

**Fuci, sive, Plantarum Fucorum generi a botanicis ascriptarum icones descriptiones et historia = Fuci, or, Colored figures and descriptions of the plants referred by botanists to the genus Fucus / by Dawson Turner.**

**Contributors**

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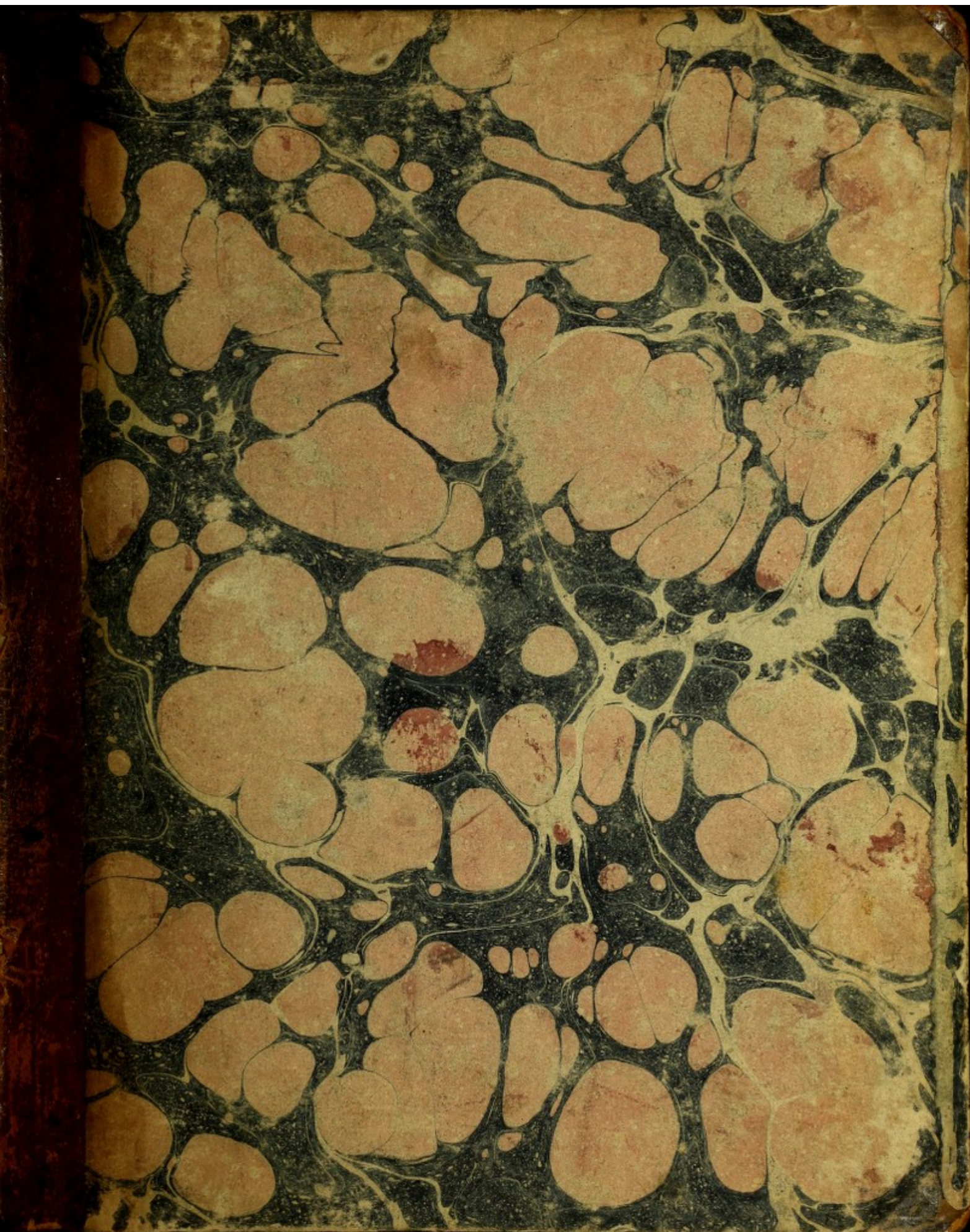
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F U C I

SIVE

PLANTARUM FUCORUM GENERI

A

*Ex Libris* BOTANICIS ASCRIPTARUM *Bibliothec.*

ICONES DESCRIPTIONES ET HISTORIA.

*Collegii Regii* AUCTORE *Medicor. Eden*

DAWSON TURNER, M. A.

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TYPIS J. M<sup>c</sup>CREERY.

IMPENSIS J. ET A. ARCH, IN VICO CORNHILL DICTO.

MDCCCVIII

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F U C I;

OR,

COLORED FIGURES AND DESCRIPTIONS

OF THE PLANTS

REFERRED BY BOTANISTS TO THE GENUS FUCUS.

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By DAWSON TURNER, A. M. F. R. A. & L. S.

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# I N D E X.

*The Names printed in Italics are Synonyms.*

*The first Number refers to the Plate, the second to the Page.*

	Plate	Page		Plate	Page
<i>ACETABULI</i> marini varietas. RUMPH. . . . .	24	50	<i>Fucus crispatus.</i> STACKH. . . . .	69	157
<i>Alga marina folia, &amp;c.</i> SEBA? . . . . .	25	54	<i>crispus.</i> HUDS. . . . .	42	90
<i>Alga marina, foliis longis, &amp;c.</i> SEBA . . . . .	64	146	<i>crispus.</i> FORSK.? . . . .	46	101
<i>Ceramium gigartinum.</i> ROTH . . . . .	28	60	<i>crispus.</i> ESP. . . . .	69	157
<i>incurvum.</i> DECAND. . . . .	11	22	<i>cristatus.</i> HERB. LINN. . . . .	23	48
<i>Plocamium.</i> ROTH . . . . .	59	130	<i>cristatus.</i> WITH. . . . .	68	153
<i>plumosum.</i> ROTH . . . . .	60	135	<i>dasyphyllus.</i> WOODW. . . . .	22	46
<i>tubulosum.</i> ROTH . . . . .	29	62	<i>Dealensis, &amp;c.</i> RAY . . . . .	20	40
<i>Conserva squarrosa.</i> FL. DAN. . . . .	12	24	<i>dentatus.</i> LINN. . . . .	13	26
<i>tubulosa.</i> WULF. . . . .	29	62	<i>denticulatus.</i> FORSK. . . . .	47	105
<i>Epatica spirale.</i> GINANNI . . . . .	43	92	<i>diaphanus.</i> ESP. . . . .	29	62
<i>spirale minore.</i> GINANNI? . . . . .	2	4	<i>distichus.</i> LINN. . . . .	4	8
<i>Folium Algæ marina, &amp;c.</i> SEBA . . . . .	25	54	<i>endiviaefolius.</i> LIGHTF. . . . .	68	153
<i>Fuco Acinara con foglie di mezzana grandezza.</i>			<i>epiphyllus.</i> FL. DAN. . . . .	42	90
GINANNI . . . . .	46	101	<i>ericifolius.</i> TURN. . . . .	56	124
<i>Acinara di foglie corte e strette.</i> GINANNI . . . . .	46	101	<i>erinaceus.</i> TURN. . . . .	26	56
<i>Acinara di foglie lunghe, &amp;c.</i> GINANNI . . . . .	46	101	<i>excisus.</i> LINN. . . . .	3	6
<i>Fucoides purpureum eleganter plumosum.</i> RAY . . . . .	60	135	<i>fastigiatus.</i> LINN. . . . .	5	10
<i>rubens variè dissectum.</i> RAY . . . . .	59	130	<i>fastigiatus.</i> STACKH. (quoad fig. min.) . . . . .	5	10
<i>Fucus abietinus.</i> KOENIG . . . . .	54	120	<i>fastigiatus.</i> HUDS. . . . .	6	12
<i>acanthophorus.</i> LAMOUROUX . . . . .	32	68	<i>fastigiatus.</i> WITH. . . . .	6	12
<i>acicularis.</i> ESP. . . . .	9	18	<i>filicinus.</i> LIGHTF. . . . .	20	40
<i>Acinaria.</i> LINN. . . . .	49	110	<i>filiformis.</i> GMEL. . . . .	4	8
<i>acinarius, var.</i> ESP. . . . .	46	101	<i>flaccidus.</i> TURN. . . . .	61	138
<i>aquifolius.</i> TURN. . . . .	50	112	<i>flexilis.</i> WULF. . . . .	9	18
<i>asplenioides.</i> ESP. . . . .	62	140	<i>floccosus.</i> ESP. . . . .	8	16
<i>atomarius.</i> GMEL. . . . .	13	26	<i>foliaceus, &amp;c.</i> KOELR.? . . . .	16	32
<i>bacciferus.</i> TURN. . . . .	47	105	<i>folliculaceus, serrato folio.</i> BARREL. . . . .	46	101
<i>Banksii.</i> TURN. . . . .	1	1	<i>fulvellus.</i> TURN. . . . .	66	148
<i>bifurcatus.</i> WITH. . . . .	7	14	<i>furcellatus.</i> LINN. . . . .	6	12
<i>bracteatus.</i> GMEL. . . . .	25	54	<i>gelatinosus.</i> DESF. . . . .	21	44
<i>canaliculatus.</i> LINN. . . . .	3	6	<i>gigartinus.</i> LINN. . . . .	28	60
<i>capillaceus.</i> ESP. . . . .	9	18	<i>glandulosus.</i> TURN. . . . .	38	82
<i>capillaris.</i> HUDS. . . . .	31	66	<i>gramineus parvus, &amp;c.</i> BUDDLE . . . . .	68	153
<i>caprinus.</i> GUNN. (quoad ic. in Act. Nidr.) . . . . .	5	10	<i>granatus.</i> LAMOUROUX . . . . .	68	153
<i>cartilagineus.</i> OED. . . . .	59	130	<i>Griffithsiæ.</i> TURN. . . . .	37	80
<i>caulescens.</i> GMEL.? . . . .	64	144	<i>holosetaceus.</i> GMEL. . . . .	70	158
<i>ciliatus.</i> HUDS. . . . .	70	158	<i>Horneri.</i> TURN. . . . .	17	34
<i>ciliatus.</i> GMEL. . . . .	69	157	<i>humilis membranaceus, &amp;c.</i> MORIS. . . . .	70	158
<i>ciliatus.</i> ESP. . . . .	64	144	<i>hybridus.</i> DECAND. . . . .	20	40
<i>ciliatus. β. Syn. Fuc.</i> . . . . .	70	158	<i>hypoglossoides.</i> STACKH. . . . .	14	28
<i>ciliatus. β. Fl. Scot.</i> . . . . .	70	159	<i>Hypoglossum.</i> WOODW. . . . .	14	28
<i>ciliatus. γ. Syn. Fuc.</i> . . . . .	70	158	<i>Hypoglossum.</i> DECAND. . . . .	15	30
<i>ciliatus. γ. Ner. Brit.</i> . . . . .	70	159	<i>Hypoglossum. β. Syn. Fuc.</i> . . . . .	14	28
<i>ciliatus. δ. Syn. Fuc.</i> . . . . .	70	158	<i>Hypoglossum. γ. Syn. Fuc.</i> . . . . .	14	28
<i>ciliatus. ι. Syn. Fuc.</i> . . . . .	70	159	<i>ilicifolius.</i> TURN. . . . .	51	114
<i>ciliatus. ξ. Syn. Fuc.</i> . . . . .	70	159	<i>incurvus.</i> HUDS. . . . .	11	22
<i>ciliatus, var.</i> ESP. . . . .	70	159	<i>jubatus.</i> LINN. TRANS. . . . .	70	158
<i>cirrhusus.</i> TURN. . . . .	63	142	<i>Kali geniculato similis, &amp;c.</i> RAY . . . . .	7	14
<i>clavellus.</i> TURN. . . . .	30	64	<i>kaliformis.</i> LINN. TRANS. . . . .	29	62
<i>clavellus. β. Syn. Fuc.</i> . . . . .	30	64	<i>kaliformis. β. Syn. Fuc.</i> . . . . .	29	62
<i>clavifer.</i> TURN. . . . .	57	128	<i>Koelreuteri.</i> Syst. Nat. Ed. Gmel.? . . . .	16	32
<i>coccineus.</i> HUDS. . . . .	59	130	<i>laceratus.</i> GMEL. . . . .	68	153
<i>confervoides.</i> HUDS. . . . .	10	20	<i>laceratus. β. Linn. Trans.</i> . . . . .	68	153
<i>corallinus.</i> FL. DAN. . . . .	9	18	<i>laceratus. γ. Syn. Fuc.</i> . . . . .	68	153
<i>corymbifer.</i> WULF. . . . .	20	40	<i>laceratus. γ. Linn. Trans.</i> . . . . .	69	157
<i>corymbiferus.</i> ESP. . . . .	20	40	<i>laceratus. δ. DECAND.</i> . . . . .	69	157
<i>crenatus.</i> GMEL. . . . .	35	74	<i>laciniatus.</i> HUDS. . . . .	69	157
<i>crenulatus.</i> TURN. . . . .	40	86	<i>laciniatus.</i> GMEL. . . . .	42	90
<i>crenulatus. β. TURN.</i> . . . . .	41	88	<i>lanceolatus.</i> WITH. . . . .	70	159
<i>crispatus.</i> HUDS. . . . .	68	153	<i>lendigerus.</i> LINN. . . . .	48	108



# I N D E X.

	Plate	Page		Plate	Page
<i>Fucus lendigerus</i> , ESP. . . . .	46	101	<i>Fucus purpureus</i> , GMEL. ? . . . . .	9	18
<i>lichenoides</i> , WILLD. . . . .	18	36	<i>pyncocistus</i> , MERT. . . . .	49	110
<i>ligulatus</i> , GMEL. . . . .	70	158	<i>racemosus</i> , FORSK. ? . . . . .	57	126
<i>linaris</i> , FL. DAN. . . . .	4	8	<i>radiatus</i> , LINN. TRANS. . . . .	5	10
<i>lumbricalis</i> , GMEL. . . . .	6	12	<i>Radula</i> , HERB. BANKS. . . . .	25	54
<i>lumbricalis</i> , β. SYN. FUC. . . . .	6	12	<i>ramosus, piperis sapore</i> , RAY . . . . .	20	40
<i>lycopodioides</i> , LINN. . . . .	12	24	<i>rosus</i> , FL. DAN. . . . .	35	74
<i>Lycopodium</i> , STACKH. (quoad descript.) . . . . .	12	24	<i>rotundus</i> , GMEL. . . . .	5	10
<i>Mackaii</i> , TURN. . . . .	52	116	<i>rotundus</i> , ESP. . . . .	3	6
<i>marinus ramosus, &amp;c.</i> , SEBA . . . . .	64	144	<i>rotundus</i> , β. SYN. FUC. . . . .	5	10
<i>marinus vesiculas habens, &amp;c.</i> , SLOANE . . . . .	24	50	<i>rotundus</i> , γ. SYN. FUC. . . . .	5	10
<i>membranaceus acaulis, &amp;c.</i> , MORIS. . . . .	20	40	<i>rubens</i> , LINN. . . . .	42	90
<i>membranaceus purpureus latifolius, &amp;c.</i> , RAY . . . . .	35	74	<i>rubens</i> , HUDS. . . . .	35	74
<i>membranaceus purpureus varie ramosus</i> , RAY . . . . .	42	90	<i>ruscifolius</i> , TURN. . . . .	15	30
<i>membranaceus rubens angustifolius, &amp;c.</i> , RAY . . . . .	70	158	<i>ruscifolius</i> , β. SYN. FUC. . . . .	15	30
<i>membranaceus rubens foliolis, &amp;c.</i> , MORIS. . . . .	13	26	<i>sanguineus</i> , HUDS. . . . .	36	78
<i>Menziesii</i> , TURN. . . . .	27	58	<i>Sargasso</i> , GMEL. . . . .	47	105
<i>miniatus</i> , FL. DAN. . . . .	42	90	<i>Sargasso, var. 1.</i> , GMEL. . . . .	46	101
<i>minimus dentatus triangularis, &amp;c.</i> , SLOANE . . . . .	33	70	<i>Sarniensis</i> , MERT. . . . .	44	96
<i>multifidus</i> , HUDS. . . . .	20	40	<i>Selago</i> , TURN. . . . .	55	122
<i>muricatus</i> , GMEL. . . . .	18	36	<i>serrulatus</i> , WEB. ET MOHR . . . . .	39	84
<i>natans</i> , LINN. . . . .	46	101	<i>sertularioides</i> , GMEL. ? . . . . .	54	120
<i>natans</i> , ESP. . . . .	47	105	<i>setaceus</i> , WULF. ? . . . . .	10	20
<i>nervosus</i> , DECAND. . . . .	43	92	<i>sinuosus</i> , LINN. TRANS. . . . .	35	74
<i>nitidus</i> , WEB. ET MOHR . . . . .	39	84	<i>sinuosus</i> , β. SYN. FUC. . . . .	35	74
<i>Norvegicus</i> , GUNN. . . . .	41	88	<i>sinuosus</i> , γ. SYN. FUC. . . . .	35	74
<i>obtus</i> , HUDS. . . . .	21	44	<i>sive Alga exigua dichotomos, &amp;c.</i> , RAY . . . . .	6	12
<i>obtus</i> , β. SYN. FUC. . . . .	21	44	<i>sive Ulva folio membranaceo, &amp;c.</i> , MORIS. . . . .	36	78
<i>ocellatus</i> , LAMOUROUX . . . . .	71	164	<i>soboliferus</i> , FL. DAN. . . . .	45	98
<i>Oederi</i> , ESP. . . . .	28	60	<i>spiciferus</i> , VAHL. . . . .	32	68
<i>Ophioglossum</i> , WEB. ET MOHR . . . . .	58	128	<i>spinosus</i> , LINN. . . . .	18	36
<i>ornatus</i> , LINN. . . . .	64	144	<i>spinosus</i> , WULF. . . . .	21	44
<i>Osmunda</i> , GMEL. . . . .	20	40	<i>spiralis serratus</i> , BARREL. . . . .	2	4
<i>pallidus</i> , TURN. . . . .	67	150	<i>stiriat</i> , MERT. . . . .	16	32
<i>palmaris angustifolius, &amp;c.</i> , MORIS. . . . .	3	6	<i>subfuscus</i> , WOODW. . . . .	10	20
<i>palmaris tenuis, &amp;c.</i> , MORIS. . . . .	6	12	<i>subrepandus</i> , FORSK. ? . . . . .	46	101
<i>Palmetta, var.</i> , ESP. . . . .	35	74	<i>taxifolius</i> , VAHL. . . . .	54	120
<i>parvus, segmentis oblongis, &amp;c.</i> , MORIS. . . . .	6	12	<i>tener gelatinosus, &amp;c.</i> , RAY . . . . .	68	153
<i>papillosus</i> , FORSK. . . . .	21	44	<i>teres albus tenuissimè divisus</i> , RAY . . . . .	9	18
<i>papillosus</i> , GMEL. ? . . . . .	16	32	<i>thyrsoides</i> , TURN. . . . .	19	38
<i>pectinatus</i> , GUNN. . . . .	60	135	<i>triangularis</i> , SYST. NAT. ED. GMEL. . . . .	33	70
<i>pilulifer</i> , TURN. . . . .	65	146	<i>trifarius</i> , SWARTZ. . . . .	33	70
<i>pinastroides</i> , GMEL. . . . .	11	22	<i>triquet</i> , LINN. . . . .	34	72
<i>pinnatifidus</i> , HUDS. . . . .	20	40	<i>triquet</i> , GMEL. . . . .	33	70
<i>pinnatifidus</i> , GMEL. . . . .	20	40	<i>tuberculatus</i> , HUDS. . . . .	7	14
<i>pinnatifidus</i> , FL. DAN. . . . .	13	26	<i>tuberculatus</i> , LIGHTF. . . . .	9	18
<i>pinnatifidus</i> , β. SYN. FUC. . . . .	20	40	<i>turbatus</i> , LINN. . . . .	24	50
<i>pinnatifidus</i> , γ. SYN. FUC. . . . .	20	40	<i>ulvoides</i> , TURN. . . . .	72	166
<i>pinnatifidus</i> , δ. SYN. FUC. . . . .	20	40	<i>undulatus</i> , SYST. NAT. ED. GMEL. ? . . . . .	46	101
<i>pinnatus</i> , LINN. . . . .	53	118	<i>uvifer</i> , FORSK. . . . .	21	44
<i>pistillaris</i> , WULF. ? . . . . .	21	44	<i>variabilis</i> , LINN. TRANS. . . . .	10	20
<i>pistillatus</i> , GMEL. . . . .	28	60	<i>verticillatus</i> , LIGHTF. . . . .	29	62
<i>pistillatus</i> , β. LAMOUROUX . . . . .	28	60	<i>vittatus</i> , LINN. . . . .	64	144
<i>Plocamium</i> , GMEL. . . . .	59	130	<i>volubilis</i> , LINN. . . . .	2	4
<i>plumaris</i> , FORSK. . . . .	53	118	<i>volubilis</i> , GMEL. ? . . . . .	68	153
<i>plumosus</i> , HUDS. . . . .	60	135	<i>Lenticula marina vulgaris</i> , PARK. . . . .	47	105
<i>polymorphi, var.</i> , LAMOUROUX ? . . . . .	41	88	<i>Pinus maritima, &amp;c.</i> , RAY . . . . .	11	22
<i>pristoides</i> , TURN. . . . .	39	84	<i>Ulva ciliata</i> , DECAND. . . . .	70	158
<i>prolifer</i> , LIGHTF. . . . .	42	90	<i>lingulata</i> , DECAND. . . . .	14	28
<i>prolifer</i> , FORSK. . . . .	58	128	<i>ocellata</i> , DECAND. . . . .	71	164
<i>Prilotus</i> , GUNN. . . . .	60	135	<i>papillosa</i> , LINN. ? . . . . .	16	32
<i>pumilus dichotomus, &amp;c.</i> , RAY . . . . .	3	6	<i>punctata</i> , STACKH. . . . .	71	164
<i>punctatus</i> , WITH. . . . .	71	164	<i>purpurascens</i> , HUDS. . . . .	29	62
<i>purpurascens</i> , HUDS. . . . .	9	18			

## TYPOGRAPHICAL ERRORS.

P. 1. l. 21, for <i>collato</i>	read	<i>collata.</i>	P. 6. l. 37, for <i>Waltenberg</i>	read	<i>Wahlenberg.</i>
27 <i>areas</i>		<i>aerreas.</i>	46 <i>Merten</i>		<i>Mertens.</i>
3. 30 <i>et</i>		<i>ex.</i>	7. 20 <i>descriptum</i>		<i>descriptum.</i>
32 <i>hinc</i>		<i>huic.</i>	30 <i>gaudo</i>		<i>gaudo.</i>
4. 20 <i>tubercles</i>		<i>peduncles.</i>	37 <i>moda</i>		<i>modo.</i>
5. 35 <i>Waltenberg</i>		<i>Wahlenberg.</i>	79, 80, &c. <i>Fucus Griffithsii</i>		<i>Fucus Griffithsia.</i>



# HISTORIA FUCORUM.

## 1.—FUCUS BANKSII.

*Fucus* fronde filiformi, coriaceâ, ramosissimâ, in receptacula sphærica, moniliformia, intervallo brevissimo disjuncta, per totam longitudinem inflatâ.

HABITAT in Novæ Hollandiæ oris, copiosè. *D. Menzies et Brown.*

RADIX exigua, discoidea.

FRONS pedalis, sesquipedalis, et interdum, teste *D. Brown*, bipedalis, ortu simplex, sed juxta basin divisa, et inde ramosissima; rami divaricati, subreflexi, nunc dichotomè, nunc vagè, dispositi, elongati, simpliciusculi, minoribus brevioribus, ad angulum rectum exeuntibus, hinc illic instructi: planta tota a basi usque ad apices e receptaculis constat innatis, monilis in formam dispositis, per frondem filiformem, pennâ passerinâ tenuiorem intervallo inter singula vix lineari connexis, junioribus oblongis, adultis sphæricis, omnibus siccitate enormitèr compressis, nec posthàc in formam pristinam ullâ arte revocandis, iis juxta basin et ramorum ad apices parvis, reliquis *pruni insititiæ* druparum magnitudine, superficie tuberculis sphæricis, immersis, prominulis, poro pertusis inæquali.

FRUCTIFICATIONEM in tuberculis supradictis, quæ ea *F. vesiculosi*, *nodosi*, et reliquorum, cùm formâ, tum structurâ referunt, includi, dubio prorsus vacare mihi videtur, licet semina nulla adhuc detexerim: lente acerrimâ observata e fibris adeo tenuibus ut oculum inermem fugiant intus constant.

COLOR plantæ recentis verisimillimè olivaceus; *exsiccata* nigerimus; in aquâ iterum immersæ obscurè olivaceus, fusco immixtus; internè rufescit.

SUBSTANTIA *madefacta* coriacea, tenacissima, *exsiccata* fragilis.

