the Salvage Islands requires confirmation. See also the entries for *Cladophora crystallina* (Roth) Kütz., *Cladophora vagabunda* (L.) Hoek and *Cladophora flexuosa* (O. F. Müll.) Harv.

Cladophora enormis (Mont.) Kütz.

See *Cladophoropsis membranacea* (C. Ag.) Børg. and *Cladophora pellucida* (Huds.) Kütz.

Cladophora expansa (Mert.) Kütz.

See *Cladophora vagabunda* (L.) Hoek.

Cladophora fascicularis (Mert.) Kütz.

Canaries (15; 65; 68; 123; 157).
Cape Verde Islands (7; 49; 65; 68; 144; 145).
Ghana (68).
Mauritanie (65).
Nigeria (68; 175).

Note. Van Den Hoek (95: 154) has found *C. fascicularis*, as determined by Kützing, from Oosterschelde, Holland, to be *C. vagabunda* (L.) Hoek. Despite the number of records of *C. fascicularis* for West Africa, the specimens involved clearly need critical re-appraisal in the light of recent studies. Söderström's (170: 129) opinion would seem to support the need for such critical work.

Cladophora flexuosa (O. F. Müll.) Harv.

Canaries (15; 36; 65; 181; 182).
Sénégal (36).

Note. European specimens determined as *Cladophora flexuosa* have been found by Van Den Hoek (95) to be representative of *C. albida* (Huds.) Kütz., *C. dalmatica* Kütz., *C. rupestris* (L.) Kütz., *C. sericea* (Huds.) Kütz. or *C. vagabunda* (L.) Hoek. The presence of the species in West Africa therefore needs confirmation, particularly as all the records from the Canaries are based on the collection of a single specimen by Vickers (182), which specimen Børgesen thought too small and badly developed to permit exact determination. Dangeard (36: 221) further records the taxon from Sénégal only as '*Cl.* (?) *flexuosa* (Griff.) Harv.'

Cladophora glomerata (L.) Kütz.

See *Cladophora crystallina* (Roth) Kütz.

Cladophora hospita Kütz.

See *Cladophora mirabilis* (C. Ag.) Rabenh.

Cladophora hutchinsiae (Dillw.) Kütz.

See *Cladophora laetevirens* (Dillw.) Kütz.

Cladophora inclusa Børg.

Canaries (15; 65; 161).

Note. The type material of this name may be representative of, or near to, *Cladophora socialis* Kütz. or *Cladophora coelothrix* Kütz. See Van Den Hoek (95: 46) for data on which this comment is based.

Cladophora kamerunica Brand

Cameroun (25; 161).
[As *Cladophora camerunica* Brand]
Cameroun (115).

Cladophora laetevirens (Dillw.) Kütz.

Canaries (176).
Cape Verde Islands (176).
Príncipe (176).
São Tomé (176).
' . . . Perhaps most Atlantic . . . coasts . . . ' (176).

Note. The distribution given is putative only; it was drawn up by Steentoft (176: 109) on the basis of synonymy reported by Söderström (170: 113). Söderström, who determined the specimens from Príncipe and São Tomé, expressed some doubt because the material was detached and this species had not previously been reported in such a form. Söderström's most recent work (171: 174–176) leaves one in little doubt that he considers *Cladophora lehmanniana* (Lindenb.) Kütz., *C. laetevirens* and *C. hutchinsiae* (Dillw.) Kütz. almost impossible to separate.

Cladophora lehmanniana (Lindenb.) Kütz.

[As *Conferva* (*Cladophora*) *macallana* Harvey]
Cape Verde Islands (172).
[As *Cladophora macallana* Harvey]
Cape Verde Islands (7; 130; 181).
[As *Cladophora utriculosa* Kütz.]
Canaries (15; 65; 138; 163).
Cape Verde Islands (7; 43; 44; 139; 141; 181).

Note. Van Den Hoek (95: 123), who appears to have seen the type and isotype material, places *C. macallana*, without qualification, in synonymy with *C. lehmanniana* (Lindenb.) Kütz. He does the same with *C. utriculosa* Kütz., the type of which name is in Leiden. Material on which the present records are based needs critical re-examination in the light of this treatment. See also *Cladophora laetevirens* (Dillw.) Kütz. and *C. neesiorum* (C. Ag.) Kütz.

Cladophora liebetruthii Grun.

Canaries (15; 65; 95; 138; 161).
[As *Cladophora boodleoides* Børg.]
Canaries (15; 18; 64; 65; 78; 161).
[As *Cladophora* sp.]
Canaries (157).

Note. Børgesen (15: 56–57) has attributed this record to the present species but there is a strong likelihood that another species is involved. See *Cladophora* sp. sensu Sauvageau.

[As *Cladophora* (*Aegagropila*) *liebetruthii* Grun.]
Canaries (138).

Cladophora lutescens Kütz.

See *Cladophora dalmatica* Kütz.

Cladophora macallana Harv.

See *Cladophora lehmanniana* (Lindenb.) Kütz.

Cladophora macallana sensu Lloyd

See *Cladophora* sp. sensu Sauvageau.

Cladophora membranacea (C. Ag.) Kütz. var. ***caespitosa*** (Bory) Kütz.

See *Cladophoropsis membranacea* (C. Ag.) Børg.

Cladophora mirabilis (C. Ag.) Rabenh.

Angola (161).
South West Africa (unpublished).

Note. It is generally accepted that *C. mirabilis* and *C. hospita* Kütz. are synonymous, both taxonomically and nomenclaturally (see, for instance, (136 : 5–6) and (161 : 728)). Papenfuss (136) has examined and resolved the nomenclatural problems involved.

Cladophora multifida Kütz.

Cameroun (25; 176).
Gabon (43; 104; 105; 176).
Sénégal (100; 176).

Note. According to Steentoft (176: 109), this taxon is possibly within the form range of *Cladophora prolifera* (Roth) Kütz.; this opinion was based on that of Hamel (79: 172). The records for this present species have therefore also been included under *C. prolifera*.

Cladophora neesiorum (C. Ag.) Kütz.

See *Cladophora albida* (Huds.) Kütz.

Note. Van Den Hoek (95 : 66, 75, 94, 128 etc.) and Söderström (170 : 65, 107) both agree that the type material of *C. neesiorum* is actually representative of *Cladophora albida* (Huds.) Kütz. There has obviously been much confusion about *C. neesiorum*, since Van Den Hoek found that material from various parts of Europe and determined by various prominent phycologists as *C. neesiorum* was in fact representative of *C. albida*, *C. lehmanniana* or *C. rupestris*.

Cladophora oblitterata Söderström

See *Cladophora dalmatica* Kütz.

Cladophora pellucida (Huds.) Kütz.

Canaries (7; 15; 43; 62; 65; 131; 182).
Cape Verde Islands (7; 130).
Salvage Islands (71; 138).
'. . . Atlantique tempéré, de l'Angleterre aux Canaries.' (62).
'. . . depuis l'Angleterre jusqu'aux Canaries . . . ' (22).
'. . . from England to the Canary Islands.' (57).

[As *Conferva pellucida* Huds.]
Canaries (11; 128).
[As *Conferva aegagropila* L.]
Canaries (11; 128).
[As ***Cladophora* (*Aegagropila*) *enormis*** Kütz.]
Canaries (182).

Note. This record, which would seem logically to be attributable to *Cladophoropsis membranacea* (C. Ag.) Børg., has been maintained here in view of the opinion expressed in (15: 52) that Vickers' *C. enormis* is Børgesen's *C. trichotoma*.

[As *Cladophora trichotoma* (C. Ag.) Kütz.]
Canaries (15; 65; 163).
Ghana (116).
[As ***Aegagropila trichotoma*** Kütz.]
Canaries (157).

Note. Van Den Hoek (95: 215) has identified the type of *Conferva trichotoma* C. Ag. as being representative of *Cladophora pellucida* (Huds.) Kütz. Further, he has (95: 215–221) removed certain elements from *C. pellucida* and erected for them the new species *C. pseudopellucida* Hoek. Specimens on which the present records are based therefore need re-assessment in the light of his work.

Cladophora penicillata Kütz.

See *Cladophora vagabunda* (L.) Hoek.

Note. Van Den Hoek (95: 147) examined the type of *C. penicillata* Kütz., 1853 (Leiden, 937/281/324) and concluded that it represents *Cladophora vagabunda*. Unfortunately, he also adds ' . . . (non *Cladophora penicillata* Meneghini, 1844, p. 306; in Kützing, 1845, p. 213). . . . '. There is no way of knowing to which treatment by Kützing of the species Gain (71) was referring, since he does not qualify his bare statement of the record. Hence, there remains doubt about this record, despite its attribution here to *C. vagabunda*.

Cladophora prolifera (Roth) Kütz.

?Cameroun (176).
Canaries (7; 15; 43; 65; 138; 163; 176; 182).
Cape Verde Islands (7; 130; 176).
?Gabon (176).
São Tomé (82; 91; 176).
Sénégal (36; 173; 176).
'Du sud de l'Angleterre aux Canaries. . . . ' (22).
' . . . de puis le sud de l'Angleterre jusqu'aux Canaries . . . ' (62).
Tropical Atlantic (173).
[As *Conferva prolifera* Roth]
Canaries (11; 128).
Cape Verde Islands (172).
[As *Cladophora catenata* (C. Ag.) Hauck]
São Tomé (82; 91; 176).

[As *Cladophora catenata* (C. Ag.) Hauck forma *robustior* Henriques]
São Tomé (89; 90).
[As *Cladophora multifida* Kütz.]
Cameroun (25; 176).
Gabon (43; 104; 105; 176).
Sénégal (100; 176).

Note. See *Cladophora multifida* Kütz. for the basis on which these records are included here.

Cladophora pseudopellucida Hoek

See *Cladophora pellucida* (Huds.) Kütz.

Cladophora ramosissima (Drap. ex Kütz.) Kütz.

Sénégal (173).
'. . . remonte dans l'Atlantique Nord jusqu'à La Corogne et descend jusqu'au Sénégal . . . ' (73; 78).

Note. Van Den Hoek (95: 66–68, 73–75) considers the type of this name (Leiden 937/281/310) to be a plant of *Cladophora rupestris* (L.) Kütz. which was undergoing characteristic, dense, spring proliferation from the perennated main axes. The present records may represent *C. rupestris*, but clearly need clarification.

Cladophora refracta sensu Crouan

See *Cladophora* sp. sensu Sauvageau.

Cladophora repens (J. Ag.) Harv.

See *Cladophora coelothrix* Kütz.

Cladophora rupestris (L.) Kütz.

Sénégal (173).

Note. See also *Cladophora flexuosa* (O. F. Müll). Harv. and *Cladophora neesiorum* (C. Ag.) Kütz.

Cladophora senegalensis Kütz.

Gambia (43; 104).
Sénégal (43; 104).

Cladophora sericea (Huds.) Kütz.

See *Cladophora flexuosa* (O. F. Müll.) Harv.

Cladophora sertularina (Mont.) Kütz.

Cameroun (25).

Note. Brand (25: 314) notes that '. . . Die Alge erinnert auch an *C. Neesiorum* Kütz. (l.c.), hat aber schlaffere Äste. . . . '

Cladophora socialis Kütz.

See *Cladophora inclusa* Børg.

Cladophora tenuis Kütz.

See *Cladophora albida* (Huds.) Kütz.

Cladophora theotonii O. C. Schmidt

Sénégal (173).

Cladophora trichotoma (C. Ag.) Kütz.

See *Cladophora pellucida* (Huds.) Kütz.

Cladophora utriculosa Kütz.

See *Cladophora lehmanniana* (Lindenb.) Kütz.

Cladophora vagabunda (L.) Hoek

[As *Cladophora expansa* (Mert.) Kütz.]

Canaries (15; 65; 182).

[As ***Cladophora penicillata*** Kütz.]

Salvage Islands (71).

Note. See also *Cladophora conglomerata* Kütz., *C. crystallina* (Roth) Kütz., *C. dalmatica* Kütz., *C. fascicularis* (Mert.) Kütz., *C. flexuosa* (O. F. Müll.) Harv. and *C. penicillata* Kütz. There is a great deal of confusion about this species. Børgesen (15: 68) examined a specimen of the Vickers collection and concluded that it was near *C. crystallina*. Söderström (170: 16, 22) considered that *Cladophora* (*Conferva*) *vagabunda* sensu Linnaeus is probably identical with *Cladophora flexuosa* (O. F. Müll.) Harv., but may be a form of *C. fracta* (O. F. Müll. ex Vahl) Kütz. Van Den Hoek (95: 193, 198) decided that many determinations of European material as *Cladophora expansa* are inaccurate, the specimens being representative of *Cladophora dalmatica* Kütz. The material on which the present records are based therefore needs critical examination.

Cladophora virgata Kütz.

South West Africa (unpublished).

Note. Van Den Hoek (95: 225) states that this species needs a new name because *Conferva virgata* C. Ag. is a later homonym of *C. virgata* Roth. This is inaccurate, for *Cladophora virgata* Kütz. is legitimate and is based on Agardh's type.

Cladophora spp.

Annobon (148).
Canaries (102).
Cape Verde Islands (61; 133).
Ghana (120).
Guinée (162; 173).
Nigeria (149).
Sénégal (16; 67; 174; 179).
Sierra Leone (117; 122).

Cladophora sp. A

Mauritanie (173).

Sénégal (173).

' . . . les îles Atlantides voisines . . . ' [de Mauritanie et Sénégal] (173).

Note. Sourie (173: 116) states that he has given this specific symbol to a species of great ecological interest, of which it was not possible exactly to determine the name.

Cladophora sp. sensu Sauvageau

Canaries (157).

Note. Sauvageau (157: 183) comments that he collected in the Canaries a *Cladophora* occurring in tufts on rocks. This he sent to Bornet, who stated that the specimens corresponded to *C. macallana* sensu Lloyd (*Algues de l'Ouest*) and to *C. refracta* sensu Crouan (in Desmazières J.-B.-H.-J., 1853–60, *Plantes cryptogames de France*, ed. II, série 2, no. 469), both of these being found unattached. The Lloyd and Crouan entities did not correspond to *C. macallana* Harv. or *C. refracta* Kütz., despite the attributions by the publishing authors, and the Canaries plant was therefore the type of a new species of which Lloyd and the Crouan frères had previously collected and distributed material modified by having become detached from the substrate. Van Den Hoek (95: 94) examined Lloyd material in Paris and concluded that it is *Cladophora battersii* Hoek; of the Crouan *C. refracta*, he further comments (95: 93) that, because there was a slight resemblance to plants of *C. albida* from localities exposed to wave action and because the latter plants were usually known as *Cladophora refracta*, the Crouan frères employed that name for material which on examination turns out to be *C. battersii*. There is thus a strong likelihood that the present record relates to *Cladophora battersii* Hoek.