Fuci hujus perquam singularis exemplaria mea benevolentia illust. Josephi Banks, Baroneti, debeo, cujus, gratâ mente ob plurima in me ipsum et in hoc opus collato beneficia, nomine insignivi. In Novæ Hollandiæ littoribus copiâ non minore, quàm *Fucus vesiculosus*, *nodosus*, et *serratus*, plantæ ibidem incognitæ, in his nostris, provenire traditur. Hæc species, harumque congeneres structurâ texturâque refert; nec, ut in descriptione jampridem dixi, dubitari potest quin fructificandi modus sit idem, et tubercula, seminibus nondum sparsis, iis harum algarum respondēant. Ex hæc fucorum tribu amicissimi *D. Weber* et *Mohr* in tractatu eximio\* distinctum genus, quod *Fucum* κατ' ἐξοχήν appellant, construxere. De ejusmodi autem rebus in subsequentibus plenius erit disserendum. Receptacula jam efficta in *bullas areas* transire, et plantæ sub aquâ sustentandæ inservire verisimillimum videtur. *Exsiccata* seriei glandium calicum filo trajecto connexorum similitudinem quandam præ se ferunt. Est *Fucus Banksii* omnino sui generis planta, a reliquis omnibus habitu et formâ, necnon receptaculorum situ statim dignoscenda. Substantia ejus est adeo crassa et tenax ut ad corium adpropinquet.

- a. *F. Banksii*, nativâ magnitudine.
- b. *Receptaculum obliquè* sectum, magn. auct. - 6.
- c. *Tuberculum* - - - - - 2.
- d. *Tuberculum extrinsecus visum*, ut porus conspiciatur - 5.

\* Einige Worte über unsre bisherigen hauptsächlich karpologischen Zergliederungen von kryptogamischer Seegewächsen. *Beiträge zur Naturkunde*, I. p. 204.



# HISTORY OF THE FUCI.

## 1.—FUCUS BANKSII.

*Fucus Banksii*, frond filiform, coriaceous, irregularly branched, and swollen throughout its whole length into spherical receptacles, arranged like the beads of a necklace placed at short distances. On the shores of New Holland, plentiful. Mr. Menzies and Mr. Brown.

ROOT small, discoid.

FROND a foot, or a foot and half long, sometimes extending to two feet, simple at first, but very soon divided, and afterwards variously and repeatedly branched: branches divaricated, and almost reflexed, long, in general undivided, but here and there beset with smaller and shorter ones, issuing from them at right angles: the whole plant from base to summit is studded with receptacles innate in the frond, arranged like beads in a necklace, at intervals scarcely exceeding a line each, connected by the filiform frond, which is more thin than a sparrow's quill, the younger ones oblong, those more perfectly formed spherical, all irregularly flattened by drying, and never afterwards recovering their proper shape by immersion or any other means; those which are situated at the base and summit of the branches are small, the others about the size of a *Bullace*; the surface of all every where rough with globular tubercles, which, though immersed in the frond, are somewhat prominent, and are perforated with a very small pore.

From the resemblance of these tubercles to those of *F. vesiculosus*, *nodosus*, &c. there can be no doubt of their containing the FRUCTIFICATION, though I have not at present been able to detect seeds in them: if examined by the highest powers of a compound microscope, they appear to be internally composed of fibres invisible to the naked eye.

COLOR of the recent plant in all probability olive, when dried intensely black, and if afterwards soaked in water, turning to a dark dull olive, mixed with brown; internally reddish.

SUBSTANCE, while wet, leathery, extremely tough; when dried, brittle.

For my specimens of this most extraordinary *Fucus*, I am indebted to the Right Honourable Sir Joseph Banks, by whose name I have called it, in memory of the kindness which he has always shewn me, and of the exceeding liberality with which he has assisted me in the present publication. It is said to be no less abundant on the shores of New Holland than *Fucus vesiculosus*, *serratus*, and *nodosus*, plants unknown in that part of the world, are upon those of Britain. In its structure and texture, it resembles these species, and their congeners, and, as has already been remarked in the description, there can be no doubt of the fructification being the same, and of the innate tubercles having, before they discharged their seeds, been wholly similar to those of this tribe, out of which Dr. Weber and Dr. Mohr, in an excellent paper,\* have constituted a new genus, which they call exclusively *Fucus*. Upon this subject I shall soon have occasion to speak more fully. It is most probable that the receptacles, when they have fulfilled their office as to the fructification, become filled with air, and perform the function of bladders designed to give buoyancy to the frond. In a dried state they may not inaptly be compared to a string of acorn-cups. In the situation of its receptacles, as well as in general habit and form, *F. Banksii* is altogether a plant *sui generis*, and differs from every other species yet known. Its substance is so extraordinarily tough that it almost resembles a piece of leather.

- a. *F. Banksii*, natural size.
- b. Receptacle transversely cut through, magnified - - 6.
- c. Tubercle - - - - - 2.
- d. Outside of tubercle, to shew the pore - - - 5.

\* Einige Worte über unsre bisherigen, hauptsächlich karpologischen Zergliederungen von kryptogamischen Seegewächsen. *Beiträge zur Naturkunde*, I. p. 204.



*Fucus banksii.*





## 2.—FUCUS VOLUBILIS.

3

*Fucus*, fronde membranaceâ, planâ, enervi, lineari, simpliciusculâ, spiralitèr tortâ, margine repando dentatâ; dentibus tuberculiferis; tuberculis exiguis pedunculatis.

*Fucus volubilis*. LINN. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1387. WULFEN, in *Jacq. Coll.* III. p. 149. WULFEN, *Crypt. Aquat.* n. 12. ÉSPER,  *Ic. Fuc.* I. p. 141. t. 71. (excl. Syn. Gmel.) ALL. *Fl. Ped.* II. p. 333. *Fl. Fr. Ed. 2da.* II. p. 20.

*F. spiralis serratus*. BARRELIER, p. 118. t. 1303.

*Epatica spirale minore*. GINANNI, I. p. 26. t. 27.?

HABITAT in mari Mediterraneo. LINNÆUS.—In portu apud Tergestum, copiosè. WULFEN.—In sinu Napolitano, prope Paulisippo. SCHMIDEL.—Ex Insulâ Ceylon accepit D. Smith.

RADIX callus explanatus, coriaceus, tenuis, sub-orbicularis, diametro sesquiunguicularis, et ultra.

FRONDES ex eâdem radice plurimæ, cæspitosæ, longitudine tri vel quadri-pollicares, latitudine unguiculares, et ubique lineares, (excepto quòd juxta basin sæpe vi fluctuum terantur, atque idcirco angustiores sint) vel simplices, vel ramo uno alteroque, præsertim apices versus, vago, brevi, erecto, sub-fastigiato instructæ, a radice usque ad apices in Archimedæam longitudinalitèr convolutæ cochleam, nervo venisque prorsus carentes, apice rotundatæ, margine repando-dentatæ, dentibus acutis, nunc solitariis, nunc binis, et ultra.

FRUCTIFICATIO tubercula perquam exigua, sphærica, atra, circitèr quina, vel sena, frondis dentibus, qui tunc temporis elongantur, attenuantur, et incurvantur, pedunculorum vice fungentes, apices versus innascentia: semina in his pauca, atra, subrotunda, limbo pellucido cincta.

SUBSTANTIA e membranaceâ coriacea.

COLOR atro-rubens,\* siccata ater.

Singulare admodùm videtur quod Fuci jamdudum a botanicis veteribus cogniti, nec infrequentis in Mari Mediterraneo, Adriaticoque, ubi, teste illustrissimo Wulfen, conchis, spongiis, lapidibusque accrescit, et a piscatoribus unâ cum retibus extrahitur, fructificatio tamdiu visum fugerit. Recedit autem hæc in eo ab omnibus quæ vulgarissimè occurrunt Fucorum familiis, quòd tubercula, licet sphærica, multo minora sint quàm in *globuliferis* plerisque, et semina quæ continent pauca, majuscula, limbo cincta, figuræque certæ, ea Fucorum propriorum ut ita dicam, referunt. Frons ab ipsâ basi ad apices in omni ætatis stadio ita pertinacitèr in spiram intorquetur, ut nequeat, nisi natura maximè renitente, evolvi, seque relicta statim in formam pristinam retrahat. Sub microscopio visa pulcherrimè reticulata apparet. Ginannii figuram, ut quæ Wulfenio dubia videtur, plantæque formam perperam exprimit, dubitanter citavi. De Gmelini *F. volubili* nequeo non stare a sententiâ in *Fucorum Britannicorum Synopsi* evulgatâ, et, ut et descriptione liquet, pro merâ *F. lacerati* varietate habere. Plantam quam sub *F. volubilis* nomine descripsit Hudsonus ad *F. vesiculosum* pertinere satis omnibus cognitum: hinc autem speciei cum *F. volubili* vero affinitatis aliquid intercedere ex eo suspicatus est M. Decandolle, quòd Linnæus vicinos disposuerat. Toto tamen cœlo discrepant; et non modo fructificationi, verùm etiam habitui (sit verbo venia) hujus nostræ speciei quiddam ita sibi proprium inest, ut statim a reliquis cunctis dignoscatur; imo difficile sit dictu cuinam omnium maximè accedat.

a. <i>F. volubilis</i> , nativâ magnitudine.				
b. <i>Ejusdem apex</i> , magn. auct.	-	-	-	6.
c. <i>Apex alter</i> , tuberculis magis confertis	-	-	-	6.
d. <i>Ejusdem pars</i>	-	-	-	3.
e. <i>Semina</i>	-	-	-	1.
f. <i>Frondis particula</i> .	-	-	-	1.

\* D'un brun verdâtre. Decandolle.



## 2.—FUCUS VOLUBILIS.

*Fucus volubilis*, frond membranous, flat, nerveless, spirally twisted, mostly simple, its margins repando-dentate; teeth bearing small pedunculate tubercles.

*Fucus volubilis*. LINN. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1387. WULFEN, in *Jacq. Coll.* III. p. 149. t. 13. f. 2. WULFEN, *Crypt. Aquat.* n. 12. ESPER,  *Ic. Fuc.* I. p. 141. t. 71. (excl. Syn. Gmel.) ALL. *Fl. Ped.* II. p. 333. *Fl. Fr. Ed. 2da.* II. p. 20.

*F. spiralis serratus*. BARRELIER, p. 118. t. 1303.

*Epatica spirale minore*. GINANNI, I. p. 26. t. 27.?

In the Mediterranean Sea. LINNÆUS.—In the Harbor at Trieste, plentiful. Wulfen.—In the Bay of Naples near Paulisippo. Schmidel.—Sent from Ceylon to Dr. Smith.

ROOT an expanded, thin, coriaceous, suborbicular disk, a nail and half, or more, in diameter.

FRONDS from the same base numerous, forming tufts, three or four inches long, about a nail wide, and of equal width throughout, except that near the base, they are frequently worn by the action of the waves, and consequently more narrow, either simple, or here and there, especially towards the apices, furnished with one or two short, erect, sub-fastigiate branches, twisted for their whole length like a cork-screw, entirely destitute of veins or nerve, rounded at their apices, and at their margins repando-dentate, with sharp teeth sometimes solitary, sometimes placed two or more together.

FRUCTIFICATION, extremely small black, spherical tubercles, growing about five or six together, and placed towards the upper part of the frond upon the teeth, which are then lengthened, very narrow, and incurved, so as to perform the office of tubercles: in each of these tubercles lie a few black roundish seeds, surrounded by a pellucid limbus.

SUBSTANCE between membranaceous and coriaceous.

COLOR,\* blackish red, when dried black.

It is not a little singular that, long as this *Fucus* has been known, and common as it appears to be in the Mediterranean and Adriatic, where, according to Baron Wulfen, it grows on shells, sponges, and stones, and is drawn out by the fishermen among their nets, the fructification should still have remained to the present day unnoticed. It does not altogether agree with that of any of the tribes more generally known, the tubercles being spherical, yet very much smaller than those of the globuliferous *Fuci* in general, and containing only a few largish regular seeds, altogether resembling those of *F. vesiculosus* and its congeners. The frond of this *Fucus* is so constantly and so naturally spiral, that it cannot be unrolled without difficulty, and immediately upon being left to itself returns to its former state. Examined under the microscope it is beautifully reticulated. I have quoted Ginanni's figure, with a mark of doubt, as being considered by Wulfen suspicious, and very ill expressing the character of the plant. With regard to Gmelin's *F. volubilis*, I cannot but adhere to the opinion expressed in the *Synopsis of the British Fuci*, that it is merely a variety of *F. laceratus*. The plant described under the name of *F. volubilis* by Hudson, is sufficiently known to belong to *F. vesiculosus*, with which species M. Decandolle was led to suppose that the present plant must have some connexion, from their being placed next each other by Linnæus. They are, however, most different, and indeed there is something so peculiar in the habit of *F. volubilis* as well as the fruit, that it is not only immediately distinguishable from every other, but it appears to me by no means easy to say which species are most properly its congeners.

- |  |   |   |    |
|--|---|---|----|
| a. <i>F. volubilis</i> , natural size. |   |   |    |
| b. Fructified end, magnified           | - | - | 6. |
| c. Do. with fruit more in clusters     | - | - | 6. |
| d. Portion of the same                 | - | - | 3. |
| e. Seeds                               | - | - | 1. |
| f. Portion of the frond                | - | - | 1. |

\* Greenish-brown, according to M. Decandolle, in the *Flore Française*.





a



c



d



e



f



b

*Fucus volubilis.*





*Fucus*, fronde coriaceâ, lineari, enervi, hinc canaliculatâ, dichotomâ, apice emarginatâ; receptaculis terminalibus, oblongo-cuneiformibus, turgidis, bipartitis, obtusis.

*Fucus canaliculatus*. LINN. *Syst. Nat.* II. p. 716. *Syst. Nat. Ed. Gmel.* II. p. 1381. *Fl. Dan.* t. 214. GMELIN, *Hist. Fuc.* p. 73. t. 1. A. f. 2. *Fl. Ang.* p. 583. *Fl. Scot.* p. 917. WITH. IV. p. 99. LINN. *Trans.* III. p. 172. ROTH, *Fl. Germ.* III. p. 451. *Fl. Fr. ed. 2da.* II. p. 21. VELLEZ. t. 1. *Eng. Bot.* XII. t. 823. *Syn. Fuc.* II. p. 242.

*F. excisus*. LINN. *Sp. Pl.* II. p. 1627. *Syst. Nat.* II. p. 715. LINN. *Mant.* p. 508. *Fl. Lapp.* p. 366. *Fl. Norv.* I. p. 96. *Fl. Fr.* I. p. 96.

*F. rotundus*. ESPEER,  *Ic. Fuc.* p. 40. t. 17. (excl. *Syn.*)

*F. pumilus dichotomus*, segmentis ex unâ parte gibbosis, ex alterâ excavatis. RAII *Syn.* p. 43. n. 12. (excl. *Syn. Moris.*)

*F. palmaris angustifolius*, ad extrema vesiculis rugosis bifurcatus. MORIS. *Hist. Or.* p. 647. s. 15. t. 8. f. 12. HABITAT in Angliâ, Scotiâ, Hiberniâ, Galliâ, Hispaniâ, et Norvegiâ oris, et ubique in Oceano Septentrionali Europæo, satis frequens.

Perennis.—Æstate et autumno fert fructum.

RADIX callus explanatus, planiusculus, diametro ferè unguicularis.

FRONDES ex eâdem radice plurimæ, cæspitosæ, longitudine palmares, nec rarò spithamæ, latitudine unius circiter lineæ, costæ venarumve prorsus expertes, ab ortu usque ad apices æquales, centro longitudinalitèr depressæ, marginibus lenitèr elevatis et incurvatis, ut tota planta, siccata æquè ac madida, canaliculata, et hinc concava illinc convexa evadat; frondes furcis repetitis per totam longitudinem dichotomæ, intervallis plerumque sub-pollicaribus, sed hoc incertum, inferioribus tamen magis approximatis, dichotomiarum angulis acutis: margines ubique integerrimi; apices emarginati, rotundato-truncati.

FRUCTIFICATIO terminalis: frondis scilicet apices turgescunt, et in receptacula binata, oblonga, seu cuneiformia, obtusissima, compressa, plus unguem longa, duasque lineas lata, nunc integra, nunc bifida dilatantur: hæc intus mucopellucido albo, fibris articulatis, pellucidis, reticulatis intertexto replentur, inter quem tubercula globosa, e fibris compactis constantia, decem vel duodecim semina oblongo-pyriformia, fusca, limbo pellucido cincta includentia reperies: receptacula extrinsecus e tuberculis innatis hic illic torulosa, et supra tubercula poro minuto pertusa.

COLOR olivaceus, vel olivaceo-fuscescens, nec rarò lutescenti immixtus, præsertim in apicibus fructiferis, qui reliquâ fronde semper pallidiores; si luci exponatur diaphanus, in siccata niger, opacus.

SUBSTANTIA lenta, coriacea, tenax.

Sint licet Fucorum plurimæ species, quarum frondes, ejusdem ubique reverà crassitiei, nihilominus ob centrum depressum marginesque elevatos canalis longitudinalis speciem præ se ferant, datur tamen, quantum scio, nulla, quæ eodem quo hæc nostra fructu gaudet, quamobrem in specie ritè determinandâ difficultati vix est locus. Est *F. canaliculatus* magnitudinis perquam variæ; accepi enim exemplaria quædam e Finmarkiâ a M. Wahtenbergio missa, quorum altitudo vix pollicem unum superabat, similemque reliquæ partes rationem servabant, dum ea quæ in Britannîæ australis oris, præsertim fluviorum ad ostia, nascuntur, altitudine spithamam latitudine duas lineas æquant. De reliquiis nescio ut mutationi sit obnoxius, nec conjicere possum quâ de causâ auctores plerique in duas varietates dispertiverint, nisi quodd fortè Linnæum, qui sub duobus nominibus descriptum sic, ut errorem melius celaret, diviserat, temerè sint consecuti. A *F. vesiculosi* minoris staturæ speciminibus, quæ *F. canaliculatus*, cùm solito major occurrat, præsertim exsiccatu gravitèrque pressatus, quodammodo refert, et quocum mirâ illâ proclivitate ad novas edendas frondes novaque ubicunque læditur receptacula convenit, costæ absentia nunquam non dignoscitur. Planta quam sub *F. canaliculati* nomine Wulfenius Esperusque, hic in *Iconibus*, ille in *Cryptogamis Aquaticis*, descripserunt, ab hæc nostrâ evidentèr recedit, et vel ad *Ulvam dichotomam*, ut mihi, vel ad *Fucum Fasciam*, ut amicissimo Mertensio videtur, pertinet.

a. *F. canaliculatus*, nativâ magnitudine.

b. Frondis transversa sectio.

c. Receptaculum extrinsecus visum, magn. auct. - 5.

d. Idem intus visum, longitudinalitèr sectum - 4.

e. Idem horizontalitèr sectum - 4.

f. Tuberculum seorsum - 2.

g. Semen - 1.



## 3.—FUCUS CANALICULATUS.

*Fucus canaliculatus*, frond coriaceous, linear, nerveless, channelled on one side, dichotomous, emarginate at the apices; receptacles terminal, oblongo-cuneiform, turgid, bipartite, obtuse.

*Fucus canaliculatus*. LINN. *Syst. Nat.* II. p. 716. *Syst. Nat. Ed. Gmel.* II. p. 1381. *Fl. Dan.* t. 214. GMELIN, *Hist. Fuc.* p. 73. t. 1. A. f. 2. *Fl. Ang.* p. 583. *Fl. Scot.* p. 917. With IV. p. 99. Linn. *Trans.* III. p. 172. ROTH, *Fl. Germ.* III. p. 451. *Fl. Fr. Ed.* 2. II. p. 21. VELLE, t. 1. *Eng. Bot.* XII. t. 823. *Syn. Fuc.* II. p. 242.

*F. excisus*. LINN. *Sp. Pl.* II. p. 1627. *Syst. Nat.* II. p. 715. LINN. *Mant.* p. 508. *Fl. Lapp.* p. 366. *Fl. Norv.* I. p. 96. *Fl. Fr.* I. p. 95.

*F. rotundus*. ESP.  *Ic. Fuc.* p. 40. t. 17. (excl. *Syn.*)

*F. pumilus dichotomus, segmentis ex una parte gibbosis, ex alterâ excavatis*. RAIL *Syn.* p. 43. n. 12. (excl. *Syn. Moris.*)

*F. palmaris angustifolius, ad extrema vesiculis rugosis bifurcatus*. MORIS. *Hist. Or.* p. 647. s. 15. t. 8. f. 12. On the shores of the British Isles, France, Spain, and throughout the Northern European seas, not uncommon. Perennial.—Summer and autumnal months.

ROOT, an expanded, coriaceous disk, near a nail in diameter.

FRONDS, many from the same base, growing in tufts from three to seven inches long, about a line wide, without rib or veins, of the same width throughout, longitudinally depressed in the centre, and the margins slightly incurved, so that the whole plant, as well when wet as dry, appears channelled and concave on one side, and convex on the other: fronds divided at uncertain distances of about an inch each, throughout their whole length, with repeated dichotomies, the lower ones shorter; the angles of the dichotomies acute: margins constantly entire; apices rounded and slightly notched.

FRUCTIFICATION terminal, the apices of the frond swelling into oblong or cuneiform, compressed, very blunt, binate receptacles, more than a nail long, and two lines wide, entire or bifid, filled internally with colorless mucus, interwoven with pellucid jointed anastomosing fibres, among which, close to the outer coat, lie globular tubercles, composed of closely matted filaments, and containing ten or twelve brown, oblongo-pyriform seeds, surrounded with a pellucid limbus: the receptacles are externally uneven from the innate tubercles, and above each perforated with a minute pore.

COLOR, while recent, olive tinged with brown, not unfrequently yellowish, especially in the fructified summits, which are always paler than the rest of the frond, subdiaphanous when held to the light; in the dry plant, black and opaque.

SUBSTANCE, coriaceous, pliant, tough.

Although several Fuci are known, which have their frond marked with a longitudinal groove, not from the substance being hollowed out, but from the centre being concave, and the margins raised and inflexed, yet I believe that the present plant affords a solitary instance of such a conformation, attended with a fruit similar to that which it bears, so that there can be no difficulty in distinguishing the species. In point of size it is extremely variable, some specimens which Mr. Wahtenberg has sent me from Finland, being scarcely more than an inch long, and in all their parts proportionably small, while on the Southern shores of England, especially near the mouths of rivers, it attains to half a foot in height, and is two or three lines wide. In other respects I am not aware that it is liable to any change, so that I cannot account for the circumstance of two varieties being enumerated by most authors, except they have merely followed Linnaeus, who thus divided it to conceal the error he had made in describing it twice under different names. In its larger state, especially when barren, and after it has been dried and much pressed, it approaches the smaller varieties of *F. vesiculosus*, with which species it also accords in the wonderfully proliferous tendency of both frond and pods when injured, but its want of mid rib will always distinguish it. The plant figured and described under the name of *F. canaliculatus*, in Professor Esper's *Icones*, t. 73, and in Wulfen's *Cryptogama aquatica*, n. 12, is very evidently different from ours, and either belongs to *Ulva dichotoma*, or, as my friend Professor Merten suspects, to *Fucus Fascia*.

- a. *F. canaliculatus*, natural size.
- b. Transverse section of frond.
- c. Exterior of receptacle, magnified - - 5.
- d. Interior of ditto, longitudinally cut - - 4.
- e. Ditto, horizontally cut - - - 4.
- f. Tubercle - - - - 2.
- g. Seed - - - - 1.





*Fucus canaliculatus.*





*Fucus*, fronde basi terete, mox planâ, lineari, dichotomâ, costatâ; costâ obsoleta; receptaculis terminalibus, oblongis, tereti-compressis.

*F. distichus*. LINN. *Syst. Nat.* II. p. 716. *Syst. Nat. Ed. Gmel.* II. p. 1381. WULFEN, *Crypt. Aquat.* n. 7.?

*F. linearis*. *Fl. Dan.* t. 351. (excl. Syn. Hudsoni.)

*F. filiformis*. GMELIN. *Hist. Fuc.* p. 72. t. 1. A. f. 1. ESPER,  *Ic. Fuc.* II. p. 87. t. 152. (excl. Syn. plerisq.)?

HABITAT in fundo maris Islandici Oeder.—In Oceano septentrionali. Gmelin.

RADIX (teste Gmelino) orbicularis, 6 vel 7 circiter linearum diametro, lapidibus adglutinata.

FRONS longitudine sesquipalmaris, vel ferè spithamæa, basi teres, pennæque passerinæ crassitie, mox compressa, duumque a radice pollicum intervallo plana, hinc omnino linearis, unamque circiter lineam lata, dichotomis sexies vel sæpius repetitis ramosa, costâ tenuissimâ obsoletâ, et vix nisi in madidâ conspiciendâ percursa, poris mucifluis minutissimis hic illic pertusa, margine integerrima, apicibus sterilibus emarginatis, segmentis obtusis, subtruncatis.

FRUCTIFICATIO frondis ad apices, tunc unguiculares, teretes, et in receptacula conversos, sita; tubercula in his globosa, poro exiguo pertusa, seminibus aliquot oblongis fuscis instructa.

COLOR in recente olivaceus; in siccâ niger, nequaquam vel nitens vel subdiaphanus.

SUBSTANTIA coriacea, cartilaginea, tenax, sed tenuis.

*Fucum* Gmelini *filiformem* reverà eandem esse speciem quam ad ipsum in Herbario Linnæano asservatum exemplar hic depictam descriptionem sisto, res est quam extra dubitationem positam nequaquam duco; plerorumque tamen Botanicorum sententiis obsequens pro synonymo in presens habeo, sumque ab ejus descriptione radice adumbrationem mutuatus. Nec tamen idcirco desistendum puto ab observando, quòd Icon ejus specimen latitudine omnia quæ ego unquam vidi longè superans exhibeat; quod de fronde basi terete, notâ maximi in specie discriminandâ ponderis, nihil dixerit; quòd costam, vix in *F. disticho* nisi summâ curâ et in exemplaribus vel exsiccatis vel lente auctis detegendam, perquam manifestam depinxerit; et quòd denique frondis apices fructiferos reapse teretiusculos, planos delineaverit. Ex omnibus hisce mihi quidem dubium videtur, annon potius vel *F. vesiculosi* varietatem quandam singularem, vel distinctam speciem coram oculis habuerit. Icon etiam in *Florâ Danicâ* depicta nequaquam ita dilucidè ut vellem *F. distichum* respicit, et æquo fere jure ad *F. linearem* Fl. Ang. quem in *Fuc. Brit. Syn.* pro *F. vesiculosi* var. descripsi, referri possit. Hæc duo tantum synonyma ad *Fucum* hunc nostrum ab auctoribus citari solent, et, cum utrumque pro ancipite ducam, eo magis gaudio quòd stirpis a reliquis satis distinctæ, sed quâ vix ulla minus sit cognita, illustrandæ occasio mihi suppeditetur. De Esperici icone quam citavi, licet haud bonâ, paulum dubito, sed de synonymis ferè omnibus erravit. Linnæus, ut ex Herbario suo patet, cum *F. membranaceo* Stackh. commiscuerat, texturamque hâc de causâ herbaceam, à quâ Fuci hujus indoles quam longè abhorret, in Systemate Plantarum dixit. Maximam autem certè habet *F. distichus* cum *F. vesiculoso* affinitatem, sed ab omnibus hujus speciei quantumvis mutabilis varietatibus, caulibus basi teres, quod neutiquam a casu vel injuriâ sed ab ipsâ plantæ naturâ pendet, substantia tenuis, costa obsoleta, et receptacula longa filiformia citò dignoscunt. A *F. ceranoide*, qui *F. distichus*, Esp. t. 139, crescendi moda toto cœlo discrepat. Magnitudine habituque *F. canaliculato* quodammodo affinis videtur, cavendumque imprimis putavit Linnæus ne cum illo commisceretur; sed fronde planâ, formâ, substantiâque alienâ, et receptaculorum figurâ satis a se invicem recedunt. Dolendum est quod nulla extet in Herbario Linnæano nota, per quam unde *F. distichi* exemplaria sua acceperit cognoscas; hinc patria ejus incerta manet: specimina etiam Stackhousii, qui à M. Desfontaines, et Mertensii, qui à Thunbergio accepit, neutro tamen locum natalem adjiciente, benevolentia debeo.

- |   |   |   |    |
|---|---|---|----|
| a. <i>Fucus distichus</i> , nat. magn.        |   |   |    |
| b. <i>Apex frondis cum fruct.</i> magn. auct. | - | - | 6. |
| c. <i>Receptaculum horizont. sectum</i>       | - | - | 3. |
| d. <i>Tuberculum</i>                          | - | - | 2. |
| e. <i>Semen</i>                               | - | - | 1. |



*Fucus distichus*, frond cylindrical at the base, thence flat, linear, dichotomous, furnished with an obsolete midrib; receptacles terminal, oblong, between cylindrical and compressed.

*Fucus distichus*. LINN. *Syst. Nat.* II. p. 716. *Syst. Nat. Ed. Gmel.* II. p. 1381. WULFEN, *Crypt. Aquat.* n. 7.?

*F. linearis*. *Fl. Dan.* t. 351. (excl. Syn. Huds.)

*F. filiformis*. GMELIN, *Hist. Fuc.* p. 72. t. 1. A. f. 1. ESPEER,  *Ic. Fuc.* II. p. 87. t. 152. (excl. Syn. plerisq.)?

In the Arctic Ocean, near Iceland. Oeder.—In the North Sea. Gmelin.

ROOT, according to Gmelin, orbicular, six or seven lines in diameter.

FROND, from five to seven inches long, at the base cylindrical, and about the size of a sparrow's quill, then compressed, and at the distance of two inches from the root becoming quite flat, after which it is about a line wide, and completely linear, divided by dichotomies six or seven times repeated, perforated here and there with extremely minute mucifluous pores, furnished with a very thin midrib scarcely visible, except in the plant when wet, entire at the margins, the barren summits emarginate, with short, blunt, almost truncated segments.

FRUCTIFICATION situated in the apices of the frond, which are then lengthened to half an inch or more, and become receptacles, containing globular tubercles, placed immediately under their surface, perforated with a small pore, and furnished with a few oblong brown seeds surrounded with a pellucid limbus.

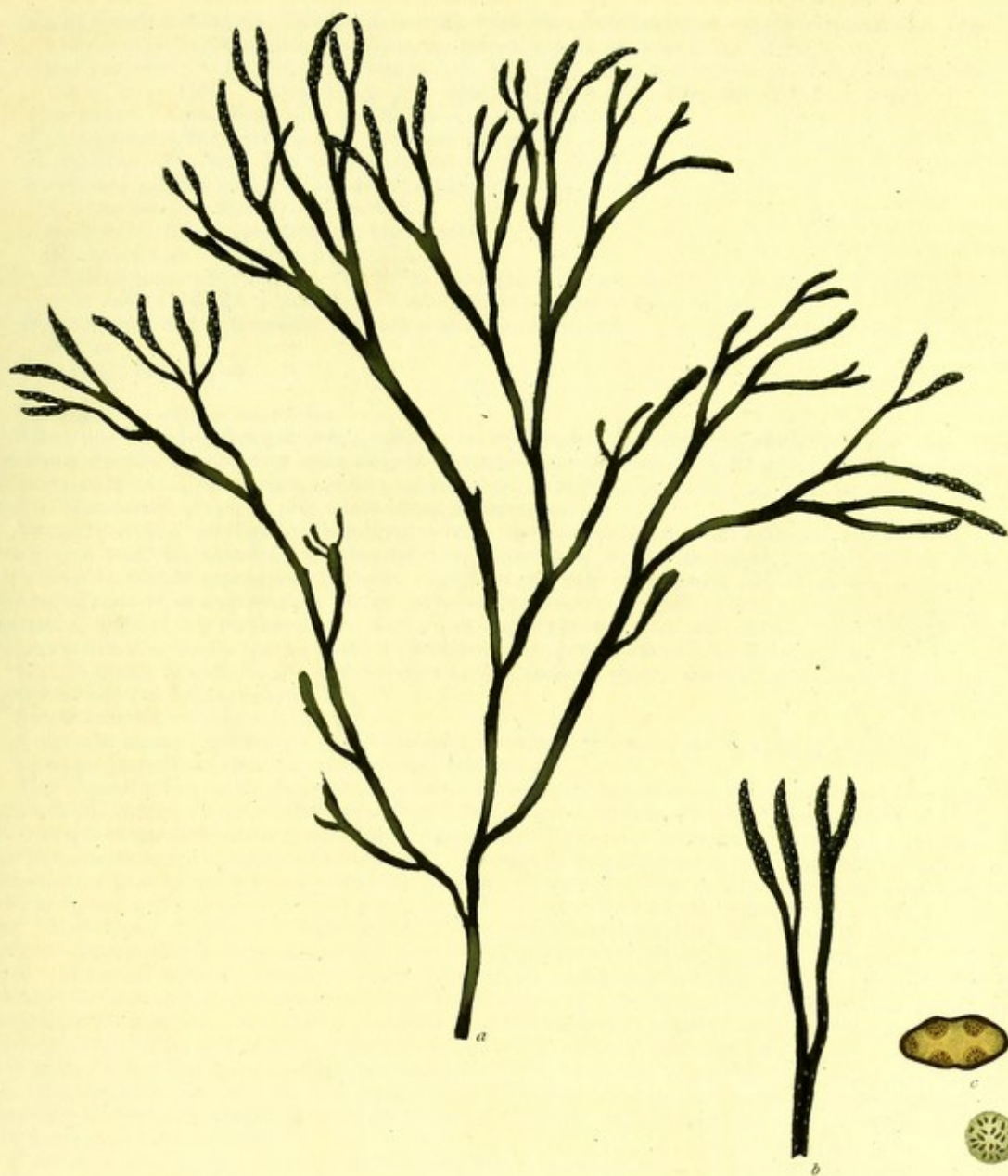
COLOR, in the plant when recent, olive, when dried black, by no means inclining to glossy or subdiaphanous.

SUBSTANCE, between coriaceous and cartilaginous, tough, but thin.

That Gmelin's *F. filiformis* is really intended for the same *Fucus* here described, and figured from one of the original specimens preserved in the Linnæan Herbarium, is a point upon which I by no means feel certain, but I have followed the opinion of the greater number of Botanists in regarding it as such; and have ventured to borrow from him the account of the root. At the same time, I consider it right to remark that his plate represents a plant whose frond is more wide than any I have seen, that he has omitted the extraordinary circumstance of its being cylindrical at the base, that he makes the midrib very visible, whereas in *F. distichus* it is scarcely to be discovered with the most attentive observation, except in dry or magnified specimens, and that he figures the apices as flat instead of nearly cylindrical, from all which circumstances it may fairly be doubted whether he did not intend either a singular variety of *F. VESICULOSUS* or a different species. The plate in the *Flora Danica* is by no means so satisfactory as I could wish, and almost equally applicable to *F. linearis*, *Fl. Ang.* which in the Synopsis of the British Fuci I have described as *F. vesiculosus*, var. 2. These are the only two synonyms that have been regarded as belonging to the present plant, which I am peculiarly gratified at having the opportunity of illustrating, as I consider it a species satisfactorily distinct from all others, but at the same time most imperfectly known. About Espeer's figure, though indifferent, I have very little doubt, but his synonymy is for the most part erroneous. It appears by Linnæus's Herbarium, that he had himself confounded it with *F. membranaceus* of Stackhouse, and this accounts for the observation in the *Systema Plantarum* that the texture is herbaceous. The nearest affinity of *F. distichus* is unquestionably with *F. vesiculosus*, from every variety of which it is distinguished by the shape of the stem at the base, a circumstance evidently not arising from accident or injury, but from the very nature of the plant, in addition to which, the thin texture, inconspicuous midrib, and long filiform pods afford ready marks of discrimination. With *F. ceranoides*, which is figured under the name of *distichus* by Espeer, t. 139, the different mode of growth precludes any fear of its being confounded. Linnæus thought it more requisite to separate the present plant from *F. canaliculatus*, to which in size and habit it bears some affinity, but its flat frond, dissimilar texture, and structure, and differently shaped fruit, render it unnecessary to dwell upon this circumstance. There is unfortunately no note in the Linnæan Herbarium to ascertain whence the specimens came, so that the habitat of the plant is in some wise doubtful. I have received it, but without any locus natalis affixed, from Mr. Stackhouse, to whom it was communicated by M. Desfontaines, and from Professor Mertens, who had it from Sir P. C. Thunberg.

- |   |   |   |   |   |    |
|---|---|---|---|---|----|
| a. <i>Fucus distichus</i> , natural size. | - | - | - | - | -  |
| b. Fructified apex, magnified             | - | - | - | - | 6. |
| c. Horizontal section of ditto            | - | - | - | - | 4. |
| d. Tubercle                               | - | - | - | - | 2. |
| e. Seeds                                  | - | - | - | - | 1. |





*Fucus distichus.*







*Fucus*, fronde cartilagineâ, filiformi, dichotomâ, fastigiâtâ; dichotomiarum angulis obtusiusculis; apicibus bifurcis acutis; capsulis difformibus, lateralibus, spongiosis, frondis epidermide non tectis.

*Fucus rotundus*. GMELIN, *Hist. Fuc.* p. 110. t. 6. f. 3. (excl. syn. Huds. et Raii.) LINN. *Syst. Nat. Ed. Gmel.* II. p. 1383. WITH. IV. p. 110. *Syn. Fuc.* II. p. 309. *Eng. Bot.* XXV. t. 1738.

*F. radiatus*. Linn. *Trans.* III. p. 202. *Ner. Brit.* p. 89. t. 14.

*F. fastigiatus*. *Ner. Brit.* p. 15. t. 6. (quoad fig. min.)

*F. caprinus*. *Fl. Norv.* I. p. 96. (quoad icon. in Act. Nidros.)

$\beta$ . *tenuior*; apicibus elongatis, linearibus, obtusiusculis.

*F. rotundus*.  $\beta$ . *Syn. Fuc.* II. p. 310.

$\gamma$ . *fastigiatus*; fronde tenuissimâ, vix bipollicari.

*F. rotundus*.  $\gamma$ . *Syn. Fuc.* II. p. 310.

*F. fastigiatus*. *Herb. Linn. Sp. Pl.* II. p. 1631. ESPER,  *Ic. Fuc.* I. p. 38. t. 16. (excl. Syn.) WULFEN, in *Jacq.-Coll.* III. p. 152. t. 14. f. 2. WULFEN, *Crypt. Aquat.* n. 30.

HABITANT  $\alpha$  et  $\beta$  in Insularum Britannicarum oris, haud raro.  $\gamma$  in Angliæ australis oris.—in Mari Adriatico. Wulfen.

Perennis. Sept.—Feb.

RADIX discus explanatus, solidus.

FRONDES ex eâdem basi plurimæ, palmares vel dodrantes, filiformes, cylindricæ, pennæ nunc corvinæ nunc coracinae crassitie, semper juxta basin, et sæpe per pollicis et ultra spatium, indivisi, hinc bifurci, et dichotomiis octies noviesve ad apices usque repetitis ramosi: apices bifurci, incurvi, et, præsertim exsiccati, acuminati: rami omnes fastigiati: dichotomiarum anguli plus minus obtusi, et rotundati.

FRUCTIFICATIO tubercula verruciformia, in ramis superioribus sessilia, ortu sphaerica, nec *Brassicæ Rapæ* seminibus majora, mox figuræ incertæ, frondem nunc ambientia, nunc seriatim decurrentia, coloris recentia dilutè rosei, exsiccata fuscæ, substantia spongiosa, glutinosa, superficies granulata et inæqualis, quandoque sulcata, frondis epidermide non tecta; dissecta, et lenti maximè augenti subjecta constare cernes e fibris parallelis, articulatis, pellucidis, densissimè compactis, angulos cum ramis rectos servantibus, et semina plurima, fusca, subrotunda, limbo pellucido cincta, singula perpressionem granulorum sphericorum minutissimorum congeriem effundentia, includentibus.

COLOR plantæ recentis fuscus, purpurascens tinctus, luci diu objectæ albellus, marcescentis dilutè roseus: colorem exsiccata servat, et diaphana evadit.

SUBSTANTIA cartilaginea, flexilis.

$\beta$  est multo tenuior, apicibusque gaudet elongatis, linearibus, et obtusis, nec brevibus et acuminatis.

$\gamma$  utrâque præcedente minor, longitudine vix bipollicari.

*Fuci rotundi* exemplar hic depictum, Sussexiæ ad littora, ubi majorem quam in borealibus eoive nostris oris statum attingit, lectum, amicissimi D<sup>n</sup> Borrer benevolentia debeo. Planta est quoad magnitudinem summopere variabilis, nec, quò magis ad mitiores accedit plagas, eo necessariè procerior esse videtur, cum varietas  $\gamma$  omnium minima in meridionalibus etiam Angliæ littoribus reperiatur, nec ulla alia stirpis hujus species in mari Mediterraneo aut Adriatico provenire tradatur. *Fucum* Linnæi *fastigiatum* ad hanc *F. rotundi* varietatem esse referendum jampridem, herbarii sui fide, in *Fucorum Britannicorum Synopsi* asserui; sed a *F. lumbricali* non distinxisse satis superque e scriptis suis constat. E contrario nobilissimus Wulfenius *Fuci sui fastigiati* descriptionem iconemque ab hac eâdem *F. rotundi* varietate deprompsisse liquidò videtur, sequentis licet speciei exemplaria eodem nomine insignita in Herbario servaverit. Memorari tamen oportet quod pusillæ hujus stirpis exemplaria nulla fructu donata adhuc viderim, siquæ eâ de causâ incertus annon planta sit reapse distincta, quamvis a *F. rotundi* quotidianâ facie non nisi staturâ minore discrepare sterilis appareat. Reperitur in Britannia australibus oris alia necdum descripta *Fuci* species, quæ inter *F. rotundum* et *plicatum* est ferè intermedia mihi que sub utroque nomine missa, cui proximè hæc varietas accedit. Tantum habet *F. rotundus*, quum sterilis modo occurrit, cum *F. lumbricali* affinitatis, ut Tyronibus *fucum* sæpe faciat, et synonymorum inter hos error sit ferè inextricabilis. Notæ ad utrumque certò dignoscendum tunc maximè valent sequentes: de fructiferis difficultati non datur locus, et quidem ab omnibus hucusque descriptis *fucorum* familiis amborum fructificatio longè recedit.

*F. rotundi* radix solida; dichotomiarum anguli obtusi, plerumq. rotundati; apices acuminati; color in exsiccato fuscus diaphanus.

*F. lumbricalis* radix fibrosa; dichotomiarum anguli acuti; apices obtusi; color in exsiccato nigerrimus opacus.

- |   |    |
|---|----|
| a. <i>F. rotundus</i> , magn. nat.              |    |
| b. var. $\gamma$ .                              |    |
| c. apex fructifer.                              |    |
| d. idem, horizontalitè sectus, magn. auct.      | 3. |
| e. idem, longitudinalitè sectus                 | 3. |
| f. tuberculum longitudinalitè ex adverso sectum | 3. |
| g. tuberculi pars                               | 2. |
| h. semen, seorsim                               | 1. |
| i. granula in semine contenta                   | 1. |
| k. una e fibris seminibus immixtis              | 1. |



*Fucus rotundus*, frond cartilaginous, filiform, dichotomous, fastigate; angles of the dichotomies bluntish; apices forked, acute; capsules lateral, of irregular form, spongy, not covered with the epidermis of the frond.

*Fucus rotundus*. GMELIN, *Hist. Fuc.* p. 110. t. 6. f. 3. (excl. syn. Huds. et Raii.) LINN. *Syst. Nat. Ed. Gmel.* II. p. 1383. WITH. IV. p. 110. *Syn. Fuc.* II. p. 309. *Eng. Bot.* XXV. t. 1738.

*F. radiatus*. Linn. *Trans.* III. p. 202. *Ner. Brit.* p. 89. t. 14.

*F. fastigiatus*. *Ner. Brit.* p. 15. t. 6. (quoad fig. min.)

*F. caprinus*. *Fl. Norv.* I. p. 96. (quoad ic. in Act. Nidros.)

$\beta$ . *tenuior*—with the extreme segments long and linear, the apices bluntish.

*F. rotundus*.  $\beta$ . *Syn. Fuc.* II. p. 310.

$\gamma$ . *fastigiatus*—with frond very thin, scarcely two inches long.

*F. rotundus*.  $\gamma$ . *Syn. Fuc.* II. p. 310.

*F. fastigiatus*. *Herb. Linn. Sp. Pl.* II. p. 1631. ESPER.  *Ic. Fuc.* I. p. 38. t. 16. (excl. syn.) WULFEN, in *Jacq. Coll.* III. p. 152. t. 14. f. 2. WULFEN, *Crypt. Aquat.* n. 30.

$\alpha$  &  $\beta$  are not uncommon on the shores of the British Isles:  $\gamma$  is found on the southern shores of England, also in the Adriatic. *Wulfen*.

*Perennial*. September—February.

**Root** a solid, expanded, disk.

**FRONDS** very numerous from the same base, from 4 to 8 inches high, filiform, cylindrical, varying in size from that of a crow's-quill to that of a raven's, simple at the base, and continuing so for an inch or more, then becoming forked, and proceeding by dichotomies 8 or 9 times repeated to the apices, which are bifurcate, incurved, and acuminate, especially when dry; the branches are all fastigate; the angles of the dichotomies more or less obtuse and rounded.

**FRUCTIFICATION**, wart-like tubercles, sessile upon the upper branches, at first spherical, and not larger than turnip-seed, afterwards taking an irregular form, sometimes extending two or three lines down the frond, and sometimes surrounding it: their color when fresh, pale pink; when dry, brown; and their substance spongy and glutinous; their surface uneven, granulated, frequently furrowed, not covered with the epidermis of the plant; if cut through and highly magnified, they are seen to be composed of parallel jointed colorless fibres, closely matted together, lying at right angles with the branches, and containing numerous brown roundish seeds, surrounded with a pellucid limbus, each of which when pressed, discharges a mass of very minute globular granules.

**COLOR** of the fresh plant brown, strongly tinged with purple; passing, when long exposed to the air, to white; when in decay, to pale pink: it preserves its color after it is dried, and is diaphanous.

**SUBSTANCE**, cartilaginous, flexible.

$\beta$  is much more slender, and the apices, instead of being short and pointed, are long, linear, and blunt.

$\gamma$  is still more small, scarcely rising above two inches.

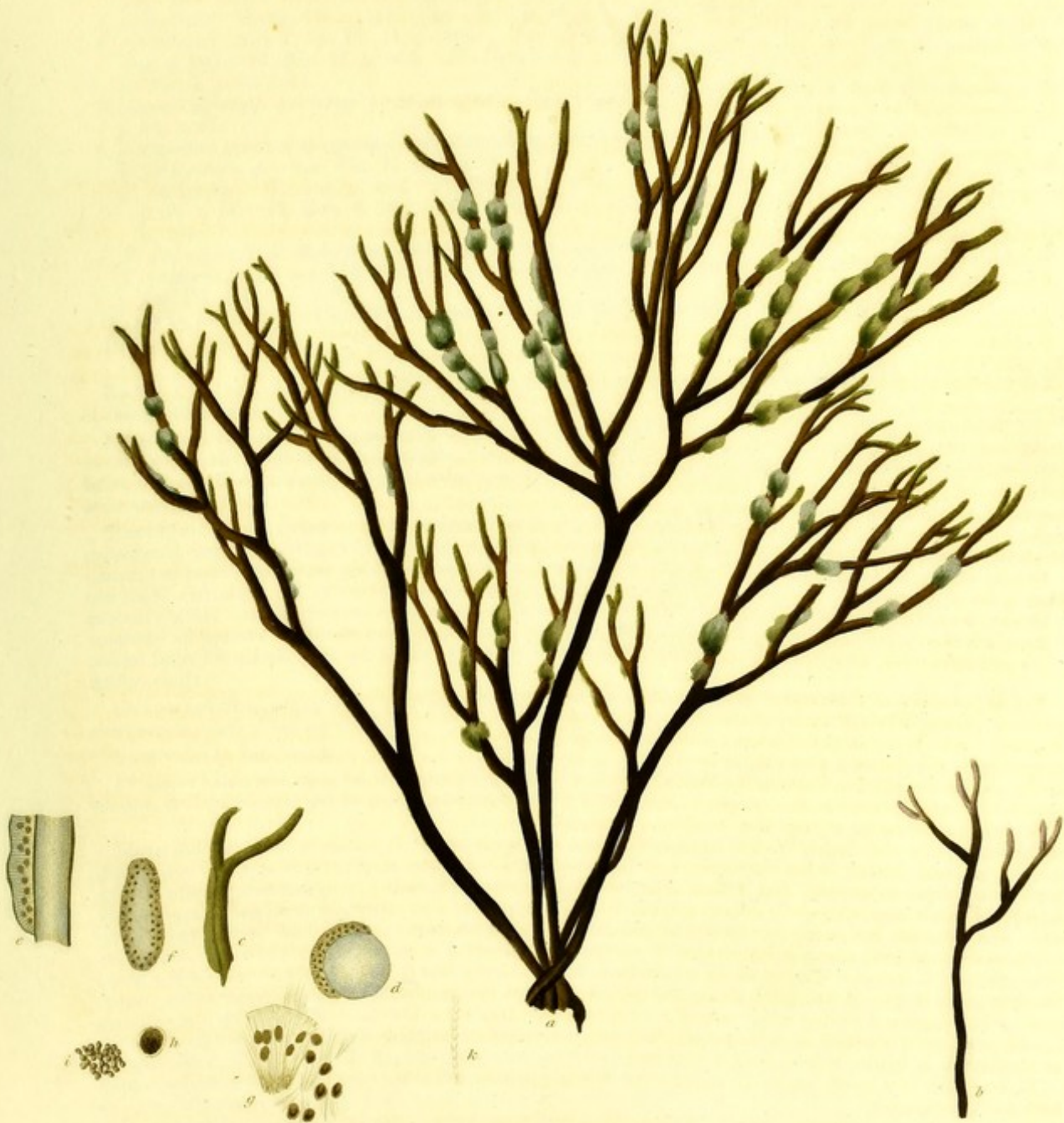
For the specimen of *F. rotundus*, here figured, I am indebted to my friend Mr. Borrer, who gathered it upon the shores of Sussex, where it usually attains a considerably greater size than on the more northern and eastern coasts of England. It is, however, in this respect liable to considerable variation; nor does its stature seem to bear any regular proportion to the climate it grows in, as the variety  $\gamma$  is also a native of our southern shores, and no other appearance of the plant is described as found in the Mediterranean or Adriatic. That this latter is the true *F. fastigiatus* of Linnæus I have already stated in the Synopsis of the British Fuci, upon the authority of his own herbarium, though it is sufficiently plain from his writings that he did not distinguish it from *F. lumbricalis*. Nearly the converse appears to have been the case with Baron Wulfen, whose description and figure of his *F. fastigiatus* were obviously taken from the present plant, though in his Herbarium were preserved, under the same name, specimens of the following one. I ought, however, to mention, that I have never seen any of this small variety in fruit, and consequently am by no means sure that it may not prove a distinct species, though I at present discover no difference except the diminutive size. It approaches very nearly to a species of *Fucus* found on the southern coast of England, and not yet described, but in texture and habit intermediate between *F. rotundus* and *plicatus*, under both which names I have received it. When barren, *F. rotundus* bears so strong an affinity to *F. lumbricalis*, that it is by no means easy for an eye unused to the observation of *Fuci* to distinguish them; and the perplexity of the synonymy between these two plants is extremely great. The characters tending most essentially to distinguish them, when barren, are as follows; when in fruit there can be no difficulty whatever upon the subject, and indeed in this state they both seem to stand quite distinct from any of the families of marine algæ at present described.