Cladophoropsis membranacea (C. Ag.) Børg.

Canaries (15; 58; 65; 70; 161).

Cape Verde Islands (65).

[As *Conferva membranacea* C. Ag.]

Canaries (11; 128).

[As *Cladophora membranacea* Kütz. var. *caespitosa* Kütz.]

Canaries (131).

[As *Cladophora aegagropila membranacea* (C. Ag.) Kütz. *β cespitosa* (Bory) Kütz.]

Canaries (104).

[As *Siphonocladus membranaceus* (C. Ag.) Bornet]

Canaries (7; 22; 182).

Cape Verde Islands (7).

[As *Siphonocladus membranaceus* (C. Ag.) Bornet var. *caespitosa* (Bory) Kütz.]

Canaries (43).

[As *Conferva enormis* Mont.]

Canaries (11; 128).

[As *Cladophora enormis* (Mont.) Kütz.]

Canaries (22; 43; 129; 131; 138; 178).

[As *Cladophora Aegagropila enormis* (Mont.) Kütz.]
Canaries (104; 142).
[As ***Aegagropila enormis*** (Mont.) Kütz.]
Canaries (106).
[As ***Conferva aegagropila*** L.]
Canaries (128).
Note. This record is attributed here on the basis of Børgesen's opinion (15: 53).
[As *Cladophora aegagropila* Kütz.]
Canaries (22).

Codiolum petrocelidis Kuckuck

See *Spongomorpha aeruginosa* (L.) Hoek.

Note. It is probable that many green algae of the Ulotrichales, Acrosiphoniales and Cladophorales have '*Codiolum*-stages' in their life-histories. For further data see (137: 530, 533 and 159: 104–107).

Codium adhaerens (Cabr.) C. Ag.

Canaries (6; 7; 11; 15; 22; 49; 60; 62; 65; 70; 72; 84; 85; 128; 135; 151; 157; 158; 160; 163; 182).
Cape Verde Islands (7; 49; 85).
Salvage Islands (71; 72).
' . . . Atlantischer Ozean: . . . Westafrika . . . ' (160).
' . . . Costas atlánticas de . . . África occidental . . . ' (163).
' . . . West Africa . . . ' (15).

Notes. Børgesen (15: 88–93) found that specimens of apparent *C. adhaerens* showed some anatomical characteristics (e.g., size of utricles; size of gametangia) the size ranges in which overlapped those of *Codium difforme* Kütz. On this basis, he proposed the name *C. adhaerens* forma *intermedia* Børg. for material from the Canaries. In this, he has been followed by some subsequent authors. He also suggested that the forma *intermedia* may have resulted from hybridization between *C. adhaerens* and *C. difforme*, since these species often grow side by side. If further work reveals clinal variation, in these and other characteristics, between the extremes at present known as *C. adhaerens* and *C. difforme*, it may be necessary to revise the concepts of these taxa.

Codium bursa (L.) C. Ag.

Canaries (15; 22; 65; 85; 102; 135; 153; 161; 163; 182).
' . . . Atlantique (de l'Irelande aux Canaries).' (62).
' . . . Atlantique depuis l'Angleterre jusqu'aux îles Canaries . . . ' (44).

Note. Apart from Norton's (135) record, all the above seem to be based entirely on those specimens reported by Bornet (22) and Vickers (182).

Codium chazaliei Weber van Bosse

See *Codium decorticatum* (Woodw.) Howe.

Codium decorticatum (Woodw.) Howe

Angola (169).
Canaries (160; 161; 169).
Cape Verde Islands (160; 169).
Sénégal (37; 67; 169).
South West Africa (169).
'. . . west coast of Africa from Gibraltar to Swakopmund, South West Africa . . .' (169).
[As *Codium chazaliei* Weber van Bosse]
'. . . Banco, près de Cap Vert . . .' (184).
[As *Codium elongatum* C. Ag.]
Angola (8; 9).
?Canaries (157).
Cape Verde Islands (7; 144; 145; 169).
Mauritanie (83; 161).
Sénégal (30; 36; 173; 179).
Spanish Sahara (152).
'. . . De Cadix aux Canaries. . . .' (22).
'. . . Mers chaudes de l'Atlantique . . .' (7).
Pantropical (173).

Note. Sauvageau (157) associates his own text very closely with Vickers' work; her published record (182) of *C. elongatum* has been attributed to *C. taylorii* by Silva (169: 518). It is just as likely that Sauvageau's material, which has not been checked, represents *C. decorticatum*. Bornet (22: 216–217) publishes a somewhat enigmatic record of *C. elongatum* C. Ag.; *C. lindenbergii* Kütz., *C. tomentosum* and *C. elongatum* are all involved in his text. There is no other real indication of the species to which the record really applies—Silva does not seem to have examined Bornet–Schousboe material, nor other material likely to have been seen by Bornet. Since *C. repens*, *C. taylorii* and *C. decorticatum* have all been identified by Silva in material from the Canaries, the latter two having previously been recorded by other authors as *C. elongatum*, it is possible that *C. decorticatum* or *C. taylorii* (or both) may be involved in the Bornet record. Dangeard (36: 224–227) records fragments of drift material of a *Codium* species as apparently of the *C. elongatum* group (either *C. lindenbergii* Binder ex Kütz. or *C. platylobium* Aresch.). Later, on p. 227, he mentions the Cape species *C. lindenbergii* as being the possible closest determination. See the entry for *C. lindenbergii*.

[As *Codium tomentosum* Stackh.]
Canaries (11; 128; 160).
Cape Verde Islands (6; 7; 49; 130; 160).

Note. Silva (169; 517, 524) has established that at least some of the material on which Montagne's (128) Canaries records are based is really *C. decorticatum*. Børgesen (15:94) suggests that some of Montagne's material, now in Paris, is actually *C. elongatum*; since Silva has identified Børgesen's *C. elongatum* as *C. taylorii*, the situation is confused. The record may therefore relate in part to *C. tomentosum*, *C. taylorii* and *C. decorticatum*. It is possible that the Schmidt (160: 40) records from

the Canaries and the Cape Verde Islands cover genuine *C. tomentosum* as well as the present species; the reported occurrence of *C. tomentosum* in the list area may rest on shaky ground—see Silva (169: 524–528). The records in (6), 7), (49) and (130) are also likely to be based on heterogeneous material (see Silva, *op. cit.*), *C. taylorii*, *C. decorticatum* and *C. tomentosum* possibly being involved.

Codium dichotomum (Huds.) Setch.

See *Codium tomentosum* Stackh.

Codium difforme Kütz.

Canaries (15; 102; 135; 151; 161; 163).

Note. See additional data at ***Codium adhaerens*** (Cabr.) C. Ag. Of the present records, only (15), (102) and (135) are original.

Codium duthieae Silva

?South West Africa (unpublished).

Note. Silva (168: 151–153) indicates that it would be easy to confuse this species with *Codium isaacii* Silva, which is also present in this area. This record therefore needs substantiation.

Codium elongatum C. Ag.

See *Codium decorticatum* (Woodw.) Howe; *Codium repens* Crouan frat.; *Codium taylorii* Silva.

Codium fragile (Sur.) Hariot

South West Africa (160; unpublished).

As *Codium fragile* (Suringar) Hariot subsp. *capense* Silva]

South West Africa (168).

Note. It is possible that the records for the parent species also relate to the subspecies as described by Silva (168: 153–157). Silva suggests that, on the basis of present temperature data, Swakopmund is the only known record for this species from the tropics and thus represents the approximate northern limit of its African range.

Codium guineense Silva

Angola (unpublished).
Canaries (unpublished).
Ghana (116).
Sénégal (37).
' . . . West coast of Africa . . . ' (169).

Note. We have been unable to locate a published description of this species and have not yet received a reply to the letter which we addressed to Dr P. Silva. It may be that the species should not be included, but details are here given for completeness.

Codium isaacii Silva

South West Africa (168).

Note. See also the entry for *Codium duthieae* Silva. Silva (168: 161) suggests that *C. isaacii* is not likely to extend much beyond Lüderitz, so far its recorded northern limit.

Codium lindenbergii Binder ex Kütz.

?Sénégal (36).

Note. According to Dangeard (36: 224–227) the record he makes for the *C. elongatum* C. Ag. group from Dakar, at present attributed to *C. decorticatum* in this list, is based on drift specimens which may well be nearer to *C. lindbergi* (sic!) as identified from the Cape of Good Hope than to any other species. Papenfuss (*Bot. Notiser*, **1940**: 204, 1940) states that this taxon is conspecific with *C. platylobium* Aresch. and that the latter name is therefore the correct one for the species.

Codium lineare C. Ag.

?Sénégal (36; 173).

Note. Silva (169: 524) considers that the type of this name really represents a proliferous, irregularly formed frond of *Codium vermilara* (Olivi) Delle Chiaje. It is therefore even more necessary carefully to check the material on which these records, already accorded some doubt by their authors, are based.

Codium platylobium Aresch.

?Sénégal (36).

Note. See the entries for *C. decorticatum* and *C. lindenbergii*. The taxa may be conspecific.

Codium repens Crouan frat.

Canaries (28; 169).

[As *Codium tomentosum* (Huds.) Stackh.]

Canaries (15).

Note. According to Silva (169: 530) the great variability of this species is distressing, but intensive population studies would help to clarify the picture. The record from the Canaries given in (15) as *C. tomentosum* is only partly relevant here; other specimens have been identified by Silva as *C. taylorii*.

Codium taylorii Silva ('taylori')

Canaries (28; 169).

Cape Verde Islands (28; 169).

Ghana (116; 169).

?St. Helena (28; 169).

[As *Codium elongatum* C. Ag.]

Canaries (15; 65; 70; 157; 163; 169; 182).

Note. The Sauvageau (157) record may possibly relate to *C. decorticatum* and not to the present species (see the entry for *C. decorticatum*). Seoane-Camba (163: 63) gives his record as '*Codium elongatum* C. Agardh [*C. decorticatum* (Wood.) Howe]'; the record has been stated by Silva in fact to represent *C. taylorii*.

[As *Codium tomentosum* Stackh.]

Canaries (15; 128).

Cape Verde Islands (49).

St. Helena (46; 86; 125).

Note. The Canaries record in (15) is only partly relevant here (see Silva (169: 527)) the other specimens apparently representing *Codium repens* Crouan frat. The records from the Canaries (128; possibly representing also *C. decorticatum* and *C. taylorii*) and the Cape Verde Islands (49; possibly involving *C. decorticatum*) also seem to be based on heterogeneous material.

General note: according to Silva (169: 530) the great variability of this species is distressing, but the picture may be clarified by intensive population studies.

Codium tenue Kütz.

Sénégal (173).

Note. Silva (169: 528) comments that *C. tenue* Kütz. [=*C. tomentosum* var. *tenue* (Kütz.) Kütz.], originally described from South Africa, has had slender-branched forms from many parts of the world referred to it. On the basis of extensive studies of topotype material and of material from other regions determined as *C. tenue*, he concludes that the species occurs only in South Africa. Hence, the identity of the present material stands in some doubt.

Codium tomentosum Stackh.

Angola (8; 9).

Canaries (11; 102; 128; 138; 158; 163).

Cape Verde Islands (7).

Congo (80; 81).

Gabon (81).

Mauritanie (83; 161).

Príncipe (176).

São Tomé (8; 9; 176).

Sénégal (100).

' . . . an der Westküste Afrikas von Marokko und den atlantischen Inseln bis zum Kap der Guten Hoffnung, . . . ' (181).

' . . . Atlantique jusqu'en Mauritanie. . . . ' (74).

' . . . de l'Angleterre aux Canaries . . . ' (22).

' . . . In mari atlantico . . . ab Anglia usque ad oras Capenses; . . . ' (104).

' . . . In mari Atlantico, ab Angliae oris usque ad caput bonae spei. . . . ' (1).

' . . . in oceano atlantico . . . tum orientali a Britanniae insulis . . . usque ad Caput Bonae Spei . . . ' (43).

' . . . in oceano atlantico . . . tum orientali, ab insulis Britanniae usque ad Cap. b. Spei . . . ' (5).

Note. See the entries for *C. decorticatum* and *C. taylorii*. It is possible that for the Canaries record in (128), *Codium decorticatum*, *C. taylorii* and *C. tomentosum* are all involved. Other records from the Canaries (163; see (15: 94)) and Cape Verde Islands (7; see (169: 517)) may also be based on mixed material. The records from

Príncipe, São Tomé and Sénégal require substantiation as they may be based on drift material.

[As ***Fucus tomentosus*** Huds.]

Ghana (96).

Note. This record requires further establishment from a study of extant specimens, if any are available. The reason for the citation of the record as 'Ghana' is explained in the entry for *Enteromorpha linza* (L.) J. Ag.

[As *Codium dichotomum* (Huds.) Setch.]

Canaries (65; 161).

Sénégal (173; 179).

Note. The Trochain record (179: 108) may have some connection with *Codium lineare* C. Ag.; see Dangeard (36: 227).

General note. According to Silva (*J. mar. biol. Ass. U.K.*, **34**: 569–571, 1955; (169: 524–528)), the distribution of this species as delimited by him in 1955 is north-eastern Atlantic only, extending south to Morocco, Azores and Algeria. In 1960, Silva considered the records of *Codium tomentosum* from the islands of the north-eastern Atlantic, but not those from continental Africa. It therefore follows that all the *C. tomentosum* records need re-assessment; those from the islands were found by Silva to represent *C. decorticatum*, *C. taylorii* or *C. repens* and it seems likely that the mainland records are also so representative.

Codium spp.

Canaries (102).

Cape Verde Islands (133).

Mauritanie (173).

Sénégal (14; 36; 37).

Conferva aegagropila L.

See *Cladophora pellucida* (Huds.) Kütz.; *Cladophoropsis membranacea* (C. Ag.) Børg.

Conferva aerea Dillwyn

See *Chaetomorpha linum* (O. F. Müll.) Kütz.

Conferva aeruginosa L.

See *Spongomorpha aeruginosa* (L.) Hoek.

Conferva breviarticulata Suhr

Note. According to De Toni (*Sylloge algarum . . .*, vol. **3**, *Sylloge Fucoidearum . . .*, 1895, pp. 445–446) this is a synonym of *Elachista globulosa* (Grat.) J. Ag., a brown alga.

Conferva crispata Roth

Note. According to Van Den Hoek (95: 180) the type of this name is lost, but it probably represented *Cladophora glomerata* (L.) Kütz. var. *crassior* (C. Ag.) Hoek. Since Montagne (128) stated that the specimens grew on rocks near Telde, Canaries, particularly near a place called Los Llanos which is clearly inland, we have omitted further data from this list.

Conferva crystallina Roth

See *Cladophora crystallina* (Roth) Kütz.

Conferva enormis Mont.

See *Cladophoropsis membranacea* (C. Ag.) Børg.

Conferva implexa Dillwyn

See *Chaetomorpha capillaris* (Kütz.) Børg.

Conferva linum Roth

See *Chaetomorpha linum* (O. F. Müll.) Kütz.

Conferva membranacea C. Ag.

See *Cladophoropsis membranacea* (C. Ag.) Børg.

Conferva pachynema Mont.

See *Chaetomorpha pachynema* (Mont.) Mont.

Conferva pallescens Bory

Note. According to De Toni (*Sylloge algarum . . .*, vol. **4**, *Sylloge Floridearum . . .*, Sectio III, 1903, pp. 1427–1429) this is a synonym of *Spyridia filamentosa* (Wulf.) Harv., a red alga.

Conferva pellucida Huds.

See *Cladophora pellucida* (Huds.) Kütz.

Conferva prolifera Roth

See *Cladophora prolifera* (Roth) Kütz.

?Conferva rivularis L.

Canaries (24).

Note. The nature of this taxon is anything but clear. Bory simply records it as '. . . 22. Conferve des ruisseaux ? *Conferva rivularis* ? L. . . . ' (24: 306). The likelihood is that a freshwater form is involved, but since Bory himself records the species with '?' and does not cite further locational data, little more can be said unless and until specimens substantiating the record are studied.

Conferva villum C. Ag.

See *Urospora laeta* (Thur.) Børg.

Conferva sp.

Canaries (24).

Note. Two entries are given by Bory (24: 306, 307), neither with any data other than simply the generic name. The records are therefore largely useless unless material has been preserved and is identifiable at specific level.

Cymopolia barbata (L.) Lamour.

Canaries (5; 15; 28; 41; 42; 43; 65; 79; 85; 131; 135; 138; 153; 161; 182; 185).

Dasycladus claviformis (Roth) C. Ag. ('clavaeformis')

See *Dasycladus vermicularis* (Scopoli) Krasser.

Dasycladus vermicularis (Scopoli) Krasser

Canaries (28; 65; 135).

[As *Dasycladus clavaeformis* (Roth) C. Ag.]

Canaries (2; 5; 11; 15; 22; 43; 57; 102; 104; 128; 131; 138; 153; 182; 185).

Canaries and warmer Atlantic (161).

'. . . Atlantic Ocean . . . African . . . coast . . . ' (57).

Note. The identity of any extant specimens relating to the above records made under the name *D. clavaeformis* needs checking. It seems very likely, however, that the species involved in most cases is *D. vermicularis*.

Dasycladus spp.

Canaries (102).

Note. Although it has not been checked, it is likely that the material recorded relates to *D. vermicularis*.

Derbesia–Halicystis complex

According to Hustede, H. (*Naturwissenschaften*, **47**: 19, 1960), *Derbesia neglecta* is the alternate generation in the life history of *Bryopsis halymeniae*. Although there has in the past been taxonomic and nomenclatural confusion between these genera, the apparent novelty of this situation requires that much further work be done on the *Derbesia–Halicystis* complex. See also the more recent study involving the *Derbesia neglecta–Bryopsis halymeniae* relationship, by Hustede, in *Botanica mar.*, **6**: 134–142, 1964.

Derbesia

The criteria employed in delimitation of species within this genus have never been entirely satisfactory: largely, the diameter of the tubular vegetative filaments; the size and shape of the chloroplasts; the diameter and length of the pedicels supporting the sporangia; and the diameter, length and shape of those sporangia have provided the delimiting data. These criteria are all highly variable, as has been indicated by Børgesen (15: 107–109) and Scagel (159: 112–113). The overall characteristics of the *Derbesia* stage do not seem to provide the best avenue of approach here; particularly, in view of the Hustede data on *Derbesia–Bryopsis* connections, it appears that the relationships between *Derbesia* forms can only be elucidated by a culture programme, embracing all the areas where the genus occurs, designed to provide data on the potential life-histories. As with *Codiolum* and *Gomontia*, there may be *Derbesia* stages in yet other green algal life-histories, so far unsuspected.

Derbesia furcellata (Zanard.) Ardiss.

[As *Pseudochlorodesmis furcellata* (Zanard.) Børg.]
Canaries (57; 65; 161).
[As *Pseudochlorodesmis furcellata* (Zanard.) Børg. var. *canariensis* Børg.]
Canaries (15; 153).
[As ***Derbesia penicillum*** (Menegh.) Ardiss.]
Canaries (182).

Note. Ardissone (Phycologia mediterranea, Parte II[a] Oosporee–Zoosporee–Schizosporee, *Mem. Soc. crittogam. Ital.*, **2** (Disp. II[a]): 161–162, 1887) first made the above combination with some doubt, which he indicated with the use of '?'. However, he made it quite clear that the doubt attached rather to the question of whether the species should be placed in *Derbesia* than to the distinctness of the species as a taxon. In any case, in accordance with Article 34, Note 1, of the *International Code of Botanical Nomenclature . . .*, 1966, the combination is validly published as Ardissone accepted it himself. The attribution here of the record of *D. penicillum* must be viewed with caution. Børgesen indicated that he was doubtful about the synonymy of *D. penicillum* and of his *Pseudochlorodesmis furcellata*, but that he was unable to comment further as he could not find a Vickers specimen for comparison (15: 85). Vickers herself indicates that the determination was uncertain since the material was sterile.

Derbesia lamourouxii (J. Ag.) Solier

[As *Bryopsis dalmatica* Kütz.]
Sénégal (173).

Note. This species was first described by J. G. Agardh in 1842 as a variety of *Bryopsis balbisiana* and was raised to species level by Solier in 1847. The epithet *lamourouxii* accordingly only has priority at the species level from 1847, and there are other names placed in its synonymy, by various authors, that antedate its use at this level. These may have to be considered in establishing the correct nomenclature. The problem is being investigated. Aside from this point, Sourie (173:106) was clearly in some doubt as to the validity of his record, since he qualifies it with '(?)'.

Derbesia marina (Lyngb.) Solier

See *Halicystis ovalis* (Lyngb.) Areschoug.

Note. **This entity represents the diploid phase of a pleomorphic life-history; only** the haploid phase (*H. ovalis*) has thus far been reported from the area.

Derbesia neglecta Berth.

Canaries (15; 65).

Note. These records are based on one small tuft of material found growing epiphytically on *Hypnea musciformis*; hence, if the determination is correct, the species is likely to be much more common, at least in the Canaries. See also the note on the *Derbesia–Halicystis* complex, above.

Derbesia penicillum (Menegh.) Ardiss.

See *Derbesia furcellata* (Zanard.) Ardiss.

Note. The comment regarding a taxon first published with qualification by '?', given above under *D. furcellata*, also applies to this species.

Derbesia souriei J. Feldm.

Sénégal (173).

'. . . Mauritanie, Sénégal et les îles Atlantides voisines . . . ' (173).

Note. This species may not have been validly described in any publication. Sourie (173: 116) comments that the species was named but not yet described by J. Feldmann and we have not been able to trace any published description subsequent to that date [1954].

Derbesia tenuissma (De Not.) Crouan frat.

Canaries (15; 57; 62; 65; 163).

Cape Verde Islands (7).

Sénégal (36).

'. . . Atlantic Ocean . . . African coasts . . . ' (57).

[As *Halicystis parvula* Schm.]

Canaries (65).

?Sénégal (173).

Note. The life-history stage previously known as *Halicystis parvula* is the gametophyte and *Derbesia tenuissima* the sporophyte of this species. In view of the established connections between the life-history stages, it is probable that the existing reports represent only a small sample of a distribution much wider in tropical West Africa. Sourie (173: 106) was clearly doubtful about the exact nature of his material; he records it as '. . . *Halicystis* sp. (aff. *parvula* Schmitz) (?) . . . '. See also the entry for *Halicystis ovalis* (Lyngb.) Aresch.

Derbesia turbinata Howe et Hoyt

Sénégal (173).

Dichotomosiphon tuberosus (A. Br.) Ernst

See *Boodleopsis pusillus* (Collins) W. R. Taylor, Joly et Bernatow.

Dictyosphaeria cavernosa (Forsk.) Børg.

[As *Dictyosphaeria favulosa* (C. Ag.) Dcne]

?Cape Verde Islands (7; 161).

?'Mers équatoriales.' (7).

Note. Askenasy (7: 158) records the entity with '?' and states '. . . Je n'ai vu que des exemplaires très jeunes. . . . ' Since the record in (161) is based solely and directly on that in (7), the actual existence of the species in the list area remains to be confirmed.

Dictyosphaeria favulosa (C. Ag.) Dcne

See *Dictyosphaeria cavernosa* (Forsk.) Børg.

Dunaliella salina (Dunal) Teodor.

Ghana (121).

Ectochaete bulbochaete P. Dang.

Sénégal (36).

Endoderma viride (Reinke) Lagerh.

See *Entocladia viridis* Reinke.

Endogenes ceramii P. Dang.

?Sénégal (36).

Note. The systematic position of this and the following species is very much in doubt. Dangeard first described the next species, *Endogenes polysiphoniae*, in 1936 (*Annls Protist.*, **5**: 171–174) and then suggested that it was probably a Xanthophyte since it appeared yellow-green in colour; however, since there was no differentiated chromatophore and the alga appeared to reproduce by fragmentation, there were some affinities with the Myxophyceae. Later (36: 212–213) in describing *E. ceramii* in the walls of *Ceramium deslongchampsii* at Roscoff, France, Dangeard found that the pigment was disposed around the periphery of the cells, which he took to indicate the presence of a parietal plate chromatophore. Hence, it is improbable that the entity is a Myxophyte. The '?' above is used for this record (i) as the 'hosts' in which the material was found in Sénégal included various *Ceramium* spp. and (ii) in view of the fact that the *Endogenes* thallus concerned was digitate; thus the material was like a smaller version of *E. polysiphoniae*, being digitate, but was in a different 'host'. Feldmann (*Trav. Stat. mar. biol. Roscoff*, (*N.S.*), **5**, Suppl. 6: 128, 1954) places the genus as 'Incertae sedis', even as to major division of the algae, '. . . tant qu'il n'aura pas été réétudié'.

Endogenes polysiphoniae P. Dang.

?Sénégal (36).

Note. **The systematic position of this species is in doubt. See the note at** *Endogenes ceramii* P. Dang.

Enteromorpha

It is clear that this genus cannot be treated in any completely satisfactory way for the list area at the moment. The data which follow are therefore in an entirely preliminary state. Scagel (159: 44) comments on the genus in British Columbia and Northern Washington as follows: '. . . Except for a few clear-cut entities, many of the forms described and recorded for this area are likely only variants in extremely plastic taxa. . . . ' These comments could apply equally well to tropical West African *Enteromorpha*.

Enteromorpha ahlnerana Bliding '(ahlneriana')

?Cape Verde Islands (7).

Note. See also the entries for *Enteromorpha clathrata* (Roth) Greville, *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag. subsp. *flexuosa* and *Enteromorpha procera* Ahlner.

Enteromorpha bulbosa (Suhr) Mont.

?South West Africa (unpublished).

Enteromorpha clathrata (Roth) Grev.

Annobon (68; 148; 181).
Ascension (68; 181).
Canaries (11; 15; 65; 68; 128; 135; 163).
Cape Verde Islands (68; 181).
Ghana (121).
Nigeria (68; 175; 176).
São Tomé (176).
Sierra Leone (68).
'Atlantic coast of Africa' (176).
' . . . De Suède aux Canaries . . . ' (22).

[As *Enteromorpha clathrata* (Roth) Grev. forma *pumita*]
Ghana (unpublished).

[As *Enteromorpha clathrata* (Roth) Grev. var. *uncinata* (C. Ag.) Grev.]
Canaries (128).

[As *Ulva clathrata* C. Ag.]
Ascension (6).

Note. According to Bliding (12: 106–113), J. Agardh's concept of *Enteromorpha clathrata* included elements representative of other species. Specimens in Herb. alg. Agardh, Lund, prove that he included material representative of *Enteromorpha ahlnerana* and *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag. If this assessment is correct, the record made in (7) for the Cape Verde Islands may well really represent *Enteromorpha flexuosa*; for the moment, that record has been placed under the latter two species. See also the entries for *Enteromorpha erecta* (Lyngb.) J. Ag., *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag. and *Enteromorpha procera* Ahlner.

Enteromorpha compressa (L.) Grev.

Cameroun (147).
Canaries (11; 15; 22; 65; 128; 138; 161; 163).
Cape Verde Islands (7; 49; 130).
Ghana (unpublished).
Salvage Islands (71; 138).
' . . . an den ganzen atlantischen Küsten . . . Afrikas bis zum . . . dem Kap der Guten Hoffnung . . . ' (181).

[As *Ulva compressa* L.]
Cape Verde Islands (172).

[As *Ulva enteromorpha* Le Jolis var. *β. compressa* Le Jolis]
Ascension (6).

Note. See also the entry for *Enteromorpha lingulata* J. Ag.

Enteromorpha crispata (Bertol.) Bornet

See ***Enteromorpha linza*** (L.) J. Ag.