*F. rotundus*: root solid; angles of dichotomies blunt, generally rounded; apices acuminate; color, when dry, brown and transparent.

*F. lumbricalis*: root fibrous; angles of dichotomies acute, apices blunt; color, when dry, black and opaque.

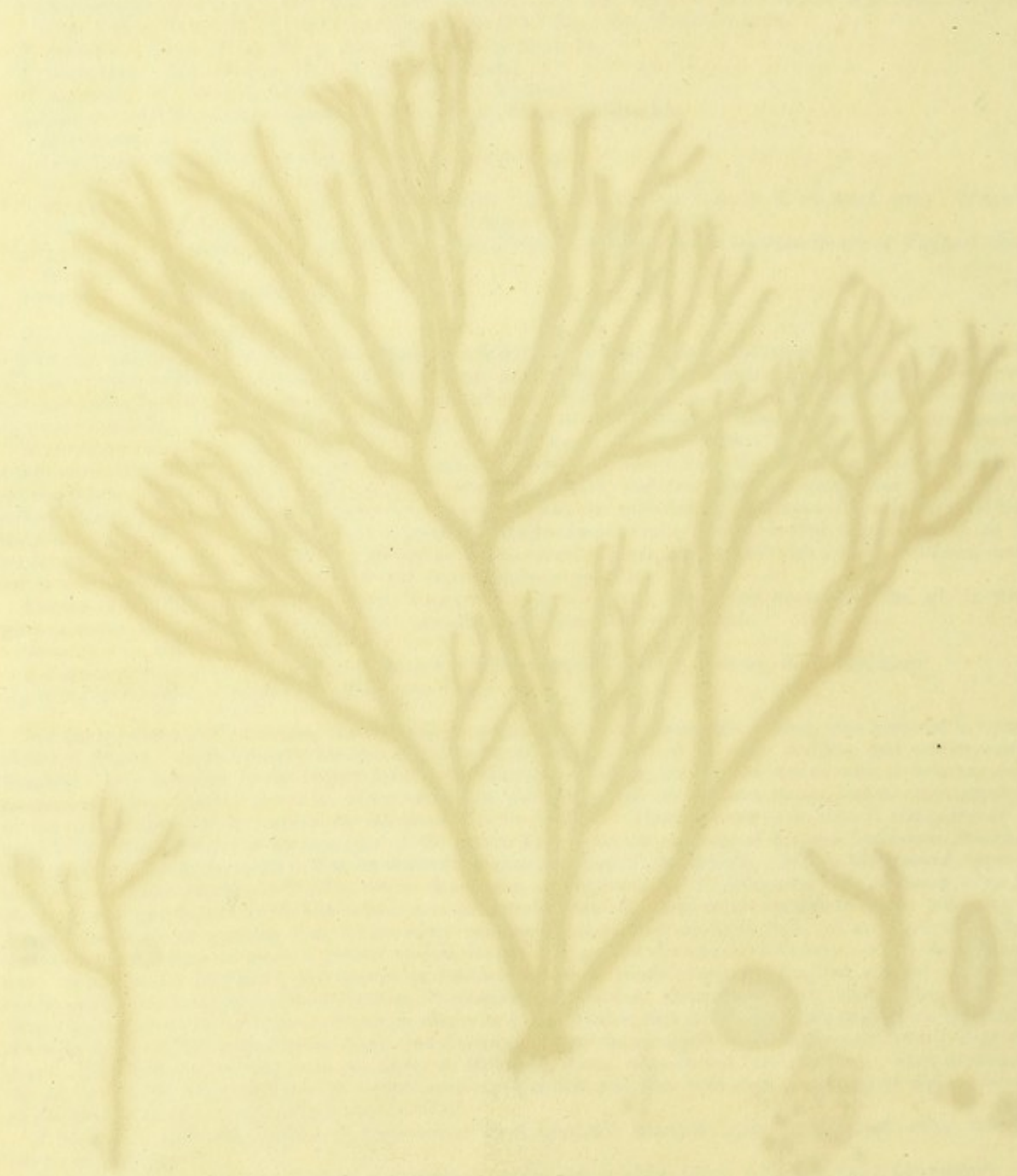
a. <i>F. rotundus</i> , natural size.				
b. var. $\gamma$ . do.				
c. fructified apex, do.				
d. horizontal section of do. magnified	-	-	-	3.
e. longitudinal section of do.	-	-	-	3.
f. tubercle longitudinally cut in the opposite direction	-	-	-	3.
g. part of tubercle	-	-	-	2.
h. seed	-	-	-	1.
i. contents of seed	-	-	-	1.
k. fibre mixed with the seeds	-	-	-	1.





*Fucus rotundus.*







*Fucus* fronde cartilagineâ, filiformi, dichotomâ, fastigiâtâ; dichotomiarum angulis acutis; apicibus bifurcis obtusis, fructu in apicibus elongatis teretibus.

*Fucus lumbricalis*. GMELIN, *Hist. Fuc.* p. 108. t. 6. f. 2. LINN. *Trans.* III. p. 204. *Syn. Fuc.* II. p. 317. *Eng. Bot.* XII. t. 824. *Fl. Fr. Ed. 2da.* II. p. 22.

*F. fastigiatus*. WITH. IV. p. 110. *Ner. Brit.* p. 15. t. 6. (quoad Fig. maj.) VELLE. t. 4.

*F. furcellatus*. LINN. *Sp. Pl.* II. p. 1631. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1383. *Fl. Ang.* p. 589. *Fl. Scot.* II. p. 932. *Fl. Dan.* t. 419. *Fl. Germ.* III. p. 456. *Fl. Norv.* II. p. 78. ESPER,  *Ic. Fuc.* I. p. 86. t. 41.

*F. parvus segmentis prælongis teretibus acutis*. MORIS. *Hist. Ox.* III. p. 648. s. 15. t. 9. f. 4. RAIL. *Syn.* p. 45. n. 24.

$\beta$ . *fastigiatus*; apicibus compressis, ovato-lanceolatis, abbreviatis, acutis, diaphanis.

*F. lumbricalis*.  $\beta$ . *Syn. Fuc.* II. p. 318.

*F. fastigiatus*. *Fl. Ang.* p. 588. *Fl. Scot.* II. p. 930. GMELIN, *Hist. Fuc.* p. 106. t. 6. f. 1. *Ner. Brit.* p. 88. t. 14. *Fl. Dan.* t. 392. *Fl. Germ.* III. p. 455. *Fl. Fr. Ed. 2da.* II. p. 35. LINN. *Trans.* III. p. 199.

*F. sive alga exigua dichotomos, foliorum segmentis longiusculis crassis et subrotundis*. RAIL. *Syn.* p. 45. n. 25.

*F. palmaris tenuis in orbem expansus, in segmenta bifida vel trifida breviora teretia divisus*. MORIS. *Hist. Ox.* III. s. 15. t. 9. f. 9.

HABITAT in Britannia, Hibernia, Hispania, Gallia, et Europæ borealis littoribus, frequens.

Perennis. Nov.—Feb.

RADIX e plurimis constans, fibris, dilutè roseis, cylindraceis, pennæ passerinæ crassitie, densissime intricatis, ramosis, et assurgentibus in catervam.

FRONDIIUM longitudine spithamæarum vel dodrantalium, cylindracearum, filiformium, pennæ corvinæ crassitie, divisarum dichotomiis prope basin incipientibus, hinc octies aut novies repetitis, et ad apices, qui in plantâ sterili sunt bifidi, obtusi, pallidè rubentes, et lenitè incurvi, spaties brevibus in certis pergentibus: rami sub-fastigiati: dichotomiarum anguli per acuti.

FRUCTIFICATIO terminalis: frondis scilicet apices at pollicarem et ultra producuntur longitudinem, et in pericarpia cylindracea, acuminata, reliquâ fronde duplò crassiora, extrinsecùs lævia, et poro nullo pertusa turgescunt: hæc intùs constant e mucò duro solido diaphano, intra quem peripheriam versus jacet series seminum fusciorum, oblongorum, non limbo cinctorum, sed, ut sub lente apparet, in partes tres dehiscentium: receptacula, fructûs tempore jam elapso, in mucum obscurè virentem putrescunt, demùmque decidunt, frondis apices, quasi in unum collecti cultro essent abscissi, truncatos relinquentia. Horum apicum e centro exoriri solent surculi novi reliquâ stirpe principio tenuiores, unde plantæ facies illa annulata, de quâ tantum est ab auctoribus disceptatum, et quâ varietas  $\beta$  in Actis Linneanis descripta nititur, evadit.

COLOR rufo-fuscus, magis in recente, quàm in *F. tuberculato* vel *rotundo*, diaphanus, in exsiccata nigerrimus: in marcescente dilutè virens aut albidus.

SUBSTANTIA cartilaginea.

$\beta^*$  apices habet plerosque circitèr duos pollices longos, ramis duplò crassiores, ovato-lanceolatos, compressos, gelatinosos, et dilutè roseos: cætera cum plantæ facie usitatâ conveniunt.

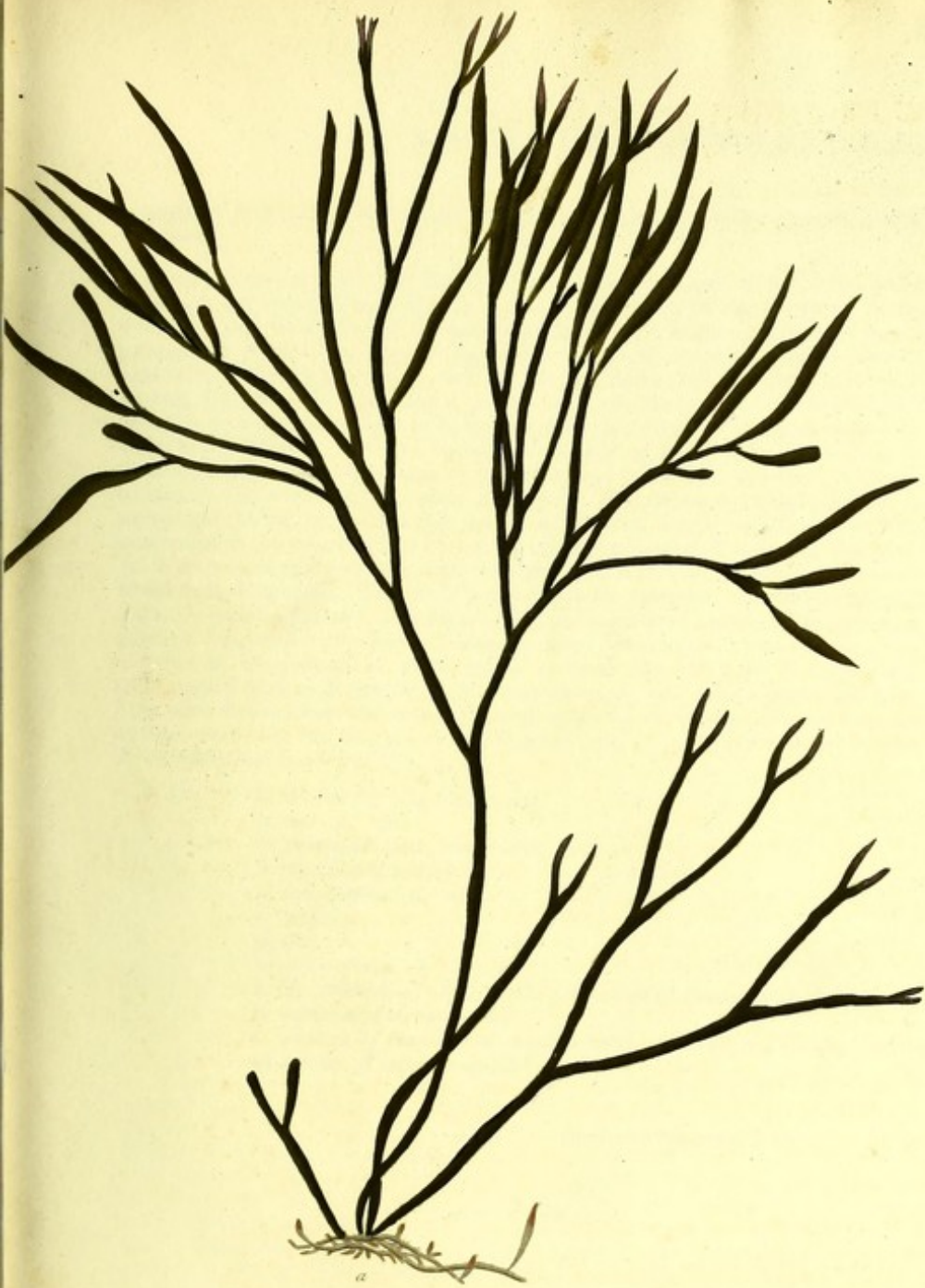
Notas eas, quæ hanc stirpem a *F. rotundo*, quocum uno ne commisceretur magnæ curæ est opus, præcipuè distinguunt, jam sub specie præcedente exposui. Duæ tamen insunt *F. lumbricalis* naturæ proprietates, de quibus hic seorsim animadvertendum puto. Harum prima quidem et princeps est singularis illa apicum facies, quâ nitens varietatem  $\beta$  suprâ descriptam construxi; non quòd ego hanc pro varietatis, nedum pro distinctæ speciei, sicut a botanicis veteribus est habita, fundamento propriè ducam, sed quòd sic disjungendo sperem me Historiæ naturalis cultorum animos hùc efficacius esse allecturum, et ita forsàn phænomeno maxime singulari lucem aliquam offusurum. Ovatos hosce apices e fructu aliquo modo pendere, tùm e substantiâ, tùm e tempore quo apparent, cum pericarpis orientes et cum iisdem marcescentes, frondisque apices truncatos relinquentes, nullus dubito. Dissecti nihilo secius seminum granulorumve vestigia nulla exhibent, sed e mucò pellucido fibris reticulatis maculis circularibus intertexto toti constant. In eâdem quæ pericarpia cylindracea fert fronde nunquam vidi, conjunctosque aliquando occurrere ex errore dictum credo. Licet enim *F. lumbricalis* specimina utrâque apicum figurâ instructa viderim, attentius, tamen inspicies e radicibus distinctis ortas semper deprehendi, et, ut in descriptione dixi, plurimæ semper intertextæ sunt radices, ut idem exemplar non tantum frons unica quantum frondium distinctarum congeries videatur. Altera illa *F. lumbricalis* proprietas in tuberculis constat, quæ vel per ramos sparsa, vel etiam in radice, nunc solitaria, nunc variè conglomerata, Fucorum globuliferorum capsulis non absimilia, quandoque occurrunt. Hæc sese omnibus anni tempestatibus nullo discrimine conspicienda præbent; textura dura et uniformis; indoles prorsus eadem cum iis quæ in *F. subfusco* et plurimis aliis sunt obvia; quas ob causas ab insectorum quorundam marinorum punctis pendere suspicor, et verrucas in præsentem appello. Non tamen illud idcirco me fallit multorum Botanicorum sententias ab hac meâ discrepare, et e septem

\* Errabam cum hos apices dissepimentis iis Confervarum instar a reliquâ fronde disjunga in Fucorum Britannicorum Synopsi dicerem: tali enim septa specie modo existere rami longitudinalitèr secti ostendunt. Texturâ tamen discrepant.









*Fucus lumbricalis.*







pressed, of a gelatinous nature; and very pale pink color; in other respects it agrees with the common appearance of the plant.

Upon the several points that distinguish *F. lumbricalis* from *F. rotundus*, with which alone there is reason to fear its being confounded, I have already dwelt in the account of the preceding Fucus; but there are two circumstances connected with the history of the present plant, which it is more particularly necessary here to notice. The first and principal of these is the singular appearance of the apices upon which I have constructed my variety  $\beta$ , not indeed regarding it properly as a variety, and still less as a distinct species, which it was considered by the elder Botanists, but looking upon the thus separating it as the most effectual method of attracting to it the attention of Naturalists, and probably procuring some light to be thrown upon its nature. That these ovate transparent tips are in reality connected with the fructification, is what I cannot allow myself to doubt, as well from their peculiar form and substance, as from their appearing only at the season of the cylindrical pods, and, like them, withering and falling off, leaving the frond truncated. At the same time, when cut through, they exhibit no appearance of seeds or granules, but are full of a transparent mucus, interwoven with reticulated fibres in circular meshes. I do not believe that they ever occur on the same plant as the cylindrical pods; for, though I have gathered masses of this species, containing either kind of apex, yet in every such case they originated from really distinct roots, of which, as noticed in the description, many are always found matted together. The other peculiarity is the tubercles, which are occasionally met with on different parts of the stem, or even on the root, sometimes single, and sometimes clustered, in appearance not unlike the fructification of some of the globuliferous Fuci. These are equally present at all times of the year, their texture is hard and uniform, and they are evidently of the same nature as those observable on *F. subfuscus* and several other species, so that I rather regard them as depending upon the puncture of some marine insect, and have for the present called them warts. I am nevertheless aware that many Botanists entertain an opinion different from mine upon this subject, and that it is on these warts that Mr. Stackhouse has founded one at least of the seven\* species into which he proposes to divide *F. rotundus* and *lumbricalis*.

a. <i>F. lumbricalis</i> , natural size.	
b. var. $\beta$ . do.	
c. fructified apex, magnified	6.
d. horizontal section of do.	3.
e. longitudinal do. do.	3.
f. seeds	2.
g. do.	1.
h. apex of var. $\beta$ .	6.
i. do. withering; shewing the formation of the annular strictures	6.
k. horizontal section of do.	3.
l. portion of frond, with single lateral, and clustered terminal warts, natural size.	
m. section of wart, magnified	3.

\* See Nereis Britannica, p. 89.



## 7.—FUCUS TUBERCULATUS.

*Fucus tuberculatus*, frond between coriaceous and cartilaginous, filiform, irregularly dichotomous; angles of the dichotomies rounded; apices forked, blunt; receptacles terminal, between oblong and cylindrical, obtuse.

*Fucus tuberculatus*. *Fl. Ang.* p. 588. *Linn. Trans.* III. p. 198. *Syn. Fuc.* II. p. 305. *ESPER. Ic. Fuc.* II. p. 20. t. 121. *Eng. Bot.* XI. t. 726.

*F. bifurcatus*. *WITH.* IV. p. 109. t. 17. f. 1. *Fl. Fr. Ed. 2da.* II. p. 23. (excl. syn. Gmel.)

*F. Kali geniculato similis, non tamen geniculatus*. *RAII.* *Syn.* p. 43. n. 13.

Rocks in Dorsetshire, Devonshire, and Cornwall.—North of Ireland. *Dr. Scott.*—Shores near Brest. *M. Decandolle.*—Coast of Barbary. *Drs. Weber and Mohr.*

*Perennial.* June—October.

**ROOT** a small callous disk, furnished with a few very short, thickish, creeping fibres, each rising at right angles into a

**FROND** cylindrical, nine inches or a foot high, equal in thickness when wet to a goose-quill, when dry to not more than a crow's, always undivided near the base, and not unfrequently extending so far half its length, there becoming forked, and afterwards branching with dichotomies six or seven times repeated, at uncertain, generally short intervals, till it reaches the summit: angles of the forks obtuse, and slightly rounded: length of the branches irregular, but the lowest always shortest, the upper ones sub-fastigate: apices obtuse, the barren ones short and always incurved.

**FRUCTIFICATION** terminal; the ends of the frond at the period of fruit-bearing extending to an inch or more in length, and taking the form of cylindrical receptacles, twice as thick as the rest of the plant, externally made uneven, by the immersed ovate tubercles that they are filled with, in which, especially towards the lower part, lie pyriform, brownish seeds, surrounded with a pellucid limbus, intermixed with fibres, their points in general turned to the pore of the receptacle, between which and them are observable numerous white, pellucid, roundish bodies, many times less than the seeds themselves.

**COLOR** of the plant when fresh, olive, when dry quite black; never recovering its former tint.

**SUBSTANCE** between coriaceous and cartilaginous, tough: in a dry state rigid and brittle.

**OBS.** The specimens of this plant, which I gathered fresh in Cornwall, had a more unpleasant and biting flavour than those of any other *Fucus* which I ever tasted.

The description here given of the fruit of *F. tuberculatus* extends as far as the powers of my compound microscope would enable me to discover, but as this is the identical *Fucus* in which *Drs. Weber and Mohr* say that they found the parts of fructification more distinctly visible than in any other of the tribe of their *Fuci proprii*, I trust that it will not be regarded as an improper or unnecessary digression, if I avail myself of this opportunity of extracting from their excellent treatise, which has already been quoted under the head of *F. Banksii*, the generic character laid down by them. Their analysis of the parts of fructification must be reserved for that portion of this work in which I shall endeavour to throw as much light as lies in my power upon the division of the submersed *Algæ* into new genera. The character is, "*Seeds furnished with an arillus, immersed in various manners in a naturally perforated receptacle.*" Upon this subject I beg leave to remark, that if, as I understand from other parts of their tract, it is their intention to call the common receptacles *spikes of fructification*, and on the other hand the smaller ones *receptacles*, I cannot but think that the word *spikes* is here inaptly applied; in consequence of which I propose to term these latter *receptacles*, and those which are called by them *receptacles, tubercles*. At the same time I should be extremely sorry to be considered as speaking at present with any positiveness upon this subject, or as wishing to hide the doubts I feel whether those parts that have hitherto gone by general consent under the denomination of seeds may not themselves be properly receptacles. In *F. vesiculosus* and some others I have clearly observed that they contained spherical granules. With regard to the extremely minute pellucid bodies discernible in the tubercles of *F. tuberculatus*, and called by *Weber and Mohr* small bladders (*bläschen*) I am utterly at a loss to form a conjecture what purpose they are intended to answer in the œconomy of the plant, and can say nothing more than that they have at present been detected in a very few species. It will require a long time and attentive observation before we arrive at an accurate knowledge of these plants, and before we are able to reform and finally to fix the synonymy, which is at present most imperfect and unsatisfactory. I must be allowed to indulge in one more remark connected with this subject: that of all the genera suggested by *Weber and Mohr*, none appears to include so natural a tribe of plants as the present. *F. tuberculatus* of the *Flora Scotica* is only a synonym to *F. purpurascens*. The unequal height of the branches, the root, the color after it is dried, and the fructification sufficiently distinguish this plant from the two preceding ones with which it is sometimes confounded.

- |  |    |
|--|----|
| a. <i>Fucus tuberculatus</i> , natural size. |    |
| b. receptacle, magnified                     | 6. |
| c. horizontal section of do.                 | 3. |
| d. tubercle                                  | 2. |
| e. seeds                                     | 1. |
| f. pellucid granules                         | 1. |





*Fucus tuberculatus.*







*Fucus*, fronde coriaceo-cartilagineâ, filiformi, subdichotomâ; dichotomiarum angulis rotundatis: apicibus bifurcis obtusis; receptaculis terminalibus oblongo-cylindraceis obtusis.

*Fucus tuberculatus*. *Fl. Ang.* p. 588. *Linn. Trans.* III. p. 198. *Syn. Fuc.* II. p. 305. *ESPER*,  *Ic. Fuc.* II. p. 20. t. 121. *Eng. Bot.* XI. t. 726.

*F. bifurcatus*. *WITH.* IV. p. 109. t. 17. f. 1. *Fl. Fr. ed. 2da.* II. p. 23. (excl. syn. Gmel.)

*F. Kali geniculato similis, non tamen geniculatus*. *RAII.* *Syn.* p. 43. n. 13.

**HABITAT** in Dorsetiâ, Devonîâ, et Cornubiâ rupibus submarinis.—In Hiberniâ Septentrionali. *D. Scott.*—

Ad littora prope Brest. *Decandolle.*—In Barbariâ oris. *Weber et Mohr.*

**Perennis.**—A Julio ad Octobrem fert fructum.

**RADIX** callus exiguus, fibris aliquot instructus crassiusculis, perquàm brevibus, repentibus, horizontalibus, singulis apice ad angulum rectum assurgentibus in

**FRONDEM** teretem, dodrantalem, vel pedalem, pennæ anserinæ madefactam, exsiccata corvinæ crassitiem æquantem, semper juxta basin, nec rarò per dimidium longitudinis indivisam, inde bifurcam, et dichotomiis intervallis incertis plerumque tamen brevibus, ad apices usque repetitis sexcies vel septies divisa; dichotomiarum anguli obtusi, rotundati; ramorum longitudo incerta, inferiores tamen semper breviores, superiores subfastigiati; apices obtusi, steriles lenitèr incurvati, abbreviati.

**FRUCTIFICATIO** terminalis; apices fructûs tempore ad pollicarem et ultra longitudinem protenduntur, receptaculorumque formam cylindraceorum, reliquâ fronde duplo fere crassiorum assumunt: tubercula in his ovata sunt immersa, in quibus præsertim basin versus jacent semina pyriformia, fibris immixta, limbo pellucido cincta, apicibus plerumque tuberculi porum spectantibus; spatium inter porum et semina occupant corpuscula quædam alba, pellucida, subglobosa, his multoties minora.

**COLOR** recentis olivaceus, exsiccata nigerrimus nunquam in pristinum revocandus.

**SUBSTANTIA** e coriaceâ cartilaginea, tenax, exsiccata rigida, fragilis.

**Obs.** Exemplaria hujus Fuci, quæ in Cornubiâ oris recentia legi, ingratiùs acriùsque ullis aliis a me unquam degustatis algis sapuerunt.

*F. tuberculati* fructûs, quantum microscopii compositi ope detegere mihi licuit, descriptionem hîc dedi, sed cùm hæc sit ipsa species, in quâ viri acutissimi, Weberus Mohriusque, organa fructificationi inservientia præ cæteris, quas *Fucus* κατ' ἐξοχήν appellant, distincta viderint, non supervacaneum fore spero si ex eximio tractatu jamjam sub *F. Banksii* laudato, characterem huic generi ab ipsis inditum hujus loci repetam, fructûs quam tradiderunt analysi ad eam operis hujus partem relictâ, ubi de algis marinis in plura genera dispertiendis disserere conabor. Est igitur generis character, "*Semina arillata, receptaculo poro naturalitèr pertuso variè immersa.*" De quibus observandum puto, ut si, quemadmodum per alias tractatûs partes intelligo, receptacula communia *fructificationis spicarum*, contra ea minora *receptaculorum* nomine insignire pergant, mihi quidem videtur terminum *spicas* hîc vix satis aptè adhiberi, idèdque eorum *spicas receptacula, receptacula tubercula* nominavi. Nec tamen ego is sum qui aliquid de his rebus adhuc extripode asseram, vel dissimulare vellem quàm in dubio est animus, annon ea quæ semina ab omnibus hactenùs appellentur sint ipsa reverà receptacula, cùm in *F. vesiculoso* et quibusdam aliis grana aliquot sphaerica in illis inclusa dilucidè conspiciantur. Cuinam autem usui inserviant minora ea in *F. tuberculati* receptaculo observanda corpuscula, quæ vesiculas (*bläschen*) nuncupant Weberus Mohriusque, nihil sanè coningere possum, nec est aliud quod nunc dicam, nisi quòd in paucis tantummodo speciebus hactenùs sint reperta. Longo tempore maximâque curâ erit opus, priusquam ad harum stirpium fructificationis cognitionem accuratam perveniamus, et a *terminologiâ*, vitiosâ in præsens imperfectâque, talis erit cognitio, ut penitùs reformetur firmèque stabiliatur, expectanda. Liceat mihi unum modò adjicere, scilicet ex omnibus quæ Weberus Mohriusque proposuerunt generibus hoc plurimum mihi quantum adhuc vidi arridere, et stirpium familiam inter se naturâ maxime connexarum includere. Planta sub *F. tuberculati* nomine in Florâ Scoticâ descripta ad *F. purpurascentem* pertinet. Ramorum altitudo inæqualis, radix, exsiccata color, necnon fructificatio hanc speciem a duabus præcedentibus, quibuscum interdum commiscetur, satis superque distinguunt.

- |  |   |   |   |    |
|--|---|---|---|----|
| a. <i>F. tuberculatus</i> , nat. magn. |   |   |   |    |
| b. <i>receptaculum</i> , magn. auct.   | - | - | - | 6. |
| c. <i>idem</i> , horizontalitèr sectum | - | - | - | 3. |
| d. <i>tuberculum</i>                   | - | - | - | 2. |
| e. <i>semina</i>                       | - | - | - | 1. |
| f. <i>granula pellucida</i>            | - | - | - | 1. |



*Fucus floccosus*, frond compressed; branches alternate distichous; ramuli setaceous, generally simple, placed in alternate clusters; capsules lineari-lanceolate, paniced.

*Fucus floccosus*. ESPER, *l.c. Fuc. II.* p. 42. t. 100.

At Port Trinidad, North-west coast of America. Mr. Menzies.

ROOT, a small expanded disk.

FRONDS, many from the same root, nine or twelve inches long, flexuose, rising with a stem cylindrical at the base, and as large as a blackbird's quill, but soon becoming compressed, and thence gradually tapering to the apices, so that at the summit it is scarcely thicker than thread, either simple, or once or twice divided without regularity near the root, beset throughout its whole length, at short distances, with alternate, distichous, flexuose, long, sub-fastigate branches, which are again in the same manner furnished with smaller ones: along the stem and all the branches grow setaceous ramuli, generally simple, not above two or three lines long, collected into distichous, alternate, paniced clusters, which appear as if about to lengthen into new branches.

FRUCTIFICATION, situated near the base of the ramuli, composed of five or six lineari-lanceolate, paniced, incurved capsules.

COLOR of the plant when wetted brown, intensely black when dry.

SUBSTANCE, in the stem and branches inclining to ligneous, in the ramuli between membranous and coriaceous; every where pliant and flexible, yet tough.

This fucus when put into water expands considerably, but recovers its original form so reluctantly and imperfectly after it has been pressed and dried, that no drawing can give an adequate idea of its elegant and beautiful appearance; and the ramuli, especially those in a fructified state, look, in spite of the greatest care, a mass of confusion. That the parts which I have supposed to contain the fructification do so in reality, is a point, that admits, in my opinion, of no doubt, as well from their peculiar form and appearance, as from the analogy they bear to the capsules of *F. sub-fuscus*, with which species the present seems to have a closer affinity than with any other *Fucus* yet described: at the same time, I must freely own that I have found in them no seeds. In the ramuli, under the highest powers of the microscope, some faint traces of septa are discernible. Professor Esper, who has figured this plant, as well as many others, from small specimens that I sent him without any expectation of seeing them published, has erroneously assigned Nootka Sound to it as its habitat, and observed that it was brought home by Cook; in which also he is mistaken; as, I believe, that no specimens of it exist in Britain, except those gathered in America by my friend Mr. Menzies, to whose kindness I am indebted for that here figured.

- |   |   |   |    |
|---|---|---|----|
| a. <i>Fucus floccosus</i> , natural size. | - | - | -  |
| b. barren ramulus, magnified              | - | - | 5. |
| c. fruit-bearing, ditto                   | - | - | 5. |
| d. portion of ditto                       | - | - | 3. |
| e. smaller piece of ditto                 | - | - | 2. |





*Fucus floccosus.*



The first part of the history of the world is the history of the creation of the world, and the history of the first man, Adam. The second part is the history of the world from the time of Adam to the time of the birth of Jesus Christ. The third part is the history of the world from the time of the birth of Jesus Christ to the present time. The fourth part is the history of the world from the present time to the end of the world.





*Fucus*, caule compresso; ramis alternis, distichis; ramulis setaceis, simpliciusculis, alternatim fasciculatis; capsulis lineari-lanceolatis paniculatis.

*Fucus floccosus*. ESPER,  *Ic. Fuc.* II. p. 42. t. 100.

HABITAT apud Port Trinidad, in Americæ borealis, quæ Occidentem spectant, littoribus. D. Menzies.

RADIX callus parvus, explanatus.

FRONDES plurimæ, dodrantes, vel pedales, flexuosè erectæ, caule assurgentes basi terete, *pennæ merulina* crassitie, mox compresso, et inde ad apices usque sensim angustato, ut cacumen vix filum æquet, simplice vel semel iterumque infernè vagè diviso, ramis remotiusculis, alternis, distichis, elongatis, flexuosis, subfastigiatis per totam longitudinem obsito, et his aliis minoribus eodem modo instructis; ramulis per caulem ramosque satis frequentibus, setaceis, vix duas tresve lineas longis, simpliciusculis, in fasciculos distichos, alternos, sese mox, ut videtur, in novos ramos porrecturos, paniculatim coactis.

FRUCTIFICATIO ramulorum prope basin orta, e capsulis quinque vel sex lineari-lanceolatis, paniculatis, in curvis constat.

COLOR plantæ *madefactæ* fuscus, *exsiccatæ* nigerrimus.

SUBSTANTIA in caule et ramis sub-lignea, in ramulis membranaceo-coriacea; ubique lenta, flexilis, tenax.

Molem suam licet magnoperè augeant hujus Fuci exemplaria aquâ dulci immersa, dolendum tamen est quòd in formam nativam tam agrè tamque imperfectè redeant, ut nulla, nisi ad stirpem vivam delineata, icon habitum perpulchrum elegantemque adæquè exprimat, nec summâ prohiberi potest curâ, ne ramuli presertim fructiferi, meræ et inextricabilis confusionis speciem præbeant. Partes eas, quas suprâ in descriptione pro fructificatione assumpsi, quamvis semina in illis nulla detexerim, esse nihilominus reverâ capsulas, cùm ob formam speciemque sibi propriam, tum ob magnam quam habent cum *F. subfusci*, cui cæteroquin affinis hæc species, fructu analogiam, dubitare nequeo. Septorum in ramulis lente acerrimâ auctis, obsoleta quædam vestigia detexi. *F. floccosum* compluresque alios ad specimina plus æquo manca, quæ ipse nullâ ut publici juris fierent spe ductus misi, depingendos curavit cl. Esperus, simulque pro loco hujus speciei natali *Nootka Sound* tribuit: haud rectè quidem; nec minus erravit cùm in Europam a Cook deportatum diceret, persuasum enim habeo nulla dari in Britannia exemplaria, exceptis iis, quæ ex Americâ boreali redux amicissimus Menzies, cujus benevolentia hæc mea accepta refero, secum attulit.

a. *Fucus floccosus*, nativâ magnitudine.

b. *ramuli steriles*, magn. auct. - - - 5.

c. *ramuli fructiferi* - - - 5.

d. *eorundem pars* - - - 3.

e. *pars minor* - - - 2.



*Fucus purpurascens*, frond filiform, irregularly branched; ramuli setaceous, scattered, bearing spherical tubercles immersed in their substance.

*Fucus purpurascens*. *Fl. Ang.* p. 589. *With.* IV. p. 113. *Eng. Bot.* XVIII t. 1243. *VELLEY*, t. 2. *Linn. Trans.* III. p. 225. *Syn. Fuc.* II. p. 357. *Fl. Fr. ed. 2da.* II. p. 36.

*F. tuberculatus*. *Fl. Scot.* II. p. 926.

*F. corallinus*. *Fl. Dan.* t. 709.

*F. capillaceus*. *ESPER, Ic. Fuc.* I. p. 75. t. 35. (excl. syn.)

*F. acicularis*. *ESPER, Ic. Fuc.* I. p. 132. t. 91.

*F. purpureus*. *LINN. Syst. Nat. Ed. Gmel.* II. p. 1384. *GMELIN, Hist. Fuc.* p. 139?

*F. flexilis*. *WULFEN, Crypt. Aquat.* n. 42?

*Fucus teres albus tenuissime divisus*. *RAII Syn.* p. 50. n. 51. *MORIS. Hist. Ox.* III. p. 648.

$\beta$  *cirrosus*, apices of the ramuli capillary, twisted spirally like tendrils.

Shores of Britain, Ireland, France, and Spain.— $\beta$  in Dorsetshire, Mr. Pigott.—Devonshire, Mrs. Griffiths.

*Perennial?* September—December.

**ROOT**, a small, solid, fleshy disk, throwing out several incurved fibres, as thick as a sparrow's quill, and above a nail long, strongly clasping the stones on which it grows.

**FROND**, filiform, cylindrical, from nine inches to a foot, or sometimes two feet, in length, preserving throughout a stem about the thickness of a crow's quill, generally simple, but sometimes occasionally divided, beset from base to summit with branches similar to it, except in size, of very uncertain length, disposed irregularly at short distances, between erect and patent, again furnished in the same manner with another series still smaller, and these either naked or bearing setaceous ramuli from three to six lines, or more, long, most frequently simple, but sometimes forked, the angles always very acute. All the branches are slightly attenuated at their base, and remarkably acuminate at the apices.

**FRUCTIFICATION**, globular tubercles, at first pale pink, afterwards crimson, nearly as large as mustard seeds, immersed in the substance of the smaller branches, sometimes solitary, at other times two, three, or four in the same branch at short distances, so as to give a sort of jointed appearance; occasionally confluent: at maturity they become gibbous, and burst laterally, discharging a great quantity of very minute, dark-red seeds of irregular form.

**COLOR**, light brown, always tinged with purple, very diaphanous, paler in the smaller branches, and not unfrequently verging to green, to which it turns in decay.

**SUBSTANCE**, between gelatinous and cartilaginous, fleshy and tender.

The fructification of this plant is so remarkable, that it will always be sufficient immediately to distinguish it from any other species with which I am at present acquainted, but at the same time, there is scarcely any *Fucus* less understood in its barren state, whence arises the multiplicity and confusion of the synonyms above quoted. With regard to *F. purpureus*, Gmel. I have already stated in the Synopsis of the British Fuci, that I consider it as doubtful how far it is intended for our plant, and, adhering to that opinion, I should not have ventured to introduce it, had not my friend Professor Mertens, in whose judgment I have the highest confidence, entertained opposite sentiments. The size, the black spots, and the color it gives out are all different from our plant.—The var.  $\beta$ , which is a very remarkable appearance, is found climbing upon other Fuci, and, according to the remarks of Mrs. Griffiths, seldom bears fruit. I received it many years ago from Mr. Pigott.—*Fucus purpurascens* is often found with swellings on the stem and branches, like those of *F. lumbricalis*, which, though unconnected with the fruit, require, nevertheless, to be mentioned, lest they should occasion error. They are about the size of the seeds of *Vicia sativa*, of an irregularly spherical form, and a pale whitish color, not covered with the epidermis of the frond, but in appearance resembling the warts of the human hand. This species is particularly liable to be infested with *Conferva confervicola* of Dillwyn.

a. <i>Fucus purpurascens</i> , natural size.					
b. <i>ramulus</i> , magnified	-	-	-	-	5.
c. <i>small piece</i> , with tubercle	-	-	-	-	3.
d. <i>seeds</i>	-	-	-	-	1.
e. <i>piece of var. <math>\beta</math></i>	-	-	-	-	5.
f. <i>piece of frond</i> , with wart, natural size.					
g. <i>wart</i> , magnified	-	-	-	-	3.
h. <i>ditto</i> , cut through	-	-	-	-	1.





*Fucus purpurascens.*







*Fucus*, fronde filiformi, ramosissimâ, ramulis setaceis sparsis; tuberculis sphaericis in ramulis innatis.

*Fucus purpurascens*. *Fl. Ang.* p. 589. *With.* IV. p. 113. *Eng. Bot.* XVIII. t. 1243. *VELLEY.* t. 2.

*Linn. Trans.* III. p. 225. *Syn. Fuc.* II. p. 357. *Fl. Fr. Ed. 2da.* II. p. 36.

*F. tuberculatus*. *Fl. Scot.* II. p. 926.

*F. corallinus*. *Fl. Dan.* t. 709.

*F. capillaceus*. *ESPER, Ic. Fuc.* I. p. 75. t. 35. (excl. *Syn.*)

*F. acicularis*. *ESPER, Ic. Fuc.* I. p. 132. t. 91.

*F. purpureus*. *LINN. Syst. Nat. Ed. Gmel.* II. p. 1384. *GMELIN, Hist. Fuc.* p. 139.?

*F. flexilis*. *WULFEN, Crypt. Aquat.* n. 42.?

*Fucus teres, albus, tenuissimè divisus*, *RAII Syn.* p. 50. n. 51. *MORIS. Hist. Or.* III. p. 648.

$\beta$ . *cirrosus*; ramulorum apicibus capillaceis, spiraltè cirrhorum instar tortis.

*HABITAT* in Britannia, Hibernia, Gallia, et Hispania oris.— $\beta$  in Dorsetia. *D. Pigott.*—in Devonia. *D<sup>no</sup>.*

*Griffiths.*

*Perennis?* Sept.—Decemb.

*RADIX* discus exiguus, carnosus, fibras, emittens plurimas, incurvas, pennae passerinae crassitie, plus ungue longas, saxis, quibus innascitur, arcuè adherentes.

*FRONS* filiformis, cylindracea, longitudine dodrantalis vel pedalis, interdum etiam bipedalis, caule instructa pennae corvinae crassitie, ut plurimum simplice, quandoque hic illic diviso, a basi usque ad apices obsito ramis sibi, staturâ minore demptâ, similibus, longitudinis perquam varia, spatiis brevibus haud æquis dispositis, erecto-patentibus, aliorum minorum serie eodem modo instructis, qui vel sunt nudi, vel ramulis tecti setaceis, tres sexve lineas longis, plerumque simplicibus, at nonnunquam bifurcis, furcarum angulis semper acutis. Rami omnes lenitè ad basin attenuantur, apicibus insignitè acuminatis.

*FRUCTIFICATIO* tubercula sphaerica, juniora dilutè rosea adulta punicea, *Sinapis nigra* seminum ferè magnitudine, in ramis minoribus innata, nunc solitaria, nunc duo, tria, vel quatuor in eodem ramulo, aliquando confluentia, sed sæpius intervallis brevibus disjuncta, ut ramuli articulati videantur; matura gibbosa fiunt, et lateralitè dissilientia semina plurima intensè rubra, minutissima, figuræ haud certæ emittunt.

*COLOR* dilutè fuscus, purpurascens semper immixtus, diaphanus, in ramis minoribus pallidior, nec rarò virescente, in quem marcescens transit, tinctus.

*SUBSTANTIA* gelatinoso-cartilaginea, carnosâ, tenera.

Fructificatione quamvis singulari donetur hic *Fucus* qui ab omnibus hucusque descriptis primo aspectu distinguat, vix tamen est ulla in Algarum catalogo species, quæ tot tantisque erroribus ansam sterilis præbeat, unde multiplex illa inter auctores synonymorum supra citatorum confusio. *Fucum* Gmelini *purpureum* huc agrè esse referendum jampridem in *Fucorum Britannicorum Synopsi* sententiam meam retuli, idemque cum nunc sentirem, hic adducere non sim ausus, nisi e partibus contrariis Mertensius, acerrimus in ejusmodi rebus judex, se stare profiteretur. Magnitudine, maculis nigris, et eâ, quam largiter fundit, tincturâ differt. Varietas mea  $\beta$ , quam a *D<sup>no</sup>. Pigott* pluribus abhinc annis accepi, formâ suâ, crescendique modo quàm maximè notabilis, *Fucus* majores scandit, et ex animadversionibus *D<sup>no</sup>. Griffiths* fructum rarò profert. In *F. purpurascens* caule ramisque non rarò hic illic occurrunt tumores ejusdem, ut videtur, cum iis in *F. lumbricali* observatis naturæ, qui e fructificatione nequaquam pendentes, nec ullo modo cum illâ nexi, ob summam nihilominus quam habent cum specierum quarundam capsulis tyronibus erroris causæ existunt. Figura his abnormitèr sphaerica, magnitudo *Vicia sativæ* seminum, color albellus, pallescens, frondis epidermide non teguntur, nec manûs humanæ verrucis facie externâ sunt absimiles. Hunc *Fucum* præaliis colere amat *Conferva Dillwynii confervicoli*.

a. <i>Fucus purpurascens</i> , nativâ magnitudine.	
b. ramulus, magn. auct.	5.
c. pars ejus parva cum tuberculo	3.
d. semina	1.
e. var. $\beta$ pars	5.
f. frondis pars cum verrucâ, nat. magn.	
g. verruca, magn. auct.	3.
h. eadem dissecta	1.



*Fucus subfuscus*, frond filiform, much and irregularly branched; ramuli subulate, pinnated, sub-alternate; capsules axillary, panicled, both lanceolate and spherical.

*Fucus subfuscus*. WOODW. in *Linn. Trans.* I. p. 131. t. 12. *Linn. Trans.* III. p. 212. WITH. IV. p. 116.

*Syn. Fuc.* II. p. 350. *Eng. Bot.* XVII. t. 1164. *ESPER, Ic. Fuc.* II. p. 11. t. 117.

*F. confervoides*. *Fl. Ang.* p. 591.

*F. variabilis*. *Linn. Trans.* III. p. 220.

*F. setaceus*. WULFEN, *Crypt. Aquat.* n. 40.?

On the shores of the British Isles, most common about Yarmouth.—Bahus, in Norway. Mr. Wahtenberg.

Perennial February—May.

ROOT, a solid, expanded, thin, pale-brown\* disk.

FRONDS, numerous from the same base, cylindrical, filiform, six or eight inches high, preserving throughout a main stem, for the most part undivided, about the thickness of a blackbird's quill, beset from base to summit at short distances with branches sometimes alternate, but more commonly scattered without order, of uncertain length, the lowest generally longest, and four or five inches long, the highest shortest, so that the whole plant has a subfastigate appearance; these branches are again clothed in the same manner with smaller ones, and these with a third or fourth series, each more small than the preceding one, all of them constantly patent, giving the plant, especially towards the summits, a pinnated appearance: the ultimate ramuli are seldom more than two or three lines long, not at all attenuated at the base, subulate, and either simple or pinnated at their apices with a few very minute distichous setae.

FRUCTIFICATION of two kinds on different individuals; in either case generally axillary, but sometimes lateral, and principally growing on the smaller branches, composed either of globular or lanceolate capsules, the former containing a few pyriform, the latter about six spherical dark-brown seeds, disposed in two rows; the capsules are panicled, and supported upon a most minute peduncle. To the naked eye, the fruit resembles small specks of a pale-pink jelly.

COLOR, reddish-brown, lighter at the extremities, turning black when dried, or exposed long to the air.

SUBSTANCE, cartilaginous, rather stiff.

The appearance of this *Fucus* at different seasons of the year are so singularly dissimilar, that it well deserves the name of *variabilis* given to it in the Linnæan Transactions, nor is it by any means surprizing that it should have been in the same work twice described as two distinct species. In winter, and the early months of spring, the stem and leading branches alone remain, beset with fragments of the others, the substance is rigid the color dark-brown, and the apices almost constantly broken off, so that it looks battered, rough, and spinous: in July, August, and September, the color becomes more pale, inclining to red, and sub-diaphanous, the texture is soft, and the whole plant covered with a profusion of young vigorous shoots, terminating in acuminate apices, and not unfrequently throwing out at their extremities tufts of the finest fibres particularly conspicuous in dried specimens. In either case it preserves the pinnated habit for which it is remarkable, and which, as well as its root, color, and smaller size, will distinguish it, even when barren, from *F. purpurascens*. It is liable, like that species, to warts in different parts, unconnected with the fruit, and most probably caused by some insect, but what is singular, is that, in either plant these always preserve their appropriate form, appearance, and color. Some specimens that I have received from the Isle of Wight, have been curiously tipped with small globules, at first sight not unlike the male fruit of a *Mnium*. The ramuli occasionally exhibit faint traces of septa, but this is most uncertain. It was not till very lately that I received through the kindness of Mrs. Griffiths, and since found myself on Yarmouth beach specimens bearing globular capsules, and pyriform seeds, but resembling in every other respect the common appearance of the plant. Something similar had been previously observed in *F. dentatus*, but this was then considered an unique instance. So far, however, from its being so, I am of opinion that it extends to a considerable tribe of Fuci, and may hereafter serve to throw new light upon their fructification.

a. *F. subfuscus*, gathered in summer, natural size.

b. ——— in fruit

c. part of frond, with lanceolate capsules, magnified 4.

d. capsules - - - - - 2.

e. seed - - - - - 1.

f. part of frond, with globular capsules - - - 4.

g. capsules - - - - - 3.

h. single capsule - - - - - 2.

i. seeds - - - - - 1.

k. variety with single sessile capsules - - - 3.

l. seeds - - - - - 1.

m. part of frond with wart - - - - - 4.

\* Dr. Goebenough and Mr. Woodward have described it as *fibrous*, for which I am unable to account, as I never saw any tendency to throw out fibres.





*Fucus subfuscus.*







*Fucus* fronde filiformi, ramosissimâ; ramulis sub-alternis, subulatis, pinnatis; capsulis axillaribus, paniculatis, lanceolatis sphaericisque.

*Fucus subfuscus*. WOODW. in Linn. Trans. I. p. 131. t. 12. Linn. Trans. III. p. 212. WITH. IV. p. 16.

Syn. *Fuc.* II. p. 350. Eng. Bot. XVII. t. 1164. ESPEr, *l.c.* *Fuc.* II. p. 11. t. 117.

*F. confervoides*. Fl. Ang. p. 591.

*F. variabilis*. Linn. Trans. III. p. 220.

*F. setaceus*. WULFEN, *Crypt. Aquat.* n. 40.

HABITAT in Britanniae et Hiberniae oris: circa Yarmouth, copiosissimè.—Bahusiae. D. Wahtenberg.

Perennis. a Feb.—Majum.

RADIX\* solida, e disco constans expanso, tenui, dilutè fusco.

FRONDES ex eadem basi plurimæ, cylindraceæ, filiformes, spithameæ vel dodrantes, caule instructæ Merulæ pennæ crassitie, plerumque indiviso, utrinque per totam longitudinem obsesso ramis, vel alternis, vel, ut sæpiùs accidit absque ordine sparsis, longitudinis incertæ, sed infimis ut plurimum longioribus, et 4—5 pollicaribus, summis brevibus, ita ut tota stirps subfastigiata evadat: rami primarii aliis minoribus hisque iterum tertiâ vel quarta serie utrâque præcedente minore, et omnibus nunquam non patentibus similiter instructi, unde plantæ præsertim apices versus facies pinnata: ramuli longitudine duas tresve lineas rarò superant, nequaquam basi attenuati, subulati, et vel simplices, vel prope extremitates setis aliquot minutissimis distichis pinnati.