Note. Bornet (22: 199) gives the geographical distribution as ' . . . De la mer du Nord aux Canaries . . . ' for a species which he describes as '*E.*[nteromorpha] ***crispata*** Bertol., *Amoen. ital.* p. 83; . . . '. There is no such entry in Bertoloni's *Amoenitates italicae*, 1819, where p. 83 is occupied by *Carex gynomane*; however, p. 93 is occupied, in part, by *Ulva crispata* Bertol. and it may be taken that 'p. 83' in Bornet's work represents an orthographic or typographic error for 'p. 93'. Thus, Bornet made a new combination in the genus *Enteromorpha*. If *E. crispata* is accepted as a variety of *Enteromorpha linza*, then the name for it in that rank is *Enteromorpha linza* (L.) J. Ag. var. ***crispata*** (Bertol.) J. Ag. (in *Lunds Univ. Årsskr.*, **19** (2): 134–135, 1882–1883 [=*Till Alg. Syst., III*]), based on *Ulva crispata* Bertol., *Amoen.* p. 93, no. 9. On the basis of this combination, De Toni (*Sylloge algarum . . .*, vol. 1, *Sylloge Chlorophyceae . . .*, pp. 124–125, 1889) included *Ulva crispata* Bertol. in his synonymy of ***Enteromorpha linza*** (L.) J. Ag. Bornet does not mention either of these cases and may have been unaware of them.

Enteromorpha erecta (Lyngb.) J. Ag.

Canaries (15; 65).

Note. There is some problem about the nature of the plant carrying the basionym of this entity—*Scytosiphon erectus* Lyngbye. According to Bliding (12: 79), Lyngbye's illustration (Tab. 15C in *Tentamen Hydrophytologiae Danicae . . .*, 1819) represents *Enteromorpha flexuosa* subsp. *paradoxa* (Dillw.) Bliding. This taxon is based on a Dillwyn description in which the name *paradoxa* was used at species level and of which specimens appear to have been sent by Dillwyn to J. G. Agardh; the latter could therefore have utilized these specimens as a basis for his ***Enteromorpha erecta***, in part at least, despite his avoiding the use of Dillwyn's name in favour of that of Lyngbye. There is no evidence to show that Agardh consulted the Lyngbye herbarium at Copenhagen and this omission may account for the confusion as to the identity of *Scytosiphon erectus*, the lectotype of which, according to Bliding (12: 80), is rather similar to *Enteromorpha clathrata* (Roth) Grev. The actual identity of the present Canaries specimens therefore depends on the comparative sources employed by Børgesen (15) in his determination; if he saw only Lyngbye's plate, which is unlikely since he was working in Copenhagen, then his Canaries specimens may represent *E. flexuosa* subsp. *paradoxa*, otherwise it is more likely that he would give greater emphasis to the Lyngbye specimens and that the material may well be *E. clathrata*. In view of the uncertainty, the records have been included here for the present.

Enteromorpha fasciculata P. Dang.

Sénégal (36).

Enteromorpha flexuosa (Wulf. ex Roth) J. Ag. subsp. ***flexuosa***

?Annobon (176).
Cape Verde Islands (176).
Ghana (176).
Nigeria (176).
São Tomé (176).
Sénégal (176).
Senegambia (unpublished).
Sierra Leone (176).

Note. This is the distribution given by Steentoft (176: 107) and is ' . . . putative, pending examination of African material . . . '.

[As *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag.]
Cape Verde Islands (176).
Ghana (120).
Sénégal (36; 173; 176).

Note. Bliding (12: 73–106) recognizes six subspecies in *Enteromorpha flexuosa*. In the absence of evidence to the contrary, it has been assumed that those records which simply refer to *E. flexuosa* (Wulf. ex Roth) J. Ag. for the list area are in fact representative of the subspecies *flexuosa*.

[As *Enteromorpha clathrata* J. Ag.]
?Cape Verde Islands (7).

Note. **The reason for** the attribution of this record here is given in the entry for *E. clathrata* (Roth) Grev.

[As ***Enteromorpha intermedia*** Bliding]
Ghana (68).
Nigeria (68).
Sierra Leone (68).

[As ***Enteromorpha prolifera*** **(O. F. Müll.) J. Ag.]**
São Tomé (82; 91).

Note. **Steentoft (176: 107) considers the Hariot (82) and Henriques (91) records** of *E. prolifera* to be representative of the present taxon; this view is accepted here.

Enteromorpha flexuosa (Wulf. ex Roth) J. Ag. subsp. ***paradoxa*** (Dillw.) Bliding

[As *Entermoropha plumosa* Kütz.]
Canaries (15; 65; 70; 181).

[As ***Enteromorpha hopkirkii*** **McCalla]**
Canaries (182).

Note. **Bliding (12: 79–85) should be consulted for the situation** with regard to *E. hopkirkii*. See also the note at *Enteromorpha erecta* (Lyngb.) J. Ag.

Enteromorpha gelatinosa Kütz.

Canaries (43; 104; 108).

Note. Kützing (104: 482) gives his record as '... In mari canariensi legit cl. *Despreaux* (v.s. in coll. *Lenormand*).' Since both the other records cited above are based directly

on the record in (104), the identity of the Lenormand specimen clearly needs establishing.

Enteromorpha hopkirkii McCalla

See *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag. subsp. *paradoxa* (Dillw.) Bliding.

Enteromorpha intermedia Bliding

See *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag. subsp. *flexuosa*.

Note. The records under the name *E. intermedia* have been so transferred since Bliding himself (12: 73–74) states that he now considers *E. intermedia* to be synonymous with *E. flexuosa* subsp. *flexuosa*.

Enteromorpha intestinalis (L.) Link

Canaries (11; 15; 65; 72; 157; 161; 163).

Cape Verde Islands (7; 130; 181).

Salvage Islands (71; 72).

[As *Enteromorpha intestinalis* L. var. *β crispa* (Roth) Mont.]

Canaries (128).

[As *Ulva intestinalis* L. var. *β crispa* (Roth) C. Ag.]

Ghana (96).

Note. Hornmann (96) records his *Ulva intestinalis* var. *β crispa* from 'Danish Guinea'; Junghans, J. (Thonning's and Isert's collections from 'Danish Guinea' (Ghana) in West Tropical Africa, *Bot. Tidsskr.*, **57**: 310–355, 1961, and **58**: 82–122, 1962) has shown that this area represents the present Ghana. See also the note to *Enteromorpha linza* (L.) J. Ag.

Enteromorpha lingulata J. Ag.

Canaries (15; 65; 182).

Cape Verde Islands (156).

[As *Enteromorpha ligulata* J. Ag.]

Canaries (163).

Note. Since this record is based on that given in (15), it may be assumed that 'ligulata' is an error for *lingulata*.

[As *Enteromorpha compressa* (L.) Grev.]

Cape Verde Islands (69).

Note. Fremy (69) states that his material was ' . . . semblant appartenir à la var. *lingulata* (J. Ag.) Hauck . . . '.

Note. The whole status of this species, and particularly of the records for this region, needs further examination. Steentoft (176: 107) suggests that at least the Canaries records may be representative of *Enteromorpha flexuosa* subsp. *flexuosa*. She does not give the basis for her suggestion, but it presumably rests on the statements made by Bliding (12: 106) as a result of his examination of Australian and European material in Herb. Alg. Agardh, Lund. He considered that *Enteromorpha lingulata* is certainly a member of the *flexuosa* group, closely related to or perhaps synonymous with *Enteromorpha flexuosa* subsp. *flexuosa*. Since there is doubt

expressed by these authors and since there are records from other areas than the Canaries, we have maintained the name *lingulata* for the present; determinations of the species should, however, be regarded with doubt.

Enteromorpha linza (L.) J. Ag.

[As *Enteromorpha linza* ? forma *lanceolata*]

Canaries (15; 163; 182).

Note. All these records are based on that given in (182). Even there, there is some doubt expressed, since it is stated that Reinbold had seen some of this Vickers material and thought it referable to forma *lanceolata* of the species. There seems not to have been any subsequent substantiation of this view.

[As *Enteromorpha crispata* (Bertol.) Bornet]

Canaries (22).

Note. For the attribution here of this record, see the note at *Enteromorpha crispata.*

[As *Ulva lanceolata* L.]

Ghana (96).

Note. Ulva lanceolata L. is now accepted as being synonymous with *Enteromorpha linza* (L.) J. Ag. The record given in (96: 8) is simply stated without authorities and to this extent is doubtful; that doubt is emphasized by the lack of any other records from Ghana for the species. Clearly it is necessary to examine whatever Isert specimens remain in Copenhagen, since Hornmann (96) states that such material formed the basis of his records. For other data regarding this record and its background, see the Junghans reference given in full in the note to *Enteromorpha intestinalis.*

Enteromorpha marginata J. Ag.

See *Blidingia marginata* (J. Ag.) P. Dang.

Enteromorpha micrococca Kütz. and varieties

See *Blidingia marginata* (J. Ag.) P. Dang.

Enteromorpha minima Näg. ex Kütz.

See *Blidingia minima* (Näg. ex Kütz.) Kylin.

Enteromorpha plumosa Kütz.

See *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag. subsp. *paradoxa* (Dillw.) Bliding.

Enteromorpha procera Ahlner

[As *Enteromorpha procera* Ahlner forma *crainosa*]

Ghana (unpublished).

[As ***Enteromorpha procera*** Ahlner forma *opposita*]

Ghana (unpublished).

[As ***Enteromorpha procera*** Ahlner forma *subnuda*]

Ghana (unpublished).

Note. These records, based on determinations by V. J. Chapman, need substantiation in view of the comments of Bliding (12: 61, 63, 66) that at least three species, ***Enteromorpha ahlnerana*** Bliding, *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag. and

Enteromorpha clathrata (Roth) Grev., are involved in some way or other in the original material and in material of some subsequent records of *Enteromorpha procera* Ahlner.

Enteromorpha prolifera (O. F. Müll.) J. Ag.

Annobon (148).
Ghana (120).
Sénégal (30).

Note. Steentoft (176: 107), without giving a basis for her statement, indicates the possibility that the records from Annobon under the name *Enteromorpha prolifera* are in fact representative of *Enteromorpha flexuosa* subsp. *flexuosa*. Since the only record which we have been able to trace in this connection is that in (148), it is necessary to check the original material to be sure of attribution.

[As *Enteromorpha prolifera* (O. F. Müll.) J. Ag. var. *tubulosa* Kütz.]
Ghana (unpublished).

Note. It is possible, in view of Bliding's opinion that the type of *Enteromorpha tubulosa* Kütz. is in fact *Enteromorpha flexuosa* (Wulf. ex Roth) J. Ag., that this unpublished determination by V. J. Chapman should be referred to that species. This presupposes, as seems indicated by his statements elsewhere, that Chapman was familiar with Kützing's concept of *Enteromorpha tubulosa*.

Enteromorpha ramulosa (Sm.) Hook. f.

Canaries (15; 65; 72; 135; 138; 140; 163; 181).
Salvage Islands (71; 72).
'. . . ad littora sabulosa oceani atlantici calidioris . . . ad Canarias (GRUNOW) . . .' (43).
'. . . D'Angleterre aux Canaries . . . ' (22).

[As ***Enteromorpha ramulosa* (J. E. Smith.) Hook. fil. forma** *spinescens* Kütz.]
Canaries (15; 182).

Enteromorpha torta (Mert.) Reinb.

Ghana (unpublished).

Note. This record needs further checking, since it is not clear what connection, if any, exists between this species and *Percusaria percursa* (C. Ag.) Rosenv. See Bliding (12: 20, 22–23) for a statement of some aspects of the problem.

Enteromorpha sp. [probably ***Enteromorpha percursa***]

See *Percursaria percursa* (C. Ag.) Rosenv.

Enteromorpha spp.

Ascension (6).
Canaries (23; 102).
Gabon (100).
Ghana (116; 120; 122).
Guinée (173).
Sénégal (14; 174).
South West Africa (unpublished).

Entocladia viridis Reinke

Angola (8; 9).

[As ***Endoderma viride*** (Reinke) Lagerh.]

Angola (181).

Canaries (15; 65).

Ernodesmis verticillata (Kütz.) Børg.

Canaries (15; 65; 135; 153; 161; 176).

Cape Verde Islands (65; 176).

Ghana (54; 116; 176).

Príncipe (176).

St. Helena (176).

São Tomé (176).

Sénégal (36; 176).

Note. The records for St. Helena and Sénégal given in (176) are both qualified by '?'.

[As *Valonia verticillata* Kütz.]

Canaries (157).

Cape Verde Islands (7; 49; 86).

St. Helena (46; 86; 125).

Flabellaria petiolata (Turra) Trev.

See *Udotea petiolata* (Turra) Børg.

Gomontia polyrhiza (Lagerh.) Born. et Flah.

Canaries (15; 65).

Note. It has become increasingly clear that the genus *Gomontia* consists, at least in part, of stages in the life-histories of other algae. Further, the relationship of *Codiolum polyrhizum* Lagerh. to *Gomontia polyrhiza* is probably not as simple as was previously thought. Scagel (159: 108) has summarized the position by stating: '. . . The justification for returning *Gomontia polyrhiza* to *Codiolum polyrhizum* and for referring the filamentous phase to *Eugomontia* [of Kornmann] is at present of questionable validity and will remain so until the whole complex involving *Urospora*, *Spongomorpha*, *Monostroma*, *Codiolum*, and *Chlorochtyrium* is more completely studied . . . '

Halicystis ovalis (Lyngb.) Aresch.

Canaries (15; 157).

Note. This alga is known to be the haploid (gametophyte) phase of *Derbesia marina* (Lyngb.) Solier; the latter has not been recorded for the area. This is an unusual situation as elsewhere *Derbesia* is more commonly reported in the absence of *Halicystis*. It is possible that inadequate collections from the area are the explanation, but it is much more likely that the situation is as follows. Feldmann (62: 77) considers that the Sauvageau (157) record of *H. ovalis* from the Canaries is very likely, in fact,

to be *H. parvula*. If this is correct, the record should be transferred to the entry for *Derbesia tenuissima* (De Not.) Crouan frat., of which *H. parvula* is the gametophyte. Since the record given by Børgesen is based directly and solely on the Sauvageau record, the effect would be to eliminate *H. ovalis* from the known flora of the area, thus removing the dilemma of the unusual appearance of *H. ovalis* without apparent *D. marina*.

Halicystis parvula Schmitz

See *Derbesia tenuissima* (De Not.) Crouan frat. and *Halicystis ovalis* (Lyngb.) Aresch.

Halicystis sp.

Canaries (102).

Note. In view of what has been said above, and assuming the present determination to be correct, this record should probably appear under *Derbesia tenuissima*.

Halimeda discoidea Dcne

Cape Verde Islands (93).

[As *Halimeda tuna* (Ellis et Sol.) Lamour.]

Cape Verde Islands (7; 8; 9; 10; 49; 85).

Halimeda platydisca Dcne

See *Halimeda tuna* (Ellis et Sol.) Lamour.

Halimeda tuna (Ellis et Sol.) Lamour.

Canaries (7; 10; 22; 65; 93; 102; 135; 138).

[As *Halimeda tuna* (Ellis et Sol.) Lamour. forma *typica* Barton]

Canaries (15).

' . . . Atlantic Ocean . . . African coast . . . ' (57).

[As *Halimeda tuna* (Ellis et Sol.) Lamour. forma *platydisca* (Dcne) Barton]

Canaries (15; 57).

[As *Halimeda platydisca* Dcne]

Canaries (22; 41; 42; 43; 104).

Note. See also *Halimeda discoidea* Dcne.

Kallonema caespitosum Dickie

Cape Verde Islands (7; 49).

Note. It is probable that the entities referred by Dickie to this genus are really forms of *Enteromorpha*. The necessary taxonomic study does not seem to have been made, however, all authors apparently overlooking or ignoring the genus.

Lola

The genus *Lola* has been considered by many authors to be of doubtful validity (e.g. by Christensen, Doty and Scagel), whereas others (e.g. Steentoft, Zaneveld and Chapman) have continued to accept or even (Zaneveld) to make new combinations in the

genus. Those authors who view the genus with doubt have referred the species to *Rhizoclonium*, *Chaetomorpha*, *Cladophora* and some other genera. We accept the point that the genus is of doubtful validity.

Lola gracilis (Kütz.) Chapman

São Tomé (176).
'Probably pantropical' (176).

Lola tortuosa (Dillw.) Chapman

See *Chaetomorpha capillaris* (Kütz.) Børg.

Note. The allocation of this record to *Chaetomorpha capillaris* may have to be reconsidered in the light of the work of Koster (*Pubbl. Staz. zool. Napoli*, **27**: 335–357, 1955). She considers *Rhizoclonium riparium* forma *validum* to be synonymous with *Rhizoclonium tortuosum* (Dillw.) Kütz., the latter being the same as Chapman's *Lola tortuosa*. It is therefore possible that, given correct determination of the material, it is in fact representative of *Rhizoclonium riparium*.

Microdictyon agardhianum Dcne

Canaries (15; 161).
[As *Microdictyon umbilicatum* Zanard.]
Canaries (138; 140; 182).

Note. Setchell (166: 497) states that the specimens determined by Børgesen (15) as *M. agardhianum* Dcne are in fact representative of *M. boergesenii* Setchell. He also includes the reference 'Boergesen, Mar. Alg. Canary Is., pp. 27–32 and 116–120, 1925' in his list of undisputed (wholly or in part) references in (166: 485–486). There is no mention of '(in part)' in either of these entries, although other entries in the same lists are very firmly so qualified. Since it has been concluded that Børgesen's determinations as *M. agardhianum* included both *M. boergesenii* and *M. agardhianum*, one can only assume that 'pro parte' was omitted by oversight. The other reference to the *M. agardhianum* determinations (166: 490) by Setchell is in the synonymy of *M. tenuius* Dcne; this reference can be discounted for the present purpose as it can be shown clearly to refer to the Cadiz specimens which Børgesen looked at subsequent to writing his text on the Canaries material. Of the records as *M. umbilicatum* Zanard., Setchell indicates that those in (138) and (140) are *pro parte* with material of *M. tenuius* and that in (182) *pro parte* with material of *M. boergesenii*. Setchell's 'in part' qualifying the (182) entry may indicate that he had seen only part of the complete collection rather than that the material was heterogeneous.

Microdictyon boergesenii Setchell

Canaries (28; 65; 135; 166).
[As *Microdictyon agardhianum* Dcne]
Canaries (15).
[As *Microdictyon umbilicatum* (Velley) Zanard.]
Canaries (182).

Note. For the entries as other names, see the note to *Microdictyon agardhianum* Dcne.

Microdictyon calodictyon (Mont.) Kütz.

Canaries (6; 15; 17; 22; 43; 52; 64; 65; 99; 104; 157; 161; 164; 166; 176; 178; 182).
São Tomé (176).
Sénégal (182).

[As *Anadyomene calodictyon* Mont.]

Canaries (11; 128; 129).

Note. The records as *Microdictyon umbilicatum* (Velley) Zanard. in (138) may apply in part to the present species as well as to *M. agardhianum*, *M. tenuius* and *M. umbilicatum*; see Setchell (166: 519). The evidence is not yet sufficiently strong for a final decision.

Microdictyon tenuius Dcne

[As *Microdictyon umbilicatum* Zanard.]

Canaries (138; 140).

Note. See the notes to the other species of *Microdictyon*.

Microdictyon umbilicatum (Velley) Zanard.

See the entries for the other species of *Microdictyon*.

Note. The records given by Piccone (138 and 140) may possibly relate in part to *M. umbilicatum*, in which he placed the material, as well as to the other species mentioned above.

Ostroebium quekettii Born. et Flah.

Canaries (15; 65).
Cape Verde Islands (61).

Percursaria percursa (C. Ag.) Rosenv.

[As *Enteromorpha* sp. ? (probably *E. percursa*)]

St. Helena (46; 86; 125).

Note. These records need critical re-assessment. The records in (86) and (125) are based directly on that in (46); in the latter, Dickie states '... Mere fragments only, ..., the structure evidently the same as that of *Enteromorpha percursa* Hook., but too imperfect for identification. ... '. Bliding (12: 20, 22–23, 50) indicates that various species of *Enteromorpha* are involved in the history of *E. percursa*, so that it would be further necessary to know what Dickie understood by *E. percursa* Hook.

Phaeophila dendroides (Crouan frat.) Batters

Canaries (20; 65).

[As ***Phaeophila floridearum*** Hauck]

Canaries (15).

Phaeophila floridearum Hauck

See *Phaeophila dendroides* (Crouan frat.) Batters.

Phycoseris fasciata (Delile) Kütz.

See *Ulva fasciata* Delile.

Phycoseris rigida (C. Ag.) Kütz.

See *Ulva rigida* (C. Ag.) Thur.

Phyllerpa prolifera (Forsk.) Kütz.

See *Caulerpa prolifera* (Forsk.) Lamour.

Pringsheimiella scutata (Reinke) Marchew.

Sénégal (173).

Pseudobryopsis myura (J. Ag.) Bert.

See *Trichosolen myura* (J. Ag.) W. R. Taylor.

Pseudochlorodesmis furcellata (Zanard.) Børg.

See *Derbesia furcellata* (Zanard.) Ardiss.

Rhipilia tenaculosa A. et E. S. Gepp

Canaries (153).

Note. This record requires confirmation in that it rests on a statement by Printz (153: 315–316): ' . . . 3 Arten, *R. tomentosa* Kützing (=*Avrainvillea laetevirens* Crouan = *Udotea tomentosa* Murray) und *R. tenaculosa* A. et E. S. Gepp (=*Udotea conglutinata* Dickie) in Atlantischen Ozean (Westindische und Kanarische Inseln), während *R. orientalis* A. et E. S. Gepp in Indischen Ozean gefunden ist. . . . '. From the way this is phrased and lacking any supporting evidence, it is possible that *R. tenaculosa* has never been reported from the Canaries. The nomenclature of this species also requires further study.

Rhipilia tomentosa Kütz.

Canaries (153).

Note. See the note at *Rhipilia tenaculosa* A. et E. S. Gepp.

[As *Avrainvillea canariensis* A. et E. S. Gepp]

Canaries (15; 65; 76; 161).

[As *Udotea* (*Rhipilia*) *tomentosa* G. Murray et Boodle]

Canaries (182).

Rhizenteron saxatile P. Dang.

Sénégal (35; 36; 39; 173).

' . . . Mauritanie, Sénégal et les îles Atlantides voisines . . . ' (173).

Note. Sourie's record for Sénégal is perhaps doubtful; the author himself gives it only qualified by ' ?'. It appears very likely, from the data given by Dangeard, that previous authors may have confused this species with certain forms of *Enteromorpha*.

Rhizoclonium africanum Kütz.

Senegambia (43; 105; 154).

Note. Senegambia can be taken to mean the present Sénégal and Gambia. See the note at *Rhizoclonium hookeri* Kütz.

Rhizoclonium hieroglyphicum (C. Ag.) Kütz.

[As *Rhizoclonium hieroglyphicum* Kütz. ampl. Stockm.]

Cape Verde Islands (69).

Rhizoclonium hookeri Kütz.

Ghana (120; unpublished).

Senegambia (77).

Note. See the note at *Rhizoclonium africanum* Kütz. *R. hookeri*, *R. africanum* and *R. ?ambiguum* (Hook. f. et Harv.) Kütz. may very well be conspecific. The record in (120) is given with doubt as to the determination.

Rhizoclonium implexum (Dillw.) Kütz.

Ghana (unpublished).

Nigeria (68; 176).

São Tomé (176).

Sierra Leone (68; 176).

[As *Bostrychia mortiziana* (Sonder) J. Ag.]

São Tomé (176).

[As *Chaetomorpha implexa* Kütz.]

Ascension (6).

[As *Rhizoclonium kerneri* Stockm.]

Canaries (15; 65; 135).

'. . . répandues dans tout l'Atlantique nord . . . sur les côtes euro- africaines . . .' (65).

[As *Rhizoclonium riparium* (Roth) Harvey var. *implexum* (Dillw.) Rosenv.]

Cameroun (25).

[As *Rhizoclonium riparium* (Roth) Harvey forma *implexa*]

Cape Verde Islands (69).

Note. Fremy (69: 151) states that: '. . . La majeure partie des individus vivant en ces deux localités appartiennent a la fa. *implexa*, caractérisée principalement par l'absence ou la rareté des rhizoïdes . . . '. For records relating to *Conferva implexa* Dillw., see *Chaetomorpha capillaris*.

Rhizoclonium kerneri Stockm.

See *Rhizoclonium implexum* (Dillw.) Kütz.

Rhizoclonium linum Thuret

See *Chaetomorpha linum* (O. F. Müll.) Kütz.

Note. This is possibly only a manuscript name and is cited here for complete cross-reference purposes only.

Rhizoclonium riparium (Roth) Harv.

Cameroun (115; 181).

Note. For records from the Cape Verde Islands, given by Fremy (69), see *Rhizoclonium implexum* (Dillw.) Kütz.

[As ***Rhizoclonium riparium*** (Roth) Harv. forma *riparium* = forma *validum* Fosl.]

Ghana (unpublished).

Note. See also the entry for *Lola tortuosa* (Dillw.) Chapman.

[As *Rhizoclonium* sp.]

Cameroun (122).

Note. This record is derived directly from that given in (115) and is therefore correctly attributed here.

Rhizoclonium tortuosum (Dillw.) Kütz.

See *Lola tortuosa* (Dillw.) Chapman.

Rhizoclonium sp.

Ascension (6).
Ghana (116; 120; 122; 149).
Sierra Leone (150).

Siphonocladus membranaceus (C. Ag.) Bornet [including var. ***caespitosa*** (Bory) Kütz.]

See *Cladophoropsis membranacea* (C. Ag.) Børg.

Siphonocladus tropicus (Crouan frat.) J. Ag.

Canaries (15; 32; 58; 135; 161; 176; 182).
Mauritanie (65; 66).
São Tomé (176).
'Pantropical' (176).

Spongomorpha aeruginosa (L.) Hoek

[As *Conferva aeruginosa* L.]

Canaries (24).

Note. Kornmann (*Helgoländer Wiss. Meeresunters.*, **7**: 195–205, 252–259; **8**: 42–57, 119–152, 167–192, 1961) has shown that classical European *Codiolum petrocelidis* gives rise to *Spongomorpha lanosa* [=*S. aeruginosa*] as the sexual generation. Hence, if this early Bory record is correctly determined and possible to substantiate, which is unlikely, the Canaries marine flora may well include *Codiolum petrocelidis*.

Struvea anastomosans (Harv.) Piccone

Annobon (176).
Cameroun (115; 176).
Canaries (22; 31).
Cape Verde Islands (65; 176).
Ghana (53; 116; 176).

Guinée (173; 176).
? Mauritanie (176).
São Tomé (176).
Sénégal (36; 173; 176).
Pantropical (173).
'Apparently pantropical between about 30°N and 30°S wherever there is a warm current . . . ' (176).

[As *Struvea anastomosans* (Harv.) Picc. var. *canariensis* Picc. et Grun.]
Canaries (5; 45; 138).

[As *Struvea delicatula* Kütz.]
Cameroun (161).
Cape Verde Islands (7).
Gabon (81).
São Tomé (82; 91).
' . . . Mers équatoriales . . . ' (7).
Note. Askenasy (7: 156) states that he found only fragments and hence could not be sure of his determination, even though the plant definitely belonged to the genus *Struvea*.

[As *Struvea delicatula* Kütz. var. *caracasana* Grün.]
Cameroun (147).

[As ***Struvea multipartita*** **Pilger]**
Annobon (148).

[As ***Struvea ramosa*** **Dickie]**
Canaries (15; 43; 65; 81; 131; 132; 161).

Struvea delicatula Kütz.

See *Struvea anastomosans* (Harv.) Picc.

Struvea multipartita Pilger

See *Struvea anastomosans* (Harv.) Picc.

Struvea ramosa Dickie

See *Struvea anastomosans* (Harv.) Picc.

Trichosolen myura (J. Ag.) W. R. Taylor

[As *Pseudobryopsis myura* (J. Ag.) Berth.]
Canaries (15; 18; 62; 65; 153; 161).

Udotea desfontainii (Lamour.) Dcne

See *Udotea petiolata* (Turra) Børg.

Udotea petiolata (Turra) Børg.

Canaries (15; 57; 62; 65; 161; 163).
Cape Verde Islands (15; 62; 65; 161; 163).
' . . . Westafrika . . . ' (161).

[As *Udotea desfontainii* (Lamour.) Dcne]
Canaries (138).
Cape Verde Islands (6; 7).
[As *Caulerpa*? *vitifolia* (Bonpl.) Lamour.]
Canaries (43; 128).
' . . . In oceano Africano, juxta insulas Lancerotam, Graciosam &c. Canarienses, profunditate 30 percarum. . . . ' (1).
[As *Chauvinia vitifolia* (Bonpl.) Lamour.]
Canaries (104).
[As *Flabellaria petiolata* (Turra) Trev.]
Canaries (76; 153).
Cape Verde Islands (76; 153).
[As *Fucus vitifolius* Bonpl.]
' . . . Habitat in fundo Oceani Africani, juxta insulas Canarias. . . . ' (97).