FRUCTIFICATIO duplex in diversis individuis; utraque paniculata, et plerumque axillaris, quandoque tamen lateralis, ramis, præsertim minoribus, innascens, e capsulis aliquot constans sphaericis aut lanceolatis, pedunculo perquam brevi communi fultis, his semina pauca pyriformia, illis circiter 6 globosa, duplici serie disposita includentibus. Planta fructifera gelatinæ dilutè roseæ maculis hic illic aspersa videtur.

COLOR rufo-fuscus, juxta apices pallidior, exsiccata, vel diu aeri objectæ, nigricans.

SUBSTANTIA cartilaginea, rigidiuscula.

Facies tam diversas diversis anni tempestatibus hic *Fucus* induit, ut *F. variabilis* nomen in actis Linnæanis impositum optimo jure mereatur, nec mirum si ab auctoribus quibusdam bis in eodem opere pro distinctis speciebus describatur. Hyeme, et ineunte vere caulis ramique primarii aliorum frustulis obsiti tantummodò supersunt, substantia rigida, color intensè subfuscus, apicesque prope omnes abrupti, unde collisus, rudis, spinosus evadit. Per Julium, Augustum, Septembrem tinctus pallidior, subdiaphanus, magis rufescens, substantia mollis, et tota stirps surculis vegetis, novellis, acuminatis, non rarò terminatis fibrillarum fasciculis, maximè in siccâ conspicuis, germinat. Habitum pinnatum sibi proprium, per quem æquè ac per radicem, colorem, staturamque minorem a *F. purpurascens* vel sterilis dignoscitur, in alterutro statu servat. Illius instar speciei obnoxius est verrucis hic illic sparsis, nihil cum fructu commune habentibus, sed ab insectorum quorundam marinorum punctis verisimilitèr pendentibus quæ nihilo minus, quod mireris, figuram, speciem coloremque certum in utrâque stirpe conservant. Exemplaria quædam ex Insulâ Vectis accepta globulis exiguis, Mnii cujusdem flores masculos primâ facie quodammodò referentibus, sunt terminati. Ramuli septis obsoletis, quod tamen incertum, aliquando distinguuntur. Specimina supra descripta, quorum, capsulæ sphaericæ, semina pyriformia, cæteroquin ab usitatâ plantæ specie nequaquam abludentia, non nisi nuperimè ornatissimæ feminae, D<sup>næ</sup> Griffiths, accepta retuli, deinde in Yermuthæ littoribus ipse legi. Simile quiddam in *F. dentato* jamdudam est observatum, et pro singulari inter Fucos phænomeno habitum. Magnopere tamen me mea fallit opinio nisi per magnam Fucorum diffundatur familiam, et forsan fructificationi novam inexpectatamque lucem mox offundet.

- |   |      |
|---|------|
| a. <i>F. subfuscus</i> , æstate lectus, magn. nat.            |      |
| b. <i>idem</i> , cum fructu.                                  |      |
| c. <i>pars frondis cum capsulis lanceolatis</i> , magn. auct. | - 4. |
| d. <i>capsula</i> - - - - -                                   | - 2. |
| e. <i>semen</i> - - - - -                                     | - 1. |
| f. <i>pars frondis cum capsulis sphaericis</i> - - -          | - 4. |
| g. <i>capsula</i> - - - - -                                   | - 3. |
| h. <i>capsula</i> - - - - -                                   | - 2. |
| i. <i>semina</i> - - - - -                                    | - 1. |
| k. <i>varietas cum capsulis solitariis sessilibus</i> - -     | - 3. |
| l. <i>semina</i> - - - - -                                    | - 1. |
| m. <i>pars frondis cum verrucâ</i> - - - - -                  | - 4. |

\* Radicem fibrosam dixerunt D. Goodenough & Woodward, sed quâ de causâ nescio, cum adfibras emittendas proclivem nunquam viderim.



*Fucus pinastroides*, frond filiform, much and irregularly branched; branches rolled in at the apices; ramuli simple, subulate, tiled on every side, the upper ones growing in pairs, on one side only; capsules pedunculated, both lanceolate and spherical.

*Fucus pinastroides*. GMELIN, *Hist. Fuc.* p. 127. t. 11. f. 1. Linn. *Trans.* III. p. 222. *Syn. Fuc.* II. p. 346. *Ner. Brit.* p. 74. t. 13. *Eng. Bot.* XV. t. 1042.

*F. incurvus*. *Fl. Ang.* p. 590. WITH. IV. p. 115.

*Ceramium incurvum*. *Fl. Fr. Ed. 2da.* II. 43.

*Pinus maritima*, sive *Fucus teres*, *cujus ramuli setis sursum tendentibus sunt obsiti*. RAII *Syn.* p. 50. n. 46.

On the shores of the southern counties of England, not uncommon.—Coast of Ireland, near Dublin. Dr. Scott.—Western coast of France. M. Decandolle.—Mediterranean. Professor Mertens.—New Zealand. Sir Jos. Banks.—Ceylon. Dr. Smith.

Perennial. November—February.

ROOT, in all the specimens which I have seen, a solid, flat, dilated disk; but described in the Linnæan Transactions, in the *Nereis Britannica*, and in the *Flore Française*, as fibrous, so that I presume it is liable to variation.

FRONDS, many from the same base, filiform, about the size of a crow's quill, six or eight inches high, irregularly divided into numerous, long, sub-fastigate shoots, and these again and again branched in a similar manner, the whole of them, but especially the younger ones, more or less recurved, with their apices rolled in: the plant is naked immediately adjoining the root, but all the rest of it covered with a profusion of subulate, frequently incurved ramuli, much more closely imbricated in some specimens than in others, generally about half an inch long, and simple, but occasionally pinnated, and lengthening into new branches, pointing principally to one side, but disposed without order, except in the upper shoots, where they grow regularly in pairs, gradually shortening as they approach the apices, and attached to one side only; in these pairs one is frequently longer than the other: sometimes but very rarely, I have seen three together: the younger branches and ramuli are regularly divided into extremely short cylindrical joints, visible in the recent plant to the naked eye.

FRUIT, of two kinds, each placed upon the upper side of the ramuli; the one consisting of spherical capsules,\* supported upon peduncles scarcely half a line long, containing several pyriform seeds, the other consisting of lanceolate pods, about a line long, and slightly incurved, containing a row of irregularly globular seeds; in either case three or four capsules fixed on the same ramulus: besides these, I have also received many years ago from Mr. Pigott, and lately from Mr. Borrer, specimens, on which were lying what appear naked spherical seeds unlike those contained in either kind of capsule, and surrounded with a pellucid limbus.

COLOR, dull red, soon turning black from drying, or exposure to the air, or being kept in fresh water, and never afterwards recovering its proper tint: when the plant grows in so shallow water as to be left on the recess of the tide, the apices are pale green, but turn equally black on drying.

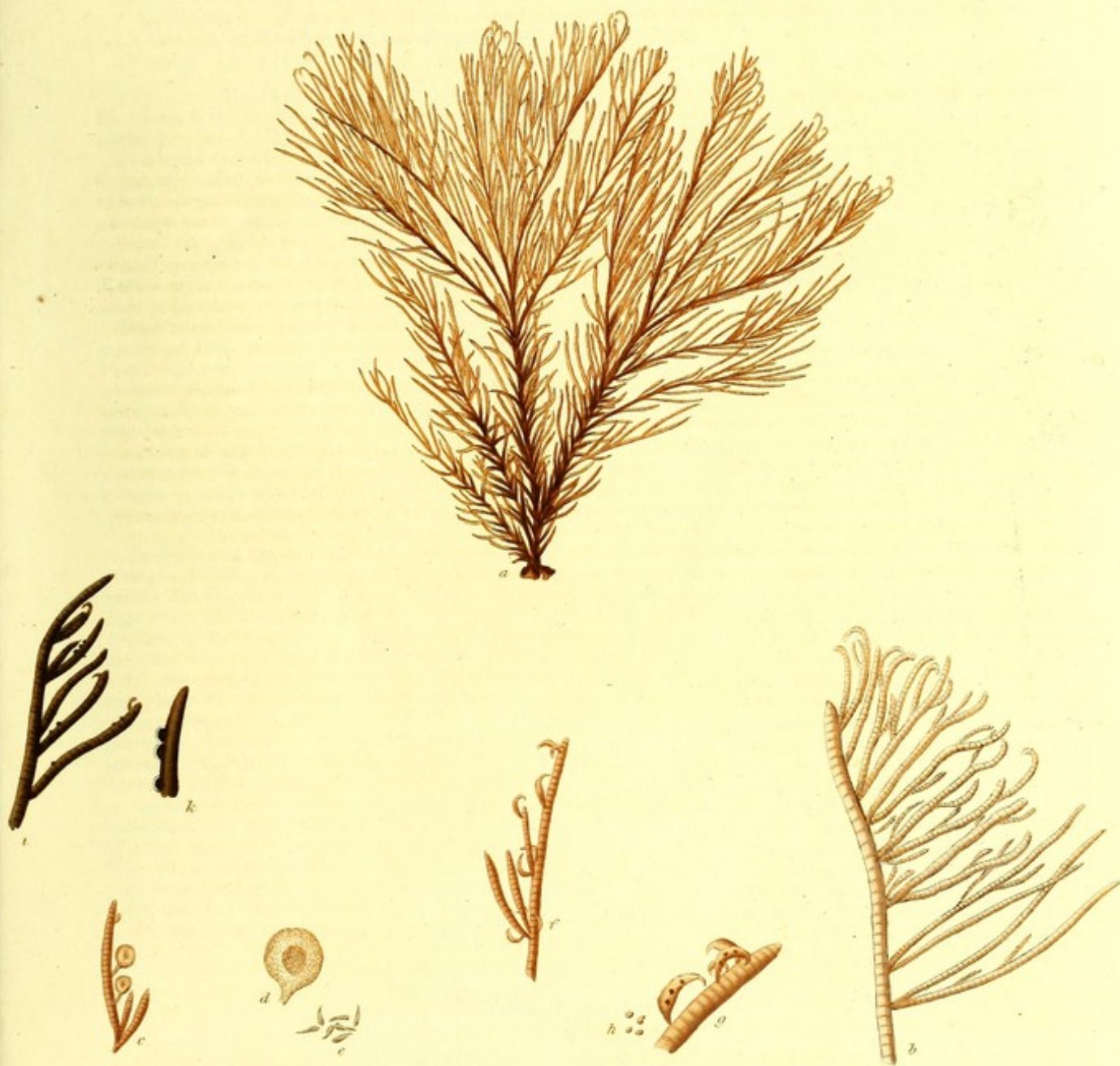
SUBSTANCE, between cartilaginous and woody, flexible, and tough: when dry, hard and brittle.

So long as the present distinction of the two great marine genera, *Fucus* and *Conferva*, depending almost wholly upon the jointed or unjointed frond, is allowed to exist, the species now before us must be considered as an highly interesting one, possessing in common with *Conferva elongata*, altogether the structure of the one, and the habit and texture of the other. In point of fructification it seems to be chiefly connected with the *Fuci*, but I must take this opportunity of declaring that, however the characters of the two genera may have been made by Linnæus and other writers, who have trodden in his footsteps, to depend upon the fruit, yet, that nothing can be more uncertain or fallacious than the marks of discrimination that they have given, nor any thing more vague and indefinite than the present distribution of the species. Much indeed has been done by Roth, Vaucher, and Mertens towards establishing upon philosophical bases the families of the more minute fresh-water *Confervæ*, but those more beautiful species which approach to the *Fuci*, have been in this point of view almost wholly disregarded. Singular as it may appear, it is nevertheless certainly true, that very young specimens of this plant bear, when dried and pressed, considerable resemblance to those of *F. cristatus*, var.  $\gamma$ ; but the two closest affinities of *F. pinastroides* are undoubtedly *F. lycopodioides* and *F. subfuscus*, from both which its habit is very different, and its mode of growth still more so. There is scarcely any plant more disguised by drying; its flexible substance then changing to rigid, and its red color to an intense unvaried black. In other points of view it is liable to but little alteration, except that specimens are found, in some of which, the disposition of the ramuli is so crowded as wholly to cover the stem and branches, while in others they are loosely scattered at considerable distances. The plant figured by Professor Esper, under the name of *F. pinastroides*, is only a young specimen of *F. mucronatus*, *Syn. Fuc.* nor does this species seem to be generally known by foreign authors, though none appears to be a native of more distant seas. The specimen, which, through the kindness of Sir Jos. Banks, I have received from New Zealand, and those sent to Dr. Smith from Ceylon, exactly agree with such as are found upon our shores.

- |   |   |   |    |
|---|---|---|----|
| a. <i>F. pinastroides</i> , natural size. | - | - | 5. |
| b. portion of frond, magnified            | - | - | 5. |
| c. ramulus, with globular fruit           | - | - | 3. |
| d. capsule                                | - | - | 1. |
| e. seeds                                  | - | - | 5. |
| f. ramulus, with lanceolate pods          | - | - | 3. |
| g. portion of ditto                       | - | - | 1. |
| h. seeds                                  | - | - | 4. |
| i. piece of frond with scattered seeds    | - | - | 1. |
| k. portion of ditto                       | - | - |    |

\* Mr. Borrer suspects that these capsules are never in reality pedunculate, but sessile near the ends of very minute shoots, which curl in under them, and afterwards lengthen into new ramuli.





*Fucus pinastroides.*







*Fucus* fronde filiformi, ramosissimâ; ramis apice involutis; ramulis simplicibus, subulatis undique imbricatis, summis sub-secundis, binis; capsulis pedunculatis, lanceolatis sphaericisque.

*Fucus pinastroides*. GMELIN, *Hist. Fuc.* p. 127. t. 11. f. 1. Linn. Trans. III. p. 222. Syn. Fuc. II. p. 346. Ner. Brit. p. 74. t. 13. Eng. Bot. XV. t. 1042.

*F. incurvus*. Fl. Ang. p. 590. WITH. IV. p. 115.

*Ceramium incurvum*. Fl. Fr. Ed. 2da. II. p. 43.

*Pinus maritima*, sive *Fucus teres*, cujus ramuli setis sursùm tendentibus sunt obsiti. RAI Syn. p. 50. n. 46.

HABITAT in Hiberniâ oris, prope Eblanam. D. Scott.—In Galliâ occidentalis oris. Decandolle.—In Mari Mediterraneo. Mertens.—In Novâ Selandiâ D. J. Banks. Bar.—In Zeylonâ. D. Smith.—In meridionalibus Angliâ littoribus, non infrequens.

Perennis. Nov.—Febr.

RADIX, in omnibus quæ ego vidi exemplaribus, callus solidus, explanatus, expansus; sed, cùm in Societatis Linnæanæ Actis, in Nereide Britannicâ, et in Florâ Gallicâ pro fibrosâ describatur, mutationi esse obnoxiam conjicio.

FRONDES ex eadem basi plurimæ, filiformes, pennæ corvinæ crassitie, sex vel octo pollices altæ, in ramos plurimos, elongatos, subfastigiatos, iterùm atque iterùm similiter divisos fissæ; rami omnes, præsertim juniores, plûs minûs recurvi, apicibus involutis: frons ad ipsam basin nuda, cætera obsita ramulis plurimis, subulatis, sæpius incurvis, nunc densissimè, nunc laxè imbricatis, plerumque circitèr unguem longis et simplicibus, interdùm pinnatis seque in novos ramos protendentibus, unum præcipuè latus spectantibus, sed sine ordine dispositis, excepto quòd in ramis summis semper bini et secundi nascantur, superioribus nunquam non brevioribus: in his paribus unus altero quandoque longior: ternos interdùm, sed rarissimè, vidi: rami juniores et ramuli articulis brevissimis cylindraceis nudo oculo in recente conspiciendis distinguuntur.

FRUCTIFICATIO duplex, utraque in ramulorum parte superiore sita: hæc e capsulis sphaericis, \* pedunculo vix semilineari fultis, semina aliquot pyriformia includentibus; illa e capsulis lanceolatis constans, lineam circitèr longis, lenitèr incurvis, seminum irregularitèr globosorum serie instructis; alterutrarum tres vel quatuor eidem ramulo insident. Præter hos fructificandi modos accepi pluribus abhinc annis a D<sup>no</sup> Pigott et nupèr a D<sup>no</sup> Borrer hujus Fuci exemplaria, quibus semina, ut sunt visa, sphaerica, nuda, iis in utrâvis capsulâ absimilia, et limbo pellucido cincta, insidebant.

COLOR obscurè ruber; in exsiccata, aut diutius æquo in aquâ dulci servatâ, seu luci objectâ, nigerrimus, nec posthæc ullâ arte in pristinum revocandus: frondis aquarum brevibus innascentis apices coloris fiunt æruginosi, sed et hi etiam exsiccati nigrescunt.

SUBSTANTIA cartilagineo-lignea, flexilis, tenax; exsiccata rigida, fragilis.

Tandiu quam, ut sese res nunc habet, ad Fucus a Confervis distinguendos frons articulata vel non articulata præcipuè valebit, *F. pinastroides*, qui una cum *Confervâ elongatâ* harum structurâ illorum verò indole et habitu gaudet, pro catenæ utrosque conjungentis summi momenti annulo necessariè est habendus. Quoad fructum maximam cum Fucis affinitatem sibi vindicat, monendus autem hujus loci est Tyro, ut quantumvis characteres his generibus a Linnæo et iis vestigia ejus prementibus impositi e fructus pendere videantur, nihil tamen magis eorum indicii incertum esse vel fallax, nihil specierum, quâ nunc utimur, distributione minus definitum. Ad minutarum aquæ dulci innascentium *Confervarum* familias ritè stabilendas multum Rothius, Vaucherus, Mertensius, et alii elaborârunt, sed species illæ longe pulchriores et Fuci propriiores, quasi nullius momenti hactenûs sunt ab omnibus fere prætermisæ. Singulare quidem sonat, attamen est verissimum, inter *F. pinastroidis* exemplaria ætate primâ lecta, exsiccata gravitèrque pressata, et *F. cristati* varietatem 7 similitudinis quiddam intercedere: illæ autem quæ ad hanc nostram proximè accedunt Fucorum species sunt *F. lycopodioides* et *F. subfuscus*, a quibus cùm habitu tùm præsertim crescendi modo discrepat. Vix ulla exstat planta cujus facies exsiccatione insigniùs mutatur; substantia flexilis tunc in rigidam, color ruber tunc in nigerrimum transit. De cæteris variationi perpauillûm est obnoxia, nisi quòd in quibusdam exemplaribus ramuli tam densè imbricati ut caulem ramosque omnino cooperiant disponantur, dum in aliis laxè sparsi nec nisi intervallis satis magnis occurrant. Planta, quam sub *F. pinastroides* nomine depinxit cl. Esperus est tantummodò *F. mucronatus* ætate minus provectâ nec, licet per maria quàm longè dissita reperiatur plerumque inter auctores externos innotescere hæc species videtur. Exemplar illud quod e novâ Selandiâ acceptum nobilissimi Jos. Banks Baroneti benevolentia debeo, et illa quæ e Zeylonâ accepit cl. Smithius cum iis Britannia ad littora repertis omnibus numeris conveniunt.

a. <i>F. pinastroides</i> , magn. nat.	-	-	-	-	-
b. frondis pars, magn. auct.	-	-	-	-	5.
c. ramulus cum capsulis sphaericis	-	-	-	-	5.
d. capsula	-	-	-	-	3.
e. semina	-	-	-	-	1.
f. ramulus cum capsulis lanceolatis	-	-	-	-	5.
g. ejusdem pars	-	-	-	-	3.
h. semina	-	-	-	-	1.
i. frondis pars cum seminibus sparsis	-	-	-	-	4.
k. ejusdem pars	-	-	-	-	1.

\* Hasce capsulas esse reverà nunquam pedunculatas, sed surculorum brevissimorum, sub iis intortorum, et mox in novos ramulos elongandorum juxta apices sessiles suspicatur D<sup>ns</sup> Borrer.



*Fucus lycopodioides*, frond filiform, mostly simple, every where covered with closely imbricated, filiform, patent ramuli, generally forked at their apices, and swelling into lanceolate paniculated capsules.

*Fucus lycopodioides*. LINN. *Syst. Nat.* II. p. 717. *Syst. Nat. Ed. Gmel.* II. p. 1384. *Fl. Norv.* II. p. 80. *Linn. Trans.* III. p. 223. *Syn. Fuc.* II. p. 343. *With.* IV. p. 107. *Eng. Bot.* XVII. t. 1163.

*F. Lycopodium*. *Ner. Brit.* p. 107. t. 17. (e descript. nec icone.)

*Conferva squarrosa*. *Fl. Dan.* t. 357. *Fl. Norv.* II. p. 105.

In the North Sea.—At Scarborough. *Sir T. Frankland*.—Coast of Northumberland. *Mr. Winch*.—North of Scotland. *Mr. Brodie*.—Antrim coast. *Dr. Scott*.—Seas of Finmark and Iceland. *Gunner*.

*Perennial*. January—March.

**ROOT**, a thin callous disk.

**FRONDS**, many from the same base, cylindrical, filiform, about the thickness of a blackbird's quill, from ten to twenty inches high, generally simple to the distance of about an inch from the root, and then divided into a few long sub-fastigiate branches, for the most part wholly simple, but sometimes furnished with one or two very short ones; the stem near the base is naked, but all the branches, except at the very lowest part, are entirely covered with closely imbricated ramuli \* scarcely thicker than hog's bristles, either patent, or between erect and patent, about half an inch long, quite filiform, disposed equally on every side, and pointing in every direction, frequently forked at the apices, and occasionally pinnated with a series of others very minute.

**FRUCTIFICATION**, terminal in the ramuli, which are at that time almost as thin as human hair, and of a pale reddish brown color, elongated and pinnated, as if extending into a profusion of young shoots, and giving the plant quite a different appearance, their apices swelling into lanceolate siliquæ, each containing three or four black irregularly globular seeds.

**COLOR**, a dark reddish brown in the ramuli; in the stem, a dull, livid, semitransparent brown; when dried intensely black.

**SUBSTANCE**, cartilaginous; flexible, white, moist, but rigid, and brittle after it is dried.

It is only four years ago that scarcely a single specimen of this *Fucus*, which had been certainly found upon the shores of Britain, was known to exist, but since that time, its claim to a place in our Flora has been established beyond a doubt, and lately by the zeal of Mr. Brodie, whose kind assistance and activity in the pursuit of marine Botany, in the course of this work, I shall have constant occasions to acknowledge, it has been gathered in considerable abundance upon the northern coast of Scotland, and the fructification has also been detected. In this last particular, it bears, as might be expected, a considerable resemblance to *F. subfuscus*, and from its affinity to that plant and *F. pinastroides*, it appears to me most probable, that at some future time it will be discovered also to produce like them seeds in globular capsules. Its habit in water is peculiarly feathery and elegant, and in this respect as well as in the disposition of the ramuli which are on all sides equally imbricated, in their want of joints, and in their uniform size from top to bottom, it essentially differs from *F. pinastroides*, to which it is considered by most Botanists as more nearly related than is by any means really the case. It seems to be generally parasitic upon the stems of *F. digitatus*, and the larger species. In its habit, it approaches considerably the tribe of verticillate *Conferve*, but still more so to the *Fucus* figured by Mr. Stackhouse under the name of *F. Lycopodium*, which is in reality a very different species, and a native of the Red Sea, whence I lately received it by the kindness of Lord Valentia. It is this latter that Mr. Woodward has preserved in his Herbarium, as gathered on the Norfolk coast, but I should rather apprehend that he was in this respect in error.

a.	<i>F. lycopodioides</i> , natural size.	
b.	portion of frond.	
c.	piece of stem in fructification, magnified	6.
d.	smaller piece of ditto	4.
e.	capsules	3.
f.	ditto	2.
g.	seed	1.
h.	contents of ditto	1.

\* In the Synopsis of the British Fuci I have described these ramuli as jointed, which is quite erroneous, and I am at a loss to conceive how I fell into such a mistake.





*Fucus lycopodioides.*







*Fucus* fronde filiformi, simpliciusculâ; ramulis filiformibus, undique et ubique densè imbricatis, patentibus, in capsulas lanceolatas paniculatas intumescensibus.

*Fucus lycopodioides*. LINN. *Syst. Nat.* II. p. 717. *Syst. Nat. Ed. Gmel.* II. p. 1384. *Fl. Norv.* II. p. 80. Linn. *Trans.* III. p. 223. *Syn. Fuc.* II. p. 343. WITH. IV. p. 107. *Eng. Bot.* XVII. t. 1163.

*F. Lycopodium*. Ner. *Brit.* p. 107. t. 17. (e descript. nec icone.)

*Conferva squarrosa*. Fl. Dan. t. 357. *Fl. Norv.* II. p. 105.

HABITAT in Oceano Septentrionali.—Apud Scarborough. D. T. Frankland, Baronet.—In Northumbriæ oris. D. Winch.—In Scotiæ Septentrionalis oris. D. Brodie.—Ad Antrimi littora. D. Scott.—In Finmarkii et Islandici maris rupibus. Gunner.

*Perennis*. Jan.—Mart.

RADIX discus callosus, expansus, tenuis.

FRONDES ex eâdem basi plurimæ, cylindraceæ, filiformes, pennæ *Merula* crassitie, dodrantes vel cubitales, plerumque simplices donec pollicis a radice unius altitudinem attigerint, atque ibidem in ramos aliquot elongatos, fastigiatos, ut plurimum simplicissimos, sed interdum ramo uno atque altero brevissimo instructos divisæ: frons ad ipsam basin nuda, inde tota cooperta\* ramulis densè imbricatis, setâ porcinâ vix crassioribus, patentibus, vel erecto-patentibus, unguem circiter longis, examussim filiformibus, utrinque ex æquo dispositis, et quoquoversum spectantibus, sæpius apice bifurcis, et interdum aliis minutis pinnatis.