Udotea tomentosa G. Murray et Boodle

See *Rhipilia tomentosa* Kütz.

Ulothrix

Setchell & Gardner (*Univ. Calif. Publs Bot.*, **8**: 139–375, 1920) emphasized the need for critical studies of this genus in culture and commented on the variations in cell size and chloroplasts at different ages, under different environmental conditions, and in the sterile and reproductive phases of the life-history. Kornmann (*Helgoländer Wiss. Meeresunters.*, **8**: 357–360, 1963), in carrying out some such studies, found a *Codiolum*-stage in the culture life-history of a marine *Ulothrix*. Scagel (159: 27), working on the green algae of British Columbia and northern Washington, commented that since a study of the above type had not been carried out using material from that area, it was not possible then to evaluate the genus any more critically than could be done using the classic criteria to distinguish species. The same considerations apply to tropical West Africa.

Ulothrix flacca (Dillw.) Thur.

Canaries (15; 60; 62; 65).

Note. These records seem all to be based on the report in (15). In the latter text, Børgesen indicates that he found only a single filament which he could identify as this species. Confirmation is therefore needed of this somewhat doubtful record.

Ulothrix laeta Thur.

See *Urospora laeta* (Thur.) Børg.

Ulothrix sp.

Annobon (148).
Ghana (120).

Ulva

It is clear that this genus cannot be treated in any completely satisfactory way for the list area at the moment. The data which follow are therefore in an entirely preliminary state. Lawson emphasized the problems of phenotypic plasticity and of possible hybridization when he stated (116: 164): ' . . . The *Ulva* plants at this level [midlittoral zone on moderately sheltered rocks] are small and stunted and often difficult to identify with certainty. What have been identified as *U. rigida* and *U. lactuca* are common, but stunted *U. fasciata* is also present. Dickinson & Foote (1951) [(54)] noted that plants with the appearance of *U. fasciata* may have the structure of *U. lactuca* and Dangeard (1952) [(36)] has pointed out that *U. fasciata* is not always entirely distinct from *U. rigida*. These links between the three species suggest that the difficulties of identifying them may be due to the formation of hybrids. . . . '.

Ulva californica Wille

Sénégal (36; 40; 173).

Note. Sourie (173) gives his record with ' ?'. There seems very considerable doubt about the whole status of this species and hence about its occurrence in West Africa.

Ulva capensis Aresch.

See *Ulva uncialis* (Kütz.) De Toni.

Ulva clathrata (Roth) C. Ag.

See *Enteromorpha clathrata* (Roth) Grev.

Ulva compressa L.

See *Enteromorpha compressa* (L.) Grev.

Ulva crispata Bertol.

See *Enteromorpha crispata* (Bertol.) Born. and *Enteromorpha linza* (L.) J. Ag.

Ulva denticulata P. Dang.

Sénégal (40).

Ulva enteromorpha Le Jol. var. ***compressa*** Le Jol.

See *Enteromorpha compressa* (L.) Grev.

Ulva fasciata Delile

Angola (8; 9; 176).
Annobon (148; 176).
Cape Verde Islands (7; 43; 139; 141; 143; 144; 145; 176).
Ghana (54; 101; 112; 113; 116; 118; 122; 176).
Guinée (176).
Mauritanie (176).
São Tomé (176; 177).

Sénégal (36; 113; 122; 162; 173; 174; 176).

' . . . In mari . . . atlantico ad oras . . . Africae . . . ' (43).

' . . . tropical atlantique . . . présentes sur les deux rives de l'océan . . . ' (173).

[As *Phycoseris fasciata* (Delile) Mont.]

Cape Verde Islands (130).

[As *Ulva lobata* Kütz.]

Cape Verde Islands (49).

Note. Steentoft's (176) record for Guinée is given with ' ?'; she considers this species to be the most common *Ulva* species of the warmer eastern Atlantic. The distinctions between *U. fasciata* and *U. rigida* have been questioned by P. Dangeard (36: 218).

Ulva intestinalis L. var. β ***crispa*** (Roth) C. Ag.

See *Enteromorpha intestinalis* (L.) Link.

Ulva lactuca L.

Angola (8; 9; 176).

Canaries (11; 15; 22; 24; 65; 70; 102; 128; 135; 155; 161; 176; 182).

Cape Verde Islands (7; 61; 75; 130; 156; 172; 176).

Congo (80; 81; 176).

Ghana (54; 116; 176).

Guinée (176).

Mauritanie (83; 161; 176).

Príncipe (176).

St. Helena (176).

Salvage Islands (71).

São Tomé (176).

Sénégal (30; 36; 162; 176; 179).

Spanish Sahara (152).

' . . . eastern Atlantic, from Britain to the Cape of Good Hope . . . ' (85).

Note. The record given by Steentoft (176) for Guinée is qualified by ' ?'.

[As *Ulva lactuca* L. forma *cribrosa* (J. Ag.) Born.]

Canaries (22).

[As *Ulva lactuca* L. **var. *cibrosa* (sic!) J. Ag.**]

Canaries (15).

[As *Ulva lactuca* L. **forma *genuina* Hauck**]

' . . . an der atlantischen Küste Afrikas von Marokko bis zum Kap der Guten Hoffnung . . . ' (181).

[As *Ulva lactuca* L. forma *lacinulata* (Kütz.) Hauck]

Sénégal (173).

[As *Ulva lactuca* L. var. *maxima*]

Sénégal (36).

[As *Ulva lactuca* L. var. *myriotrema*]

Sénégal (36).

[As *Ulva lactuca* L. var. *pulvinata* Despr. ex Mont.]
Canaries (128).
[As *Ulva latissima* Lamour.]
St. Helena (46; 86; 125).

Note. The records for *Ulva latissima* are included here as it seems most likely that the basis for these was an *Ulva*, rather than the *Laminaria* which Papenfuss (*J. Linn. Soc.* (*Bot.*), **56**: 303, 1960) found the type of *Ulva latissima* to be.

Ulva lactuca L. var. and forma ***rigida***

See *Ulva rigida* C. Ag.

Ulva lanceolata L.

See *Enteromorpha linza* (L.) J. Ag.

Ulva latissima Lamour.

See *Ulva lactuca* L.

Ulva lobata Kütz.

See *Ulva fasciata* Delile.

Ulva parvula Kütz.

St. Helena (86; 125).

Note. The record in (86) is based on that given in (125); the latter records the species with '?'.

Ulva pavonia L.

Note. This is probably the brown alga *Padina pavonia* (L.) Lamour.

Ulva popenguinensis P. Dang.

Sénégal (40).

Ulva pruniformis L.

Canaries (24).

Note. This somewhat cryptic record by Bory probably represents a species of *Nostoc*.

Ulva rigida C. Ag.

Ghana (54; 116).
Sénégal (36; 173).
'. . . In mari Atlantico usque ad caput bonae spei . . . ' (1; 2).
[As *Phycescris regida* Kütz., a mis-rendering of *Phycoseris rigida* Kütz.]
Angola (87).
[As *Phycoseris rigida* Kütz.]
Angola (88).

[As *Ulva lactuca* L. forma *rigida* De Toni]
Angola (43).
[As ***Ulva lactuca*** L. var. *rigida* C. Ag.]
Canaries (15).
[As ***Ulva lactuca*** L. var. *rigida* (Ag.) Le Jol.]
Canaries (163).

Ulva tropica Mert.

Ghana (96).
Note. The attribution of this record is problematical.

Ulva uncialis (Kütz.) De Toni

South West Africa (55; 146).
[As *Ulva capensis* Aresch.]
South West Africa (unpublished).

Ulva uvoïdes Bory

Canaries (24).
Note. The description given seems to correspond to *Valonia*.

Ulva spp.

Canaries (70).
Gabon (100).
Ghana (116).
Guinée (173).
Ivory Coast (unpublished).
Mauritanie (173).
Sénégal (14; 36; 40; 67).
South West Africa (unpublished).

Ulvella peltata P. Dang.

Sénégal (36).

Ulvella setchellii P. Dang.

Sénégal (36; 173).

Urospora laeta (Thur.) Børg.

Canaries (15; 65; 161).
[As *Ulothrix* (*Hormotrichum*) *laeta* Thur.]
Canaries (182).
[As *Conferva villum* C. Ag.]
Canaries (11; 43; 104; 128).
Note. See the note on *Ulothrix* genus for comments which apply equally well to *Urospora*.

Urospora sp.

Sierra Leone (117).

Valonia

Despite one rather vague record in the distribution list given in (57), there appears, as stated by Lawson (119 : 23), to be no authenticated instance of this genus being found on the tropical West African mainland coasts.

Valonia aegagropila C. Ag.

Canaries (11; 128).

Note. According to Børgesen (15: 23), this record is possibly to be referred to *Valonia utricularis* (Roth) J. Ag.

Valonia macrophysa Kütz.

Ascension (6).

Canaries (15; 62; 65; 135; 161).

[As *Valonia ovalis* C. Ag.]

Canaries (138).

Note. The record for *Valonia ovalis* is attributed to this species rather than to *Halicystis*, despite Piccone's (138 : 18) own opinion, since Børgesen (15 : 22) examined some Piccone specimens and concluded that they were probably representative of *Valonia macrophysa* Kütz.

Valonia ovalis C. Ag.

See *Valonia macrophysa* Kütz.

Valonia utricularis (Roth) C. Ag.

Canaries (15; 22; 44; 57; 58; 62; 65; 72; 138; 157; 163; 182).

Salvage Islands (71; 72).

' . . . Atlantic Ocean . . . African Coast . . . ' (57).

' . . . Atlantique: du Cap St. Vincent aux Canaries . . . ' (73).

' . . . Canaries and warmer Atlantic . . . ' (161).

[As *Valonia utricularis* (Roth) C. Ag. forma *crustacea* Kuckuck]

Canaries (15).

Note. See the note at *Valonia aegagropila* C. Ag.

Valonia verticillata Kütz.

See *Ernodesmis verticillata* (Kütz.) Børg.

Vaucheria sp.

Canaries (56).

Ghana (116; 120).

Willeella ordinata Børg.

Ghana (unpublished).

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Note. Publication of the algal section was definitely in 1888, since it was noted in *Naturae Novit.*, no. 21, p. 328, October 1888. The overall title page for Theil IV was issued in 1889 and, since the whole Theil seems also to have been issued in soft covers dated 1889, the algal portion was quite probably reissued on that date. Of the assistance acknowledged, pp. 3–4 and 6–8 seem to have involved Nordstedt, pp. 23–29 Grunow and, p. 47 only, Bornet. See also no. 145.
7. ASKENASY, E., 1896. Enumération des algues des îles du Cap Vert. *Bolm Soc. broteriana*, **13**: 150–175.
Note. There is some evidence that the reprints of this paper were repaged 1–25.
8. BARTON, E. S., 1897. Welwitch's African marine algae. *J. Bot., Lond.*, **35**: 369–374.
9. BARTON, E. S., 1901. Marine algae [pp. 324–328]. In Anon. [Hiern, W.S. ?], *Catalogue of the African plants collected by Dr. Friedrich Welwitsch in* 1853–61, vol. 2, part 2, *Cryptogamia*, pp. [6] + 261–566 + [1]. London.
10. BARTON, E. S., 1901. The genus *Halimeda*. Monographe 60 of Weber, M., *Uitkomsten op zoologisch, botanisch, oceanographisch en geologisch Gebeid verzameld in Nederlandsch Oost-Indië* 1899–1900 *aan boord H.M. Siboga onder commando van Luitenant ter zee I^e kl. G. F. Tydeman*, pp. [2] + 32 + [9]. Leiden.
11. BENÍTEZ, A. J., 1928. *Historia de las Islas Canarias (Edición illustrada)*, [Vol. I], pp. 528 + [1]. Santa Cruz de Tenerife.
Note. The work does not appear to be dated, but the BM copy was received on 3/7/1928 and 1928 has been accepted as the publication year. The flora list, entitled 'Fitografía Canaria . . . ', appears on pp. 137–144 and, so far as the algae are concerned, is merely a list of the species described in 128.
12. BLIDING, C., 1963. A critical survey of European taxa in Ulvales. Part 1. *Capsosiphon, Percursaria, Blidingia, Enteromorpha. Op. bot. Soc. bot. Lund.*, **8** (3): 1–160.

13. BODARD, M., 1965. *Grateloupia senegalensis*, nouvelle espèce de l'ouest africain (Rhodophytes, Cryptonemiales). ***Bull. Inst. fr. Afr. noire*, 27: 1211–1220.**
14. BODARD, M., 1966. Première liste des espèces d'algues présentes sur la Pointe de Sarène (Sénégal). *Notes afr.*, **111**: 81–89.
15. BØRGESEN, F., 1925. Marine algae from the Canary Islands especially from Teneriffe and Gran Canaria. I. Chlorophyceae. ***K. danske Vidensk. Selsk. Skr.*, 5 (3): 1–123.**
16. BØRGESEN, F., 1932. Some Indian green and brown algae especially from the shores of the residency of Bombay—II. ***J. Indian bot. Soc.*, 11: 51–70.**
17. BØRGESEN, F., 1934. Some marine algae from the northern part of the Arabian Sea with remarks on their geographical distribution. ***K. danske Vidensk. Selsk. Skr.*, 9 (6): 1–72.**
18. BØRGESEN, F., 1935. A list of marine algae from Bombay. *K. danske Vidensk. Selsk. Skr.*, **12** (2): 1–64.
19. BØRGESEN, F., 1936. Some marine algae from Ceylon. *Ceylon J. Sci.*, (*A*) *Botany*, **12**: 57–96.
20. BØRGESEN, F., 1939. Marine algae from the Iranian Gulf especially from the innermost part near Bushire and the Island Kharg. ***Dan. scient. Invest. Iran*, 1: 1–141.**
21. BØRGESEN, F., 1940. Some marine algae from Mauritius. I. Chlorophyceae. *K. danske Vidensk. Selsk. Skr.*, **15 (4): 1–81.**
22. BORNET, É., 1892. Les algues de P. K. A. Schousboe récoltees au Maroc et dans la Méditerrannée de 1815 à 1829. *Mém. Soc. Sci. nat. mát. Cherbourg*, **28**: 165–376.
Note. Also published as a separate with pagination [2] + 165–376, dated 1892.
23. BORNET, É. & FLAHAULT, C., 1886–1888. Revision des Nostocacées hétérocystées contenues dans les principaux herbiers de France. *Annls Sci. nat.* (*Botanique*), sér. **7, 3**: 323–381, 1886; **4**: 343–373, **1886; 5: 51–129, 1887; 7: 177–262, 1888.**
24. BORY DE SAINT-VINCENT, J. B. G. M., 1803. *Essais sur les Isles Fortunées et l'antique Atlantide, ou* ***précis de l'Histoire générale de l'Archipel des Canaries*, pp. [8] + 522 + [2]. Paris.**
25. BRAND, [F.], 1911. Cladophoraceae [pp. 313–316]. In Engler, A., Beiträge zur Flora von Afrika XXXIX. *Bot. Jb.*, **46**: 293–464, 1911; 465–597, 1912.
Note. See also 147.
26. BUCH, L. VON, 1825. ***Physicalische Beschreibung der Canarischen Inseln*, pp. [8] + 407 + [1]. Berlin.**
Note. This work has been cited as a source of algal records by certain authors, but in fact is entirely irrelevant as regards the present area. The small list of algae which appears on p. 199 was given as from Madeira, not from the Canaries.
27. CARPINE, C., 1959. Aperçu sur les peuplements littoraux [pp. 75–90]. In Forest, J., Campagne de la *Calypso* dans le golfe de Guinée et aux îles Principe, São Tomé, Annobon (1956). *Annls Inst. océanogr., Monaco*, **37**: 1–244.
28. CHAPMAN, V. J., 1961. The marine algae of Jamaica. Part 1. Myxophyceae and Chlorophyceae. *Bull. Inst. Jamaica Sci. Ser.*, **12** (1): 1–159.
29. CHAPMAN, V. J., 1964. The Chlorophyta. *Oceanogr. mar. Biol. ann. Rev.*, **2**: 193–228.
30. CHEVALIER, A., 1920. *Exploration botanique de l'Afrique occidentale française*, Tome I, *Enumération des plantes récoltées avec une carte botanique, agricole et forestière*, pp. xiii + [3] + 798. Paris.
Note. The algae, pp. 785–788, are acknowledged as being determined by P. Hariot.
31. COLLINS, F. S., 1909. Green algae of North America. ***Tufts Coll. Stud.* (*Scientific series*), 2: 79–480.**
Note. A photographic reprint of the whole text was issued in 1928 by Stechert & Co. of New York. This was repaged [4] + 1–11[a] + 11[b]–11[c] + 12–400. The Supplements (I: 1912; II: 1918) and the Working Key (1918), all usually issued with the 1928 version in a single binding, are not relevant here.
32. CRIBB, A. B., 1960. Records of marine algae from South-Eastern Queensland, V. *Pap. Dep. Bot. Univ. Qd*, **4** (1): 1–31.
33. CROSSLAND, C., 1905. The oecology and deposits of the Cape Verde marine fauna. *Proc. zool. Soc. Lond.*, **1**: 170–186.
Note. Occasionally cited as relevant to algal distribution, but contains only passing reference to *Lithothamnion*.
34. DANGEARD, P., 1936. La Laminaire du Cap '*Laminaria pallida*' (Grev.) J. Ag. *Bull. Stn biol. Arcachon*, **33**: 89–105.
35. DANGEARD, P., 1952. Sur un genre nouveau d'Ulvacée: *Rhizenteron* nov. gen. ***C.r. hebd. Séanc. Acad. Sci., Paris*, 235: 1265–1267.**
36. DANGEARD, P., 1952. Algues de la presqu'ile du Cap Vert (Dakar) et de ses environs. ***Botaniste*, 36: 193–329.**
37. DANGEARD, P., 1955. Remarques sur quelques *Codium*, en particulier le *Codium fragile* (Sur.) Hariot. *Botaniste*, **39**: V–XVII.
Note. Pp. IX–X include a quotation from a letter of P. C. Silva, written to Dangeard, concerning a number of herbarium specimens which Dangeard collected and sent to Silva from Dakar and other localities. The information on determinations which Silva sent back to Dangeard is what is relevant here and should perhaps more accurately be cited as Silva, P. C., [Comments on herbarium specimens]. [pp. IX–X]. In: Dangeard, P., ...

38. DANGEARD, P., 1958. Le reproduction et le développement de l'*Enteromorpha marginata* Ag. et le rattachement de cette espèce au genre ***Blidingia***. *C.r. hebd. Séanc. Acad. Sci., Paris*, **246**: 347–351.
39. DANGEARD, P., 1958. Observations sur quelques Ulvacées du Maroc. *Botaniste*, **42**: 5–63.
40. DANGEARD, P., 1958. Sur quelques espèces d''Ulva' de la région de Dakar. *Botaniste*, **42**: 163–171.
41. DECAISNE, J., 1842. Mémoire sur les Corallines ou Polypiers calcifères. *Annls Sci. nat.* (*Botanique*), sér. 2, **18**: 96–128.
42. DECAISNE, J., 1842. *Essais sur une classification des algues et des polypiers calcifères* [pp. 1–84] [and] *Mémoire sur les Corallines* [pp. 85–116]. In Anon., *Académie de Paris. Faculté des Sciences. . . . Thèses Présentées et soutenues à la Faculté des Sciences de Paris le* 19 *Décembre* 1842, pp. [4] + 120 + pls. 14–17. Paris.
Note. Repaged from papers by Decaisne in *Annls Sci. nat.* (*Botanique*), sér 2, **17**: 297–380, 1842 and *Annls Sci. nat.* (*Botanique*), sér. 2, **18**: 96–128, 1842. Plates associated with the first of these Thèses, like those in the original paper, bear erroneously the volume number 16, despite having been published in volume **17**. See also 41.
43. DE TONI, G. B., 1889. *Sylloge algarum omnium hucusque cognitarum. I. Sylloge Chlorophycearum . . .*, pp. 12 + CXXXIX + [1] + 1236. Patavii.
44. DE TONI, G. B. & FORTI, A., 1913. Contribution à la flore algologique de la Tripolitaine et de la Cyrénaïque. *Annls Inst. océanogr., Monaco*, **5** (7): 1–56.
45. DE TONI, G. B. & LEVI-MORENOS, D., 1888. Litteratura phycologica. *Notarisia*, **3**: 475–490.
Note. Includes extracted records from J. G. Agardh's *Till Algernes Systematik*, VIII, Siphoneae. See 5.
46. DICKIE, G., 1872. On the marine algae of the island of St. Helena. *J. Linn. Soc.* (*Bot.*), **13**: 178–182.
47. DICKIE, G., 1874. On the marine algae of Barbados. *J. Linn. Soc.* (*Bot.*), **14**: 146–152.
48. DICKIE, G., 1874. On the algae of Mauritius. *J. Linn. Soc.* (*Bot.*), **14**: 190–202.
49. DICKIE, G., 1874. Enumeration of algae collected at the Cape-Verde Islands by H. N. Moseley, M.A., naturalist to H.M.S. 'Challenger'. *J. Linn. Soc.* (*Bot.*), **14**: 344–349.
50. DICKIE, G., 1874. Enumeration of the algae collected at St. Paul's Rocks by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger'. *J. Linn. Soc.* (*Bot.*), **14**: 355–359.
51. DICKIE, G., 1874. Enumeration of algae from Fernando de Noronha, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger'. *J. Linn. Soc.* (*Bot.*), **14**: 363–365.
52. DICKIE, G., 1874. Enumeration of algae from 30 fathoms, at Barra Grande, near Pernambuco, Brazil, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' (Sept. 10th, 1873). *J. Linn. Soc.* (*Bot.*), **14**: 375–376.
53. DICKINSON, C. I. & FOOTE, V. J., 1950. Marine algae from the Gold Coast: I. *Kew Bull.*, **5**: 267–272.
54. DICKINSON, C. I. & FOOTE, V. J., 1951. Marine algae from the Gold Coast: II. *Kew Bull.*, **6**: 133–138.
55. DINTER, K., 1928. Index, der aus Deutsch-Sudwestafrika bis zum Jahre 1917 bekannt gewordenen Pflanzenarten. XXIV. *Reprium nov. Spec. Regni veg.*, **24**: 302–304.
56. DIXON, P. S., 1962. The genus ***Ptilothamnion*** in Europe and North Africa. *Br. phycol. Bull.*, **2**: 154–161.
57. EDELSTEIN, T., 1964. On the sublittoral algae of the Haifa Bay area. *Vie Milieu*, **15**: 177–210.
58. EGEROD, L. [L. EUBANK], 1952. An analysis of the siphonous Chlorophycophyta with special reference to the Siphonocladales Siphonales, and Dasycladales of Hawaii. *Univ. Calif. Publs Bot.*, **25**: 325–454.
59. EUBANK, L. L., 1946. Hawaiian representatives of the genus *Caulerpa*. *Univ. Calif. Publs Bot.*, **18**: 409–432.
60. FELDMANN, J., 1931. Contribution à la Flore algologique marine de l'Algérie. Les Algues de Cherchell. *Bull. Soc. Hist. nat. Afr. N.*, **22**: 179–254.
61. FELDMANN, J., 1935. Algues marines des Iles du Cap Vert recoltées par M. le Professeur Aug. Chevalier [pp. 1069–1071]. In Chevalier, A., Les Iles du Cap Vert Géographie, Biogéographie, Agriculture. Flore de l'Archipel. *Revue Bot. appl. Agric. trop.*, **15**: 733–1090.
62. FELDMANN, J., 1937. Les Algues marines de la Côte des Albères, I–III Cyanophycées, Chlorophycées, Pheophycées. *Revue algol.*, **9**: 141–355 + [5].
Note. A separate exists, repaged pp. [8] + 1–197 + [1]. As explained on p. [2] of the terminal [5] of the paper, pp. 141–150 were used twice in this volume of *Revue algol.*; once at the end of fasc. 1–2 and once at the beginning of the present paper, which comprises fasc. 3–4 of that volume.
63. FELDMANN, J., 1938. Sur la répartition du *Diplanthera wrightii* Aschers. sur la côte occidentale d'Afrique. *Bull. Soc. Hist. nat. Afr. N.*, **29**: 107–112.
64. FELDMANN, J., 1938. Sur la classification de l'ordre des Siphonocladales. *Revue gén. Bot.*, **50**: 571–597.
***Note.* A reprint exists, repaged pp. [2] + 1–27 + [3].**
65. FELDMANN, J., 1946. La flore marine des Iles Atlantides. *Mém. Soc. Biogéogr.*, **8**: 395–435.
66. FELDMANN, J., 1951. La flore marine de l'Afrique du Nord. *C.r. somm. Séanc. Soc. Biogéogr.*, **28**: 103–108.
67. FELDMANN, G. & BODARD, M., 1965. Une nouvelle espèce de *Botryocladia* des côtes du Sénégal. ***Bull. Inst. océanogr. Monaco*, 65 (1342): 1–14.**
68. FOX, M., 1957. A first list of marine algae from Nigeria. *J. Linn. Soc.* (*Bot.*), **55**: 615–631.

69. FREMY, P., 1935. Récoltes algologiques de M. le Pr Auguste Chevalier aux Iles du Cap Vert en 1934. ***Bull. Mus. natn. Hist. nat.*, sér. 2, 7: 151–155.**

70. FREMY, P., 1936. Marine algae from the Canary Islands especially from Teneriffe and Gran Canaria IV. Cyanophyceae. ***K. danske Vidensk. Selsk. Skr.*, 12 (5): 1–43.**

71. GAIN, L., 1914. Algues provenant des Campagnes de l'*Hirondelle II* (1911–1912). *Bull. Inst. océanogr. Monaco*, **279**: 1–23.

72. GAIN, L. & MIRANDE, R., 1912. Note sur les Algues recueillies par M. L. Garreta aux îles Salvages et Canaries. *Bull. Mus. natn. Hist. nat., Paris*, **18**: 479–481.

73. GAYRAL, P., 1958. ***La Nature au Maroc II. Algues de la côte atlantique marocaine***, pp. [4] + 524 + errata/addendum slip. Rabat.

74. GAYRAL, P., 1966. *Les algues des côtes Françaises (Manche et Atlantique). Notions fondamentales sur l'écologie, la biologie et la systematique des algues marines*, pp. 632 + [1]. Paris.

75. GEPP, A. & GEPP, E. S., 1905. Atlantic algae of the 'Scotia'. *J. Bot., Lond.*, **43**: 109–110.
Note. Also issued as a separate in combination with the same authors' 'Antarctic algae', *J. Bot., Lond.*, **43**: 105–109, 1095. Pagination altered in total to 1–7, of which the present paper occupies pp. 6–7.

76. GEPP, A. & GEPP, E. S., 1911. The Codiaceae of the Siboga Expedition including a monograph of Flabellarieae and Udoteae. [Livraison 56e., (Monographie LXII), pp. [4] + 1–150 + [44]]. In Weber, M. [C.W.], *Uitkomsten op zoologisch, botanisch, oceanographisch en geologisch gebied verzameld in Nederlandsch Oost-Indië* 1899–1900 *aan boord H. M. Siboga onder commando van Luitenant ter zee 1e kl. G. F. Tydeman*, Livraisons 1–132, Monographies 1–66, 1901–1938. Leiden.

77. GRUNOW, A., 1868. Algae [pp. [2] + 1–104 + tabs. I–XIX]. In Fenzl, E., *Reise der Österreichischen Fregatte Novara um die Erde in den Jahren* 1857, 1858, 1859 *unter den Befehlen des Commodore B. von Wüllerstorf-Urbair, Botanischer Theil, Erster Band, Sporenpflanzen*, pp. [4] + 261. Wien.
Note. The publication date is confirmed by a note in *Hedwigia*, **8**: 41, 1869.

78. HAMEL, G., 1924–30. Quelques *Cladophora* des côtes françaises. I–[V]. *Revue algol.*, **1**: 168–174; 293–297; 458–461, 1924; **2**: 68–71, 1925; **4**: 43–76, 1930.
Note. For details of the separate of this work, see 79.

79. HAMEL, G., 1930–31. Chlorophycées des côtes françaises. *Revue algol.*, **5**: 1–54, 1930; **5**: 383–430, 1931; **6**: 9–73, 1931.
Note. Also issued as a complete work with Hamel, 1924–30 (78), the total pagination being **XV + [1] + 168 + 22 + [2] + 34.**

80. HARIOT, P., 1895. Liste des algues recueillies au Congo par M. H. Lecomte. *J. Bot., Paris*, **9**: 242–244.

81. HARIOT, P., 1896. Contribution a la flore algologique du Gabon et du Congo français. *C.r. Ass. fr. Avanc. Sci.*, **24 (2)**: 641–643, 1895 [Bordeaux].