FRUCTIFICATIO terminalis in ramulis, qui tunc temporis capillo vix crassiores, coloris dilutè rufo-fusci, elongati, et pinnati, quasi in novos surculos abituri, evadunt, unde toti plantæ facies mutatur: horum apices in capsulas lanceolatas, singulas semina tria vel quatuor nigra sub-globosa includentes, turgescunt.

COLOR obscure rufo-fuscus, in caule lividus, et subdiaphanus, *exsiccatæ* nigerrimus.

SUBSTANTIA cartilaginea, *madentis* flexilis, *exsiccatæ* rigida et fragilis.

Cùm *Fucorum Britannicorum Synopsis* in quatuor modò abhinc annis scriberem, vix unum hujus *Fuci* exemplar Britanniae ad oras certè lectum innotuit, nec an ritè *Fucus* Britannicis annumeretur inter Botanicos constitit: tales autem tempus insequens exemit scrupulos, et nuperrimè per amicissimi D<sup>ni</sup> Brodie studium, qui cùm algis marinis investigandis, tùm præsertim huic libro adjuvando maximam operam navavit, in Scotiâ septentrionali copiosè est lectus, et fructificatio omnibus antehàc incognita latere desiit. Fructus, ut e stirpis indole suspicari licuerit, ab eo *F. subfusci* non multùm recedit, nec forsàn nimis auderem, si ex affinitate quam habet *F. lycopodioides* cum hâc specie et *F. pinastroide* capsulas sphaericas quoque ferre conjicerem. Sub aquâ observati hâbitus elegans est et plumosus, per quod, non minùs quàm per ramulorum exactè cylindraceorum, articulis expertium, et undique ex æquo dispositorum, naturam, se a *F. pinastroide* dignoscendum præstat. Nec est quidem inter has species similitudo tam arcta quàm Botanici plurimi autumant. *Fucorum* majorum stipitibus plerumque parasiticè innasci traditur. Ad *Consevarum* verticillatarum familiam habitu accedit, longè tamen propiùs ad illam *Fuci* speciem quam sub *F. Lycopodii* nomine depinxit Stackhousius, quæ tamen est ab hâc nostrâ reverà distinctissima, et maris Erythræi, unde per nobilissimi Vicecomitis de Valentia liberalitatem nupèr accepi incola. Hæc est eadem cujus exemplar in *Phytophylacio* suo sub "*F. lycopodioidis* Norfolkicæ ad oras lecti" nomine servat D. Woodward, sed esse e longinquo aliquo mari deportatum, talique per errorem titulo insignitum, nequeo non suspicari.

a. <i>F. lycopodioides</i> , nat. magn.	
b. <i>frondis portio</i> .	
c. <i>frondis portio fructifera</i> , magn. auct.	- 6.
d. <i>ejusdem pars minor</i>	- - - 4.
e. <i>capsula</i>	- - - 3.
f. <i>eadem</i>	- - - 2.
g. <i>semen</i>	- - - 1.
h. <i>granula in semine contenta</i>	- - - 1.

\* In *Fucorum Britannicorum Synopsis* hos ramulos articulatos dixi, quod a vero prorsus abhorre videtur, nec quomodo in talem errorem inciderim mente nunc capio.



*Fucus dentatus*, frond flat, membranaceous, branched, alternately pinnatifid; ramuli alternate, linear, sharply toothed at the apices; capsules pedunculate, panicle, axillary, lanceolate and urceolate.

*Fucus dentatus*. LINN. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1388. LINN. *Mant.* p. 135.

*Fl. Ang.* p. 582. *Fl. Scot.* II. p. 952. WITH. IV. p. 102. *Fl. Norv.* II. p. 91. Linn. *Trans.* III. p. 158. *Syn. Fuc.* I. p. 149. *Ner. Brit.* p. 95. t. 15. *Eng. Bot.* XVIII. t. 1241.

*F. pinnatifidus*. *Fl. Dan.* t. 354. (excl. *Syn. Huds.*)

*F. atomarius*. GMELIN, *Hist. Fuc.* p. 125. t. 10. f. 1.

*F. membranaceus rubens, foliolis latiusculis, ad extremitates dentatis*. MORIS. *Hist. Or.* III. p. 646. s. 15. t. 8. f. 5.

On the coasts of Northumberland, Scotland, and Ireland.—In the Atlantic Ocean. Linnæus.—North Sea, near Iceland. Oeder.—Shores of America. Gmelin.

*Perennial.* February—April.

**ROOT**, a small, callous, somewhat conical disk.

**FROND**, in general solitary, from five inches to a foot high, compressed, and scarcely more than half a line wide immediately adjoining the base, in all its other parts flat, and preserving throughout a width of about two lines; divided by a few dichotomies which begin very near the root; the primary branches long, of almost equal height, and irregularly beset with others more short, patent, and distichous, which are again frequently furnished with a series of still smaller ones, all of them pinnatifid throughout their whole length with alternate ramuli, placed at very short distances, generally about half a nail long, but shortening as they approach the summits, their margins for the most part quite entire, though sometimes again pinnatifid, as if they were lengthening into new branches, their apices always cleft with three or four very short acuminate segments: the sinuses of the ramuli bluntish.

**FRUCTIFICATION**, of two kinds; the one consisting of small lineari-lanceolate capsules, either growing solitary, like cilia, along the margin of the frond, or collected into panicles supported upon an extremely short peduncle, and placed at the axæ of the ramuli, containing several roundish seeds disposed in a single or double row; the other composed of pedunculate capsules of an urceolate form, with open orifice, growing in axillary clusters, and furnished with a few pyriform seeds.

**COLOR**, a dark brownish red, deeper in the centre of the frond; pale pink in the very young shoots, and blackish near the base.

**SUBSTANCE**, thin and membranaceous, but with a tendency to coriaceous; rigid and rather thick near the base, in the young shoots extremely tender.

Between the Fuci provided with a flat veinless frond, and those furnished with a midrib, the present species may be regarded as an intermediate link, nor is it in my opinion by any means clear, though it has been by all authors classed with the former, that it has not an equal pretension to a place among those of the latter division. The frond, especially if held to a strong light, evidently appears to be furnished in its centre with a wide line thicker and darker than the rest, agreeing in this respect with *F. rubens*, a plant with which it has scarcely any other point in common, except the singular substance that is peculiar to both of them. The fructification, after remaining very long undetected, was discovered only a very few years ago by Mr. Brown, a botanist of singular acuteness, but for my specimens, I am indebted to Mr. Brodie, who has found it in plenty, and who first observed the solitary capsules arranged along the margins. It appears probable that these capsules are occasionally, perhaps not unfrequently, barren, and that this may be the origin of that ciliated appearance of the plant, already noticed in the Linnæan Transactions, and the Synopsis of the British Fuci. The fruit of *F. dentatus* differs from that of *F. subfuscus*, and the other species that are furnished with a similar twofold fructification, in the circumstance of the capsules which contain the pyriform seeds, being urceolate instead of spherical, and provided in all stages of their growth, as far as I have seen, with a wide open orifice. It appears particularly deserving of remark, that the seeds in the lineari-lanceolate capsules are in their early state very small, and disposed in two rows separated by a longitudinal line, but that this line vanishes as they grow older, and each seed becomes joined into one with that which lies opposite to it. Gmelin's *F. atomarius* was long ago referred to this species in the *Systema Plantarum*, and coincides very well as to the description, but by no means so as to the plate. I have nevertheless here quoted it, yet not without some doubt, as he received his specimen from America, and lays a particular stress upon the frond being every where covered with dots, which must have arisen from chance, or we must allow that he intended some other species which may probably agree better with his figure.

- |  |    |
|--|----|
| a. <i>Fucus dentatus</i> , natural size.                       |    |
| b. piece of the frond, with lineari-lanceolate pods, magnified | 5. |
| c. pods panicle  | 3. |
| d. ditto growing singly  | 3. |
| e. seeds   | 1. |
| f. contents of ditto   | 1. |
| g. piece of the frond, with urceolate pods                     | 5. |
| h. pod   | 3. |
| i. seeds   | 1. |





*Fucus dentatus.*







*Fucus*, fronde planâ, membranaceâ, ramosâ, alternatim pinnatifidâ; ramulis alternis, linearibus, apice incisis, lacinulis acutis; capsulis pedunculatis, axillaribus, lanceolatis, urceolatisque.

*Fucus dentatus*. LINN. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1383. LINN. *Mant.* p. 135.

*Fl. Ang.* p. 582. *Fl. Scot.* II. p. 952. WITH. IV. p. 102. *Fl. Norv.* II. p. 91. Linn. *Trans.* III. p. 158. *Syn. Fuc. I.* p. 149. *Ner. Brit.* p. 95. t. 15. *Eng. Bot.* XVIII. t. 1241.

*F. pinnatifidus*. *Fl. Dan.* t. 354. (excl. *Syn. Huds.*)

*F. atomarius*. GMELIN, *Hist. Fuc.* p. 125. t. 10. f. 1.

*F. membranaceus rubens, foliolis latiusculis, ad extremitates dentatis*. MORIS. *Hist. Or.* III. p. 646. s. 15. t. 8. f. 5.

HABITAT in Northumbriâ, Scotiâ, et Hiberniâ oris.—In Oceano Atlantico. LINNÆUS.—In Mari Islandico. Oeder.—Ad Americæ littora. Gmelin.

Perennis. Febr.—Apr.

RADIX callus parvus, expansus, sub-conicus.

FRONS plerumque solitaria, spithamæa, vel etiam pedalis, juxta basin compressa, ibique vix semilineam lata, cætera plana, duarum circiter linearum latitudine, et ubique ad apices usque æqualis, dichotomiis aliquot sub ipso ortu incipientibus ramosa; rami primarii elongati, subfastigiati, aliis brevioribus distichis patentibus vagè obsiti, qui interdum serie minorum tertiâ similiter sunt instructi; rami omnes per totam longitudinem pinnatifidi ramulis alternis, approximatis, sub-semiunguicularibus, iis summitates versus brevissimis, margine plerumque integerrimis, quandoque tamen iterum pinnatifidis, quasi in novos ramos sint abituri, apicibus semper incisis, lacinulis tribus vel quatuor, brevibus, acuminatis: ramulorum sinus obtusiusculi.

FRUCTIFICATIO duplex: una e capsulis constans exiguis, lineari-lanceolatis, nunc solitariis frondis margini, ciliorum instar, innascentibus, nunc in paniculas pedunculo perbrevis fultas, et ramulorum ad sinus dispositas congestis, semina plurima subrotunda serie simplice vel duplici ordinata includentibus; altera capsulæ urceolatae, pedunculatae, ramulorum ad sinus conglomeratim collocatae, ore aperto, seminibus intus pyriformibus instructæ.

COLOR e fusco obscure ruber, in surculis tantummodò jam primùm ortis roseus; ramorum in medio intensior, prope basin nigricans.

SUBSTANTIA tenuis, membranacea, ad coriaceam tamen accedens, prope basin rigida et crassiuscula, in surculis junioribus tenerima.

Fucorum familiam fronde planâ aveniâ præditorum, cum illis fronde costatâ instructis hæc species connectit, quæ, licet a cunctis auctoribus inter illos censeatur, æquo tamen jure his annumerandus mihi videtur; cum totius plantæ, præsertim si lucernæ obijciatur, partem mediam linea lata incrassata nudo oculo conspicienda percurrat. Consentit in hoc cum *F. rubente*, stirpe cæteroquin absimillimâ, nisi quod substantiâ, in utrâque singulari, eadem propemodùm gaudeant. Fructificationem diù incognitam primus paucis modò abhinc annis detexit vir acutissimus D. Brown; specimina autem mea benevolentia debeo D<sup>m</sup> Brodie, qui copiosè legit, et capsulas solitarias margini innascentes non antehac visas patefecit. Capsulas hasce steriles quandoque evadere, et hinc ciliatam illam plantæ faciem jamdudùm in Societatis Linnæanæ Actis et in Fucorum Britannicorum Synopsi memoratam pendere, verisimile videtur. *F. dentati* fructus ab eo *F. subfusi* et reliquorum fructificatione duplici præditorum in hoc discrepat, quod capsulæ quæ semina pyriformia includunt non, ut in illis, globosæ, sed urceolatae, ore semper, quantum vidi, lato et aperto instructæ evadant. Notatu quoque est dignissimum, semina in capsulis lineari-lanceolatis reperta principio esse parva, et duplici serie lineâ longitudinali distinctâ disponi, hanc autem lineam in adultioribus sensim evanescere, et singula semina cum iis sibi invicem oppositis in unum coalescere. *Fucum* Gmelini *atomarium* jampridem in Systemate Plantarum sub hac specie citatum, et perperam quoad iconem sed bene quoad descriptionem cum *F. dentato* convenientem hæc retuli, nec tamen pro synonymo indubio habeo; ex Americâ enim accepit Gmelinus, et “universam plantæ superficiem punctis sive atomis creberrimis obsitam” dicit, quod nisi casu evenisse credamus, aliam Fuci speciem hoc nomine esse designatam satis mihi constare videtur.

a. <i>Fucus dentatus</i> , nat. magn.	
b. <i>pars frondis, cum capsulis lineari-lanceolatis</i> , magn. auct.	5.
c. <i>capsulæ hæ paniculate</i> - - - - -	3.
d. <i>aliæ singulatim dispositæ</i> - - - - -	3.
e. <i>semina</i> - - - - -	1.
f. <i>granula in seminibus contenta</i> - - - - -	1.
g. <i>pars frondis, cum capsulis urceolatis</i> - - - - -	5.
h. <i>capsula</i> - - - - -	3.
i. <i>semina</i> - - - - -	1.



*Fucus Hypoglossum*, stem branched, winged; leaves between linear and lanceolate, flat, undivided, entire, reticulated, proliferous from the midrib; spherical capsules on the midrib, and scattered seeds on the leaf.

*Fucus Hypoglossum*. WOODW. in Linn. Trans. II. p. 30. t. 7. Linn. Trans. III. p. 113. WITH. IV. p. 95.

Eng. Bot. XX. t. 1396. Syn. Fuc. I. p. 17. ESPEY, Ic. Fuc. II. p. 17. t. 120. (malè.)

*Ulva lingulata*. Fl. Fr. Ed. 2da. II. p. 14.

$\beta$ . *minor*; leaves extremely narrow.

*F. Hypoglossum*.  $\beta$ . Syn. Fuc. I. p. 17.

*F. hypoglossoides*. Ner. Brit. p. 76. t. 13.

*F. Hypoglossum*.  $\gamma$ . Syn. Fuc. I. p. 17.

$\gamma$ . *incrassatus*; narrow linear leaves, scarcely visibly reticulated.

$\alpha$  on the shores of England, Ireland, and France.— $\beta$  in Devonshire, Cornwall, and Anglesea.— $\gamma$  at Torquay. Mrs. Griffiths.

Annual. June—September.

ROOT, a very minute callus.

FRONDS, numerous, two or three inches long, rising at first with a single undivided leaf, in general almost linear, occasionally approaching to lanceolate, about two lines wide, furnished with a cylindrical filiform midrib, scarcely thicker than thread at the base, and soon becoming faint, so that it is quite obsolete towards the apices, out of which, at uncertain distances throughout its whole length, issue other leaves, similar to the primary one in every respect, except their smaller size, the lowest constantly longest, and thence gradually shortening, producing in the same manner a series of still smaller ones, the youngest always lanceolate; towards the base of the frond the foliaceous membrane is generally worn away, leaving the midrib naked, and thus giving the plant the appearance of being naturally provided with a stem: the leaves are constantly undivided, and quite flat, except that the margins, which are always entire, are sometimes beautifully crisped with minute undulations: the apices are more or less acute.

FRUCTIFICATION, of two kinds, in different individuals; *the one* consisting of spherical capsules, smaller than turnip seed, sessile on the midrib, especially towards the ends of the younger leaves, often four or five on each, of a deep red color, full of sub-globose seeds, surrounded with a pellucid limbus; *the other* of very minute naked seeds, irregular both as to shape and size, lying on the leaf on each side of the midrib in small patches of a lanceolate form, the part of the frond on which they lie being apparently thicker than the rest.

COLOR, of the leaf, a most beautiful transparent pale pink, of the midrib, darker.

SUBSTANCE, membranaceous, extremely thin and delicate, under a microscope elegantly reticulated.

$\beta$  differs in its habit which is more clustered: has its leaves scarcely more than half a line wide, in general not more than a nail long, and inclining to lanceolate, but sometimes much longer and quite linear.

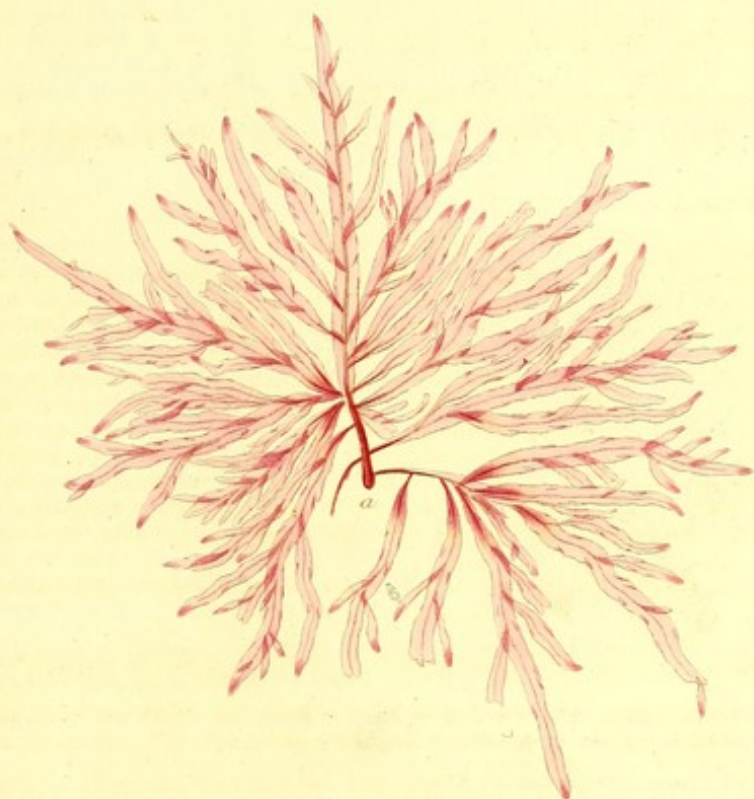
$\gamma$  is also much smaller than  $\alpha$ ; its leaves very narrow and linear, but its strongest character is the darker color inclining to scarlet, and the substance so much thicker than in the other varieties that no reticulations are visible.

The two different appearances of this plant described in the Synopsis of the British Fuci, I have here upon a comparison of a greater number of individuals thought it best to unite, but I lately received from Mrs. Griffiths some specimens so very unlike any others which I had previously seen, that I have still found myself under the necessity of separating it into three varieties. In the two first of these the frond is most strikingly reticulated, appearing when viewed with a common magnifier to be every where composed of net-work, forming irregularly hexagonal meshes, and bearing some resemblance to the *Hydrodictyon* of Roth, or the *Ulva stellata* of Wulfen. That Mr. Stackhouse finding this reticulated structure unnoticed by preceding authors, should have been led from it to regard his *F. hypoglossoides* as a distinct species, cannot be matter of wonder; but as the same is now known to be equally observable in the more common appearances of the plant, no doubt as to their identity can any longer exist. \* The undivided frond, entire at the margins, proliferous from the midrib, and destitute of any lateral nerves or veins sufficiently distinguish this *Fucus* from its congeners. With regard to its fruit some short observations will be found under the following species. M. Decandolle, who seems to be acquainted with *F. Hypoglossum* only with scattered seeds, and with *F. ruscifolius* only with capsules, has been led from this circumstance to refer them to different genera, and has erred in his application of the names; his description, however, of both is so accurate that there can be no doubt as to his synonyms.

- |    |  |    |
|----|--|----|
| a. | <i>Fucus Hypoglossum</i> , natural size. |    |
| b. | leaf with scattered seeds.               |    |
| c. | part of ditto, magnified                 | 3. |
| d. | seeds                                    | 1. |
| e. | leaf with capsule, natural size.         |    |
| f. | summit of ditto, magnified               | 3. |
| g. | seeds                                    | 1. |
| h. | portion of frond                         | 1. |

\* It ought to be noticed that the apex of the frond is occasionally, but very rarely, forked, as sometimes appears in *Scolopendrium vulgare*, but this seems merely the effect of injury





*Fucus hypoglossum.*







*Fucus* caule ramoso, alato; foliis lineari-lanceolatis, planis, simplicibus, integerrimis, reticulatis, e costâ proliferis; capsulis in costâ sphaericis, seminibusque in folio sparsis.

*Fucus Hypoglossum.* WOODW. in Linn. Trans. II. p. 30. t. 7. Linn. Trans. III. p. 113. WITH. IV. p. 95.

Eng. Bot. XX. t. 1396. Syn. Fuc. I. p. 17. ESPEY, Ic. Fuc. II. p. 17. t. 120. (malè.)

*Ulva lingulata.* Fl. Fr. Ed. 2da. II. p. 14.

$\beta$  minor; foliis angustissimis.

*F. Hypoglossum.*  $\beta$  Syn. Fuc. I. p. 17.

*F. hypoglossoides.* Ner. Brit. p. 76. t. 13.

*F. Hypoglossum.*  $\gamma$ . Syn. Fuc. I. p. 17.

$\gamma$  incrassatus; foliis angustis lineari-lanceolatis, vix evidentè reticulatis.

HABITAT in Angliæ, Hiberniæ, et Galliæ oris.— $\beta$  in Devoniâ, Cornubiâ, et Insula Monâ.— $\gamma$  apud Torquay in Devoniâ. D<sup>na</sup> Griffiths.

Annua. Jun.—Sept.

RADIX callus perquam minutus.

FRONDES ex eadem basi plurimæ, bi-tri-pollicares, folio assurgentes primùm unico simplicissimo, figuræ plerumque linearis, interdum ad lanceolatam accedentis, duas circiter lineas lato, costâ instructo cylindricâ filiformi, vix filo tenuissimo ad ipsam basin crassiore, citòque deficiente, ut apices versus prorsus evanescat: intervallis incertis per totam longitudinem ex hac oriuntur folia alia, primarij, staturâ minore demptâ, omninò similia, inferiora semper longissima, et quo magis ad apices appropinquant eo breviora, omnia minorum seriem simili modo edentia, juniora nunquam non lanceolata: membrana foliacea frondis basin versus sæpius atteritur, unde costa denudata caulis speciem præbet: folia omni ætatis stadio indivisa sunt et plana, nisi quòd margines, semper integerrimi, aliquando minutissimè undulati et crispatuli evadant: apices plus minus acuti.

FRUCTIFICATIO duplex: hæc e capsulis constans sphaericis, intensè rubris, papaveris semine minoribus, in costâ, præsertim foliorum juniorum apices versus sessilibus, seminibus sub-globosis limbo pellucido cinctis refertis; illa e seminibus constans nudis, minutissimis, neque figuræ neque magnitudinis certæ, folij superficie impositis, in maculas exiguas lanceolatas costâ percursas congestis: eâ quibus insident frondis parte incrassatâ.

COLOR folij amoenissimus, dilutè roseus, diaphanus; costæ intensior.

SUBSTANTIA membranacea, tenuissima, et tenerima; sub lente pulchrè reticulata.

Varietas  $\beta$  habitu magis conferto discrepat, et folia habet vix plus quam semilineam lata, sæpius circiter unguem longa et lanceolata, interdum elongata et prorsus linearia.

Varietas  $\gamma$  quoque minor quàm  $\alpha$ ; folia perangusta et linearia: in hoc autem præcipuè a præcedentibus differt, quòd color intensior ad coccineum accedat, et substantia tantum sit incrassata ut structura reticulata penitus lateat.

Duas illas perpulchræ hujus speciei varietates in Fucorum Britannicorum Synopsi descriptas, hic in unam, pluribus comparatis exemplaribus reque accuratius perpensâ, reduxi: nuperrimè autem a D<sup>na</sup> Griffiths specimina aliquot tantum reliquis absimilia accepi, ut tertiam vel nunc varietatem describere necesse habeam. Indole suâ hæc a præcedentibus insignitè differt, quarum structura reticulata, maculis abnormitè hexagonis distincta, adeo usque conspicua apparet, ut, vel sub lente mediocri observata, *Hydrodictyi* Rothiani aut *Ulvæ stellatæ* Wulf. similitudinis aliquid præ se ferant. Reticulatam hanc faciem ab omnibus autem prætermittam Stackhousio maximè notabilem, esse visam, et quæ ad *Fucum* suum *hypoglossoidem* pro distinctâ specie stabiliendum sufficeret quis mirabitur?

\* Cum autem in eâ etiam quæ creberrimè occurrit plantæ formâ non minùs evidentè posse conspici observationes nupera edocuerint, rite esse conjungendos nullus dubito. Frons integerrima, e costâ prolifera, et nervorum vel venarum lateralitèr excurrentium absentia hanc plantam satis a congeneribus distinguunt. De fructu sub insequente specie paucis erit disserendum. *F. Hypoglossum* tantummodò seminibus sparsis præditum, contra autem *F. rusci-folium* non nisi capsulis sphaericis instructum, reperisse videtur cl. Decandolle, qui eam ob causam ad diversa genera relegavit, descriptione tamen utriusque accuratissimâ adjunctâ, unde de synonymis nulla dubitatio.