82. HARIOT, P., 1908. Les algues de San Thomé (cote occidentale d'Afrique). *J. Bot., Paris*, sér, 2, **1**: 161–164.

83. HARIOT, P., 1911. Algues de Mauritanie recueillies par M. Chudeau. *Bull. Soc. bot. Fr.*, **58** [=sér. **4, vol. 11]: 438–445.**
HARIOT, P., 1920. See no. 30.

84. HARVEY, W. H., 1846–1851. *Phycologia britannica*: . . ., vol. 4, *Chlorospermeae, or green sea-weeds*. . . ., [Synopsis nos. 280–388]. London.
Note. The bibliography of this work is very complicated: for a preliminary statement of the position, see Dixon, Irvine and Price, *Br. phycol. Bull.*, **3**: 87–142, 1966, entry 535. A detailed paper is in preparation.

85. HEMSLEY, W. B., 1885. II.—Report on the botany of the Bermudas and various other islands of the Atlantic and Southern Oceans [pp. 1–135 + [27]]. In Thompson, C. W. & Murray, J., *Report on the scientific results of the voyage of H.M.S. Challenger during the years* 1873–76 *under the command of Captain George S. Nares, R.N., F.R.S. and the late Captain Frank Tourle Thompson, R.N.* . . ., *Botany*—vol. I, pp. xi + [1] + 75 + [1] + 135 + [27] + 299 + [81] + 333 + [25]. London.

86. HEMSLEY, W. B., 1885. III.—Report on the botany of the Bermudas and various other islands of the Atlantic and Southern Oceans [pp. 1–299 + [81]]. In Thompson, C. W. & Murray, J., see (85).

87. HENRIQUES, J. [A.], 1885. Contribução para o estudo da flora d'algumas possessões portuguezas I Plantas colhidas por F. Newton na Africa occidental. *Bolm Soc. broteriana*, **3**: 129–140.
Note. See also no. 88.

88. HENRIQUES, I. [=J.] [A.], [DE TONI, G. B. & LEVI, D.], 1886. Contribução para o estudo da flora d'algumas possessoes portuguezas. Plantas colhidas por F. Newton na Africa occidental. (dal Boletim da Sociedade Broteriana III–IV p. 129—Coimbra 1885). Algae [pp. 121–122]. In De Toni, G. B. & Levi, D., Contributiones ad phycologiam extra-italicam. *Notarisia*, **1**: 117–122.
Note. This work is simply an extract of information from 87. There is definite evidence that the text was affected by editing before reproduction in *Notarisia*; mistakes present in the original have been corrected and other new ones introduced, for instance an interchange of data between the original papers nos 87 and 89.

89. HENRIQUES, J. [A.], 1886. Algae [pp. 217–221]. In Henriques, J. [A.], Contribuções para o estudo da Flora d'Africa. Flora de S. Thomé. *Bolm Soc. broteriana*, **4**: 129–221.

90. HENRIQUES, J. [A.], 1887. Flora de S. Thomé. [130] [pp. 381–383]. In De Toni, G. B. & Levi, D., Contributiones ad Phycologiam extra-italicam. *Notarisia*, **2**: 375–383.

Note. An extract from no. 89. The present text has been attributed entirely to Henriques as there appear to be no alterations in the algal text, which is extracted complete.

91. [HENRIQUES, J. A.], 1917. Catálogo das espécies de animais e plantas até hoje encontradas na ilha de S. Tomé. *Bolm Soc. broteriana*, **27**: 138–197.

92. HIERONYMUS, G., 1895. Klasse: Chlorophyceae [pp. 21–24]. In Engler, A., *Deutsch-Ost-Afrika Wissenschaftliche Forschungsresultate über Land und Leute unseres ostafrikanischen Schutzgebietes und der angrenzenden Länder. Band V. Die Pflanzenwelt Ost-Afrikas und der Nachbargebiete, Theil C. Verzeichniss der bis jetzt aus Ost-Afrika bekannt gewordenen Pflanzen* mit 45 Tafeln, pp. [8] + II + 433. Berlin.

Note. According to p. [5] of the initial [8], pp. 1–96 of this Theil were published 15/6/1895.

93. HILLIS, L. W., 1959. A revision of the genus *Halimeda* (order Siphonales). *Publs Inst. mar. Sci. Univ. Tex.*, **6**: 321–403.

94. HOEK, C. VAN DEN, 1961. Sur la morphologie et la taxonomie du genre *Cladophora*. [pp. 89–98]. In Davy de Virville, Ad. & Feldmann, J., *Proceedings of the Fourth International Seaweed Symposium Biarritz—September* 1961, pp. xxiii + [1] + 467. Oxford, New York, London & Paris.

95. HOEK, C. VAN DEN, 1963. *Revision of the European species of Cladophora*, pp. xi + [1] + 248 + [1]. Leiden.

96. HORNEMANN, J. W., 1819. *Anniversaria in memoriam Reipublicae Sacrae et Litterariae cum Universae, tum Danicae nostrae restauratae celebranda indicit Regiae Universitatis Hauniensis Rector cum senatu academico. De Indole plantarum Guineensium [observationes.]*, pp. 27. Hauniae.

97. HUMBOLDT, F. H. A. VON & BONPLAND, A. J. A., 1805–1817. Pt. VI. Botanique. Sect. 1. [*Plantes équinoxiales, recueillies au Mexique, dans l'île de Cuba, dans les provinces de Caraccas, de Cumana et de Barcelonne, aux Andes de la Nouvelle-Grenade, de Quibo et du Pérou, et sur les bords du Rio-Negro, de l'Orénoque et de la rivière des Amazones. Ouvrage rédigées par M. A. Bonpland.*], 2 vols., folio. Vol. 1. Pts. 1–8. pp. 1–232, pls. to 65, 1805–08. Vol. 2. Pts. 9–17. pp. title pg. + 1–191, vars. pls., 1808–June 1817.

Note. Volume 2 includes, in part 9, title page to the volume, the double frontispiece and pp. 1–20, pls. 66–68. This part is said by Sherborn, C. D. and Woodward, B. B., *J. Bot., Lond.*, **39**: 203, 1901, to have been published in 1808. The part includes the text of the plate of *Fucus vitifolius* [=*Udotea petiolata*], on p. [8], but is said by the above authors specifically to exclude pl. 69, which, as fig. A, illustrates *F. vitifolius*. From the general appearance, the binding and the basal signatures in the BMNH copy, the likelihood seems strong that this plate *was* published with part 9, but firm proof is needed in view of the contrary assertion by Sherborn and Woodward.

98. IRVINE, F. R., 1932. *Flowerless plants*. Nature Study leaflet, pp. 11. Accra.

99. IYENGAR, M. O. P. & RAMANATHAN, K. R., 1941. On the life-history and cytology of *Microdictyon tenuius* (Ag.) Decsne. (Preliminary Note). *J. Indian bot. Soc.*, **20**: 157–159.

100. JARDIN, E., 1851(?). *Herborisations sur la côte occidentale d'Afrique pendant les années* 1845–1846–1847–1848, pp. [4] + 19. Paris.

Note. A pair of extracts from the July 1850 and May 1851 numbers of *Nouvelles Annales de la Marine et des Colonies*. The texts have clearly been repaged, but it is probable that the division of the present text into two parts, pp. 1–8 and pp. 9–19, at least represents the break between the parts as originally published.

101. JENÍK, J. & LAWSON, G. W., 1967. Observations on water loss of seaweeds in relation to microclimate on a tropical shore (Ghana). *J. Phycol.*, **3**: 113–116.

102. J[OHNSTON], C. S., 1966. Marine biological survey [pp. 43–54]. Ecological reports [pp. 55–119]. In Johnston, C. S., *Canary Island Biological Expedition* 1965 *A scientific expedition to the Canary Island of Lanzarote organised by the Heriot Sub-aqua Club Edinburgh, Expedition Report*, Vol. I, pp. [2] + 132. Edinburgh.

Note. Reproduced from typed stencils, but bound in a printed cover. Generally distributed.

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Note. A continuously repaged separate exists. The pagination is 1–46, of which 1–28 represents the 1888 text.
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135. NORTON, T. A., 1967. Unpublished Canaries records, personal communications to J. H. Price.
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139. PICCONE, A., 1886. *Alghe del viaggio di circumnavigazione della Vettor Pisani*, pp. 97. Genova.
Note. See also no. 141.

140. PICCONE, A., 1886. Pugillo di alghe Canariensi. *Nuovo G. bot. ital.*, **18**: 119–121.

141. PICCONE, A. 1887. ***Alghe del viaggio di circumnavigazione della*** **Vettor Pisani.**—[ ] Elenchi parziali delle alghe raccolte nelle diverse località [pp. 283–287]. In De Toni, G. B. & Levi, D., Contributiones ad phycologiam extra-italicam. *Notarisia*, **2**: 283–291.
Note. See also no. 139. This reference is a direct copy of the lists given on pp. 85–91 of that work. Since, so far as can be seen, there is no alteration in the text from the original presentation, authorship has been attributed to Piccone alone. The list of algae collected at Cape Verde Islands (139: 85; 141: 283) is the relevant portion.

142. PICCONE, A., 1889. *Elenco delle alghe della crociera del Corsaro alle Baleari*, pp. 22. Genova.

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Note. See also no. 185.

154. RABENHORST, L., 1868. *Flora Europaea algarum aquae dulcis et submarinae. Sectio III. Algas Chlorophyllophyceas, Melanophyceas et Rhodophyceas complectens*, pp. XX + [2] + 461. Lipsiae.

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Note. 1928 is the publication date of the whole volume and of the last part; the earlier parts were published separately at various dates as completed.

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Note. The algal material was sent to Sonder in Hamburg; he worked on the plants and provided both determinative data and text as printed. See the footnote on p. 125 of the work.
173. SOURIE, R., 1954. Contribution a l'étude écologique des côtes rocheuses du Sénégal. *Mém. Inst. fr. Afr. noire*, **38**: 1–342 + [1].
Note. From the note on p. 117, it is clear that the algae were worked on mainly by Feldmann, but that Sourie took account of some of the views of Dangeard as expressed in the latter's memoir on the Cape Verde peninsula algae. Since the exact contribution of the various people involved is in doubt, we have left the reference in the name of Sourie, who seems to have exercised overall authorship.
174. SOURIE, R., 1954. Principaux types de zonations verticales des algues sur le littoral rocheux de la presqu'ile du Cap Vert (Zone intercotidale). *Rapp. Commun.* 8e *Int. bot. Congr.*, **17**: 151–153.
175. STEENTOFT NIELSEN, M., 1958. Common seaweeds at Lagos I. *Niger. Fld*, **23**: 34–44.
176. STEENTOFT, M., 1967. A revision of the marine algae of São Tomé and Príncipe (Gulf of Guinea). *J. Linn. Soc.* (*Bot.*), **60**: 99–146.
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178. TAYLOR, W. R., 1960. *Marine algae of the eastern tropical and subtropical coasts of the Americas*, pp. ix + [3] + 870. Ann Arbor.
179. TROCHAIN, J., 1940. Contribution a l'étude de la végétation du Sénégal. *Mém. Inst. fr. Afr. noire*, **2**: [1–6] + 1–433 + [63].
Note. Feldmann clearly had a great deal to do with the main determinations on which the algal list (pp. 108–110) was based; since the extent to which the data were accepted or amended by Trochain is not clear, and since there are other parts to the text which seem definitely to have been attributable to Trochain, we have accepted the latter as author.
180. URIARTE, L. BELLÓN, 1930. Bibliografia acerca de las Algas de España, Portugal, Baleares, Canarias y Norte de Marruecos. *Congr. internat. Oceanog., Hidrog. mar. Hidrol. continental*, Sevilla, 1–7 Mayo 1929, Tomo 1, pp. 407–444. Madrid, 1930.
Note. This reference is clearly relevant as a probable source of further data; unfortunately, we have been unable to locate a copy as yet and the data are therefore quoted from the bibliographies given in various other works of Uriarte. In view of the fact that the Congress was held in Sevilla, it is strange that publication should have been from Madrid, but the work is so quoted by Uriarte in at least one set of references. The work is included here for completeness.
181. VAN GOOR, A. C. J., 1923. Die Holländischen Meeresalgen (Rhodophyceae, Phaeophyceae und Chlorophyceae) insbesondere der Umgebung von Helder, des Wattenmeeres und der Zuidersee. *Verh. K. Akad. Wet., Tweede sectie*, **23** (2): i–ix + [3] + 1–232.
182. VICKERS, A., 1897(?). Contribution a la flore algologique des Canaries. *Annls Sci. nat.* (*Botanique*), sér. 8, **4**: 293–306.
Note. The date is somewhat difficult to cite with certainty. It is possible that preprints were issued in 1896 and the date is usually so cited. The copy in BMNH has certain of the individual part wrappers remaining and that for parts 1–6 is dated November 1897; the work here relevant was issued in parts 19–20 of volume 4. Since the wrappers of parts 1–2 of volume 5 are dated March 1898 and there are only 24 parts in total in volume 4, it seems very likely that parts 19–20 were issued early in 1898; however, as it remains possible that all the parts of volume 4 were issued

on the same date, we have maintained 1897(?) as the possible earliest date. The cover of the BMNH separate of this individual work (preprint or reprint ?) bears the erroneous information 'Septième série'.

183. WEBER-VAN BOSSE, A., 1898. Monographie des Caulerpes. *Annls Jard. bot. Buitenz.*, **15**: 243–401.

184. WEBER-VAN BOSSE, A., 1899. Note sur quelques algues rapportées par le yacht 'Chazalie'. *J. Bot., Paris*, **13**: 133–135.

185. WILLE, N., 1890–91. Chlorophyceae [Lief. 40; 41; 46; 60] [pp. 24–175]. In Engler, A. & Prantl, K., *Die naturlichen Pflanzenfamilien nebst ihren Gattungen und wichtigeren Arten insbesondere den Nutpflanzen unter Mitwirkung zahlreicher hervorragender Fachgelehrten*, Teil 1, Abteilung 2, pp. XII + 580. Leipzig.

Note. See also no. 153. The publication dates of the relevant parts seem to have been as follows: Lief. 40, pp. 1–48, 1890; Lief. 41, 49–96, 1890; Lief. 46, 97–144, 1890; Lief. 60, 145–192, 1891. The Nachträge, 1909–1911, also by Wille, lacks named records for the area.