- |    |                                    |   |   |   |    |
|----|------------------------------------|---|---|---|----|
| a. | <i>F. Hypoglossum</i> , magn. nat. |   |   |   |    |
| b. | folium cum seminibus sparsis.      |   |   |   |    |
| c. | ejusdem pars, magn. auct.          | - | - | - | 3. |
| d. | semina                             | - | - | - | 1. |
| e. | folium cum capsulâ, magn. nat.     |   |   |   |    |
| f. | ejusdem apex, magn. auct.          | - | - | - | 3. |
| g. | semina                             | - | - | - | 1. |
| h. | pars frondis                       | - | - | - | 1. |

\* Memorari debet frondis apicem quandoque, sed rarissimè, eodem modo qui in *Scolopendria vulgari* nonnunquam accidit, bifurcam occurrere, sed hoc ex injuriâ pendere pro certo habeo.



*Fucus ruscifolius*, stem branched, winged; leaves widely oblong, obtuse, flat, undivided, entire, proliferous from the midrib, marked with pellucid, jointed veins; spherical capsules sessile on the midrib, and scattered seeds on the leaf.

*Fucus ruscifolius*. TURNER, in Linn. Trans. VI. p. 127. t. 8. f. 1. Syn. Fuc. I. p. 11. Eng. Bot. XX. t. 1395.

*F. Hypoglossum*. Fl. Fr. Ed. 2da. II. p. 27. (excl. Syn. omn.)

$\beta$ . *minor*; with ovato-lanceolate leaves, about a nail long.

*F. ruscifolius*.  $\beta$ . Syn. Fuc. I. p. 11.

On the shore at Yarmouth.—Coasts of Cornwall and Devonshire, both varieties. Mrs. Griffiths.

Perennial? January—April.

ROOT, a very minute callous \* disk.

FRONDS, numerous, two or three inches long, rising with a single flat undivided leaf, at first sub-orbicular, afterwards oblong, about four lines wide, the apices constantly blunt, and the margins quite entire, furnished with a deep red midrib, blackish at the base, as thick as horse-hair, clearly visible to the very apices, proliferous throughout its whole length with other leaves precisely similar to the primary one, except in their smaller size, and these again with a third or sometimes with a fourth series, each less than the preceding, the middle ones generally longest, but this is uncertain, the youngest roundish or inversely ovate: the leafy membrane, at the base of the frond, is generally worn away by the action of the sea, so that the midrib is left naked, and the plant has the appearance of being naturally provided with a stem: from either side of the midrib, at rather acute angles and short distances, issue rows of pellucid colorless veins, visible to the naked eye in a recent plant, intersected at regular distances by joints like the dissepiments of *Confervæ*, and generally running to the margins of the leaf in a direction parallel to each other and undivided, but sometimes branched and anastomosing.

FRUCTIFICATION, of two kinds, on different plants; the one consisting of dark-red spherical capsules, smaller than poppy seed, sessile on the midrib, especially towards the apices of the younger leaves, and containing a great quantity of globular seeds, surrounded by a pellucid limbus; the other consisting of extremely minute naked seeds, of uncertain size and form, disposed in small patches of an irregularly lanceolate shape on each side of the midrib, the frond being apparently thickened where they lie.

COLOR, of the leaf, transparent, blood-red; when dry, crimson: of the midrib, darker.

SUBSTANCE, thin and membranaceous, but elastic and stiff compared with that of *F. Hypoglossum*.

$\beta$  differs only in its smaller size, having its leaves not more than half an inch long, and one or two lines wide.

Upon the characters which separate this species from the preceding, I have already dwelt so much at large in the Transactions of the Linnean Society, and Synopsis of the British Fuci, that there can be no necessity here to repeat them, farther than by saying that the two plants are distinguishable by the form, color, and substance of the leaves, but still more certainly by the texture, which in *F. Hypoglossum* is uniform, and composed of most beautiful reticulations, forming oblong meshes, while in *F. ruscifolius* the reticulations are so minute as to require a compound microscope to discern them, but the frond is very visibly streaked with pellucid veins, as mentioned in the description. I am sorry to be under the necessity of adding, that I now see reason to believe that the whole of the opinion I formerly stated respecting the fructification of these plants, that the scattered seeds are in reality those which were contained in the tubercles, is erroneous. Their regular disposition had led me always to feel some doubt on this point, and more attentive observation, with higher microscopical powers, has shewn me that in this, as in most of the Fuci known to possess this double fruit, the capsular granules differ as to shape from those which lie naked on the frond, so that it is impossible they should ever have been the same; and I am fearful I was also in error when I said that plants were occasionally found, in which the two modes of fructification may be seen on the same individual. It is sufficiently known that different marine algæ often arise from one basis, and I now believe that the specimens on which I have seen both the capsules and scattered seeds were in reality distinct, though originating from the same point. I therefore incline to consider these plants as dioecious, and lament in common with the excellent Authors of *Observations on the British Fuci*, that in the present imperfect knowledge of the nature and properties of marine plants; it is impossible for us positively to determine how far the suspicion first entertained by Dr. Solander of their being male and female is well founded; and that from the impracticability of examining these plants whilst actually growing in their native element, it is probable that the manner in which the impregnation is performed may ever remain among the arcana of nature.

- |   |   |   |   |    |
|---|---|---|---|----|
| a. <i>Fucus ruscifolius</i> , natural size. | - | - | - | 2. |
| b. portion of the frond, magnified          | - | - | - | 1. |
| c. smaller part of ditto                    | - | - | - | 1. |
| d. summit of frond, with scattered seeds    | - | - | - | 3. |
| e. seeds                                    | - | - | - | 1. |
| f. summit of frond with capsule             | - | - | - | 3. |
| g. seeds                                    | - | - | - | 1. |

\* The fibres which are described in the Syn. Fuc. as adhering to the root, I believe to have been extraneous matter.





*Fucus ruscifolius.*







*Fucus*, caule ramoso alato; foliis latè oblongis, obtusis, planis, simplicibus, e costâ proliferis; venulis diaphanis catenatis; capsulis in costâ sphaericis, seminibusque sparsis.

*Fucus ruscifolius*. TURNER, in *Linn. Trans.* VI. p. 127. t. 8. f. 1. *Syn. Fuc.* I. p. 11. *Eng. Bot.* XX. t. 1395.

*F. Hypoglossum*. *Fl. Fr. Ed. 2da.* II. p. 27. (excl. *Syn. omni.*)

$\beta$ . *minor*; foliis ovato-lanceolatis, unguicularibus.

*F. ruscifolius*.  $\beta$ . *Syn. Fuc.* I. p. 11.

HABITAT in Cornubiæ et Devonîæ oris, utraque varietas. *D<sup>na</sup> Griffiths*— $\alpha$  inter rejectamenta maris apud Yermutham.

*Perennis?* Jan.—Apr.

RADIX \* callus explanatus, exiguus.

FRONDES ex eâdem basi plurimæ, bi-tri-pollicares, folio unico, plano, sub-orbiculari, simplice, primùm assurgentes, apicibus nunquam non obtusis, marginibusque integerrimis: hoc folium costâ percurritur sanguineâ, basin versus nigricante, setæ equinæ crassitie, ad apices usque conspiciendâ, per totam longitudinem proliferâ, folia alia primariis, staturâ minore demptâ, omnimodè convenientia emittente, quæ tertiâ vel interdum quartâ serie, utrâque præcedente minore, sunt instructa; media plerumque longissima, sed hoc inconstans, juniora subrotunda vel obovata; membrana frondis ad basin foliacea vi fluctuum sæpius atteritur, unde costa denudata caulis speciem præbet. Ex utroque costæ latere emanant venarum pellucidarum albarum series, intervallis brevibus distinctæ, patentes, oculo inermi in recente conspiciendæ, Confervarum instar geniculatæ, et ad foliorum margines plerumque simplices et parallelæ, sed quandoque ramosæ et anastomosantes, decurrentes.

FRUCTIFICATIO duplex: hæc e capsulis intensè rubris, sphaericis, papaveris semine minoribus, in costâ, presertim foliorum juniorum apices versus, sessilibus, semina plurima globosa limbo pellucido cincta includentibus, illa e seminibus constans minutissimis, nudis, figuræ magnitudinisque incertæ, in maculas abnormitè lanceolatas costâ percursas dispositis; frondis cui insident parte incrassatâ.

COLOR folii e roseo sanguineus, diaphanus, *exsiccati* puniceus; costæ intensior.

SUBSTANTIA tenuis et membranacea, sin cum eâ *F. Hypoglossi* conferatur rigidiuscula.

Varietas  $\beta$  non nisi staturâ minore discrepat: folia huic longitudine unguem, latitudine lineam unam atque alteram vix exsuperant.

De iis quæ hanc speciem a præcedente secernunt notis jampridem in Societatis Linnæanæ Actis et in Fucorum Britannicorum Synopsi tam fusè disserui, ut nihil hîc aliud repetendum ducam, nisi quodd foliorum figurâ, colore, et substantiâ, certissimè autem texturâ discrepent, quæ in *F. Hypoglossi* uniformis est et pulcherrimè reticulata, maculis oblongis, dum *F. ruscifolii* frons tantummodò microscopii compositi ope reticulata apparet, contrâ autem venulis pellucidis jamjam in descriptione memoratis per totam longitudinem notata evadit. Invitum fateri cogit veritas, totam illam hypothesin quam de harum plantarum fructu olim struxeram, scilicet semina sparsa eadem esse quæ antea in capsulis erant inclusa, observationibus nuperis nequaquam esse confirmatam. Dispositio regularis scrupulos semper injecerat, lentisque acrioris usus tandem edocuit, semina nuda, in hæc, sicut in aliis plurimis speciebus fructificatione duplici præditis, figurâ ab iis quæ capsulâ continentur discrepare, unde eadem unquam extitisse prorsus impossibile. Illud etiam vereor, ne, cum utrumque fructificandi modum in eodem individuo quandoque occurrere assererem, vix satis cautè dixerim. Diversas ex eâdem basi algarum species non rarò oriri satis Botanicis notum; easque frondes, in quibus cum capsulas tum semina sparsa vidi, licet ex uno puncto sint natæ, reverà distinctas fuisse suspicor. Hasce igitur plantas pro dioicis in præsens habere nunc propendeo, et unâ cum viris amicissimis, Goodenovio et Woodwardio, lugeo, quodd in mancâ illâ, quâ solâ nunc fruimur, algarum marinarum indolis atque proprietatum cognitione, non nobis detur ritè dijudicare, quatenus opinio primùm a Solandro excogitata fructificationem duplicem ad duplicem sexum pertinere re ipsâ sanciat, et quodd impossibile sit has stirpes in solo nativo nascentes observare, unde impregnandi modus inter arcana naturæ arcanum forsân perpetuò permanebit.

a. <i>F. ruscifolius</i> , magn. nat.				
b. frondis pars, magn. auct.	-	-	-	2.
c. ejusdem pars minor	-	-	-	1.
d. frondis apex seminibus sparsis	-	-	-	3.
e. semina	-	-	-	1.
f. frondis apex cum capsulâ	-	-	-	3.
g. semina	-	-	-	1.

\* Fibras quas in *Fuc. Brit. Syn.* radice adhærentes descripsi a plantâ alienas fuisse nunc credo.



*Fucus stiriatus*, frond flat, sub-gelatinous, cuneiform, palmate, every where beset with compressed strap-shaped ramuli, generally simple, longitudinally furrowed; capsules spherical, half-immersed.

*Fucus papillosus*. Gmelin, *Hist. Fuc.* p. 188.?

*F. Koelreuteri*. Linn. *Syst. Nat. Ed. Gmel. II.* p. 1388.?

*Ulva papillosa*. Linn. *Mant.* p. 311. (excl. Syn. Gmel.)

*F. foliaceus*, frondibus fructificantibus papillatis. Koelreuter in *Nov. Comment. Petrop. XI.* p. 424. l. 13.?

At the Cape of Good Hope. Thunberg.

ROOT, composed of branched, creeping, entangled fibres, gradually rising into new fronds.

FRONDS, many from the same base, three or four inches long, immediately at their origin cylindrical, and about the size of a sparrow's quill, then becoming compressed, and insensibly widening into a flat leaf, of a shape between oblong and cuneiform, at first simple, but afterwards once or twice irregularly palmate. Either side of the frond, and even the margins, are covered with a profusion of ligulate ramuli, between erect and patent, an inch or more long, in general simple, compressed, irregularly wrinkled, and longitudinally furrowed; their summits cylindrical, and attenuated, so that in dry specimens they have almost an acuminate appearance.

FRUCTIFICATION, spherical capsules, about the size of the seeds of *Ervum tetraspermum*, placed without any certain order, sometimes at the apices, sometimes on the surface of the ramuli, and half immersed in the substance of them, containing a compact purplish globule, full of extremely small seeds of no regular form: the apices of the capsules perforated with a minute pore.

COLOR, brownish purple, semitransparent; more dark in the plant when dry, soon fading to a dull dirty yellow, to which it also turns in decay.

SUBSTANCE, between gelatinous and cartilaginous, extremely tender and pulpy: when dry, horny and rigid: when moistened, it imbibes a great deal of water, and shrinks considerably in drying.

The specimens of this *Fucus* here figured were taken from Ellis's Herbarium, where, when I first saw them, their nature and appearance struck me altogether as so particular, that I could scarcely refrain from regarding them as a mere *lusus naturæ*; nor was it till I again met with similar ones in the Linnæan Collection, and received others under the very apt name of *F. stiriatus* from Professor Mertens, that I could reconcile myself to considering it a distinct species. Neither to Ellis's nor Linnæus's plants were any habitats affixed, but those sent by Professor Mertens were gathered by Sir C. P. Thunberg at the Cape of Good Hope. It is in compliance with the opinion of my friend, Dr. Mohr, that I have quoted *F. papillosus*, Gmel. under the present *Fucus*; but I could not regard Gmelin's synonym as sufficiently indisputable to warrant the introducing of it without a mark of doubt, or to justify me in adopting his name; as his description by no means applies, either with regard to the substance, the stem, the reflexed margins, or the form of the papillæ, and I rather incline to suspect that Koelreuter's figure was intended to represent one of the appearances of *F. bracteatus*, Gmel. (*F. Radula*, Esp.) a plant particularly liable to variation. Linnæus's account of his *Ulva papillosa* agrees much better with *F. stiriatus*, and was probably taken from it in a dried state: there are no specimens under this name in his Herbarium, so that those alluded to above may possibly be what he described; but, if this conjecture be well founded, he has made a strange error in taking for a synonym *F. muricatus*, Gmel. which belongs to his own *F. spinosus*. The plant introduced by Forskål under the name of *F. papillosus* is merely a variety of *F. obtusus*. *F. stiriatus* is distinguished from its congeners by its ligulate ramuli, and gelatinous substance: its capsules also are larger than those of most of the Fuci, and, what is singular, are perforated at their apices with a pore which is distinguishable even in dry specimens. I have sought in vain for those reticulated anastomosing fibres, which Weber and Mohr say they found particularly evident mixed with the globule of granules in this species.

- a. *F. stiriatus*, natural size.
- b. young plant, with root, but no ramuli yet appearing.
- c. plant in fruit.
- d. part of the same, magnified - - - - 4.
- e, e. globules of granules taken out of the capsules - 2.
- f. seeds - - - - - 1.





*Fucus stiriatus*







*Fucus* fronde planâ, subgelatinosâ, cuneiformi, palmatâ, ramulis compressis, ligulatis, simpliciusculis, longitudinaliter sulcatis undique et utrinque densè obsitâ; capsulis sphaericis semi-immersis.

*Fucus papillosus*. GMELIN, *Hist. Fuc.* p. 188.?

*F. Koelreuteri*. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1388.?

*Ulva papillosa*. LINN. *Mant.* p. 311. (excl. Syn. Gmel.)

*F. foliaceus, frondibus fructificantibus papillatis*. KOELREUTER, in *Nov. Comment. Petrop.* XI. p. 424. t. 13.?

HABITAT apud Promontorium Bonæ Spei. Thunberg.

RADIX fibrosa, fibris ramosis, repentibus, intertextis, in novas frondes paullatim crescentibus.

FRONDES, ex eâdem radice plurimæ, circiter palmares, sub ipso ortu pennæ passerinæ crassitie, et teretes, inde statim ferè compressæ, seque sensim in folium planum, enerve, ex oblongo cuneiforme, principio simplex, mox iterùm atque iterùm sine ordine palmatum, segmentis unguem vel pollicem latis, dilatantes. Utramque frondis paginam, atque etiam margines, densissimè obsident ramuli ligulati, erecto-patuli, plerumque simplices, pollicares et ultrâ, compressi, irregularitè rugosi et longitudinaliter sulcati, apice teretes, et attenuati, ut in plantâ exsiccatâ acuminati propemodùm videantur.

FRUCTIFICATIO capsulæ sphaericæ, *Ervi tetraspermi* seminum ferè magnitudine, ramulorum nunc apicibus, nunc superficiei absque ordine insidentes, et semi-immersæ, globulum compactum purpurascentem e seminibus minutissimis, figuræ nequaquam certæ constantem includentes, apice poro exiguo pertusæ.

COLOR fusco-purpurascens, sub-diaphanus; *exsiccatæ* intensior; *marcescentis* sordidè lutescens.

SUBSTANTIA inter gelatinosam et cartilagineam, tenerrima, succosa; *exsiccatæ* cornea, rigida:—aquæ plurimum madefacta imbibit, et exsiccando magnoperè contrahitur.

Cùm hujus Fuci exemplar hîc depictum in Ellisii Herbario primùm cernerem, figura et indoles adeò mihi singulares sunt visæ, ut pro lusu quodam naturæ, ut aiunt, habere propenderim. Postea verò phytophylacium Linnæanum perlustranti plura sese specimina obtulerunt, (neque tamen his neque Ellisianis loco ullo natali adjecto,) et tandem a Mertensio eandem stirpem, *F. stiriati* nomine aptissimo designatam, ad Caput Bonæ Spei lectam accepi, nec distinctam esse reverà speciem e tot partibus missam ampliùs dubitare licuit. Amicissimi Mohrii, qui se in eâ esse sententiâ nuperrimè me per literas certiore fecit, monitui obsequens, *F. papillosum* Gmel. sub hâc specie citavi; dubitationis tamen signo postposito: neque enim viro acutissimo edusque assentiri sim ausus, ut synonymum pro indubio habens nomen a Gmelino impositum asciscam, cùm ejus descriptio, quoad substantiam, caulem, margines reflexos, et papillarum formam, nequaquam tantum quantum vellem *F. stiriato* respondeat, et Koelreuteri icon, dubia, *F. bracteatum* Gmel. (qui *F. Radula* Esp.) stirpem præ cæteris plerisque variabilem potiùs respicere mihi videatur. Linnæi *Ulva* suæ *papillosæ* descriptio tantò meliùs cum hoc Fuco nostro convenit, ut ab exsiccatò depromi possit, nec extant ulla in Herbario suo hoc nomine insignita exemplaria:—sin ita sit, mirè de synonymo erravit, *F. muricatum* Gmel., qui ipsissimus est *F. spinosus*, ad hanc speciem referens. *F. papillosus* Forsk. est tantummodò *F. obtusi* varietas. Ramuli ligulati et substantia gelatinosa *F. stiriati* a congeneribus distinguere semper valebunt; capsulæ quoque iis plurimorum Fucorum multò majores, et, quod singulare, poro, vel in siccâ conspiciendo, ad apices pertusæ. Filamenta reticulata anastomosantia, quæ granulorum glomerulo immixta evidentissimè in hâc stirpe perspexerunt Weberus Mohriusque, ipse frustra conquisivi.

- a. *F. stiriatus*, magn. nat.
- b. *planta junior, cum radice; ramulis nondum exortis.*
- c. *planta fructifera.*
- d. *ejusdem pars, magn. auct.* - - - - 4.
- e. *granulorum glomeruli capsulis deprompti* - - - 2.
- f. *semina* - - - - - 1.



*Fucus Horneri*, with sub-cylindrical frond, and branches long, compressed, generally simple, ending in a long cylindrical pod; vesicles oblong, terminated by a linear decurrently pinnatifid leaf.

In the Straits of Corea. Dr. Horner.

I am unable to say any thing as to the ROOT or length of the frond of this *Fucus*.

STEM, nearly cylindrical, furrowed in places, thicker than a crow's quill, sending out branches at intervals of three or four inches, whether ever divided or not I am ignorant, but I have seen it entire for three feet.

BRANCHES, disposed round the stem in an irregularly spiral order, a little thickened at their origin, after which they become compressed, and preserve throughout their whole length the size of a sparrow's quill, sometimes one foot, sometimes two, or more long, undivided, but beset with other smaller ones, arranged at distances not exceeding a nail each, all of them terminated by a pod, if I may use the expression, about an inch and half long, cylindrical, simple, and as thick as the quill of a blackbird.

VESICLES placed in tolerable plenty upon the branches, especially the smaller ones, between oblong and cylindrical, supported upon extremely short stalks, in size and shape not unlike the pods of *Sisymbrium Nasturtium*, quite hollow within, ending in linear leaves, fixed upon short petioli, an inch or more long, but scarcely a line wide, pinnatifid with alternate decurrent laciniae, and furnished with an obsolete midrib, which disappears near the apices.

FRUCTIFICATION, in my opinion, unquestionably placed in the pods, most of which I found solid within, but some having a row of cavities near the circumference, in which, though I could discover no seeds, there were observable pellucid granules.

COLOR, in the leaves and vesicles, a tawny green; in the pods, brown.

SUBSTANCE, of the stem coriaceous, pliant and tough; of the leaves membranaceous.

In compliance with the wishes of my highly valued friend, Professor Mertens, I have named the present very beautiful *Fucus* in memory of Dr. Horner, who, in the quality of astronomer, accompanied the Russian expedition lately sent round the world in the ships *Nerva* and *Nadeshda*, and brought with him, from the coasts of Corea and Kamtschatka, a variety of species not yet described. The whole of these I have received from Professor Mertens, who was many years since termed by \*Weber and Mohr the most able *Algologist* of our times, and to whom I am exceedingly indebted for the assistance he has rendered me towards the present publication, in which I trust they will all soon make their appearance. These Asiatic *Fuci* constitute a tribe naturally allied among themselves, but very different, both as to form and nature, from those which are found in our seas, and none of them more strikingly so than that which is the subject of the present plate. As to the fructification, I have already observed in the description, that I can say nothing positively; but at the same time I entertain no doubts whatever of its being unlike that of any of the families of European *Fuci*, or of its being contained in the long terminal pods, which in their form, and their smooth exterior, perforated with no pores, resemble those of *F. lumbricalis*, while the pellucid granules observable within them are like those of *F. tuberculatus* and *erinaceus*. From the mode of growth of this *Fucus*, the almost ligneous stem, and the vesicles, a suspicion might be entertained that it belongs to the tribe of *F. natans*, but the thin membranaceous texture of the leaves and the fructification forbid such a conjecture.

- |                                      |   |   |   |    |
|--------------------------------------|---|---|---|----|
| a. <i>F. Horneri</i> , natural size. |   |   |   |    |
| b. upper part of a branch, magnified | - | - | - | 6. |
| c. horizontal section of a pod       | - | - | - | 5. |
| d. ditto of another pod              | - | - | - | 4. |
| e. pellucid granules                 | - | - | - | 1. |

\* Beiträge zur Naturkunde, I. p. 269.





*Fucus horneri.*







*Fucus* caule teretiusculo; ramis elongatis, compressis, simpliciusculis, in siliquam longam teretem abeuntibus; vesiculis oblongo-cylindraceis, folio lineari decursivè pinnatifido, terminatis.

HABITAT in Mari Coreano. D. Horner.

Nec de RADICE, nec de frondis longitudine, utrâque mihi adhuc incognitâ, aliquid proferre possum.

CAULIS teretiusculus, hic illic sulcatus, pennâ corvinâ crassior, simplex necne dicere nequeo, sed per trium pedum longitudinem indivisum vidi, ramos intervallis sub-palmaribus emittens.

RAMI circa caulem ordine irregularitè spirali dispositi, ortu levitèr incrassati, hinc compressi, pennæque passerinae crassitiem ubique æqualem servantes, longitudine pedales, bipedales, et ultra, indivisi, sed aliis minoribus brevibus, intervallis sub-unguicularibus absque ordine positos, instructi; omnes terminati siliquâ, ut ita dicam, sesquipollicari, tereti, simplice, Meralæ pennæ crassitie.

VESICULÆ ramis, præsertim minoribus, satis copiosè innascentes, oblongo-cylindraceæ, brevissimè pedicellatæ, *Sisymbrii Nasturtii* siliquarum haud absimiles, intus cavæ, apice in folia abeuntes linearia, breviter petiolata, pollicem et ultra longa, vix lineam lata, pinnatifida, laciniis alternis decurrentibus, costâ obsoletâ prope apicem evanescente instructa.

FRUCTIFICATIONEM in siliquis, quarum plurimas intus solidas, quasdam vero instructas vidi cellulis juxta peripheriam cavis, reperiri dubitari nequit, sed semina nulla adhuc detexi.

COLOR foliorum et vesicularum e viridi fulvescens, siliquarum fuscus.

SUBSTANTIA caulis coriacea, lenta, tenax, foliorum membranacea, tenuis.

Amici suavissimi Mertensii votis obsequens perpulchrum hunc *Fucum*, quem e Mari Coreano secum attulit D. Horner, Russicæ circa orbem expeditioni, a navibus *Nerva* et *Nadeshda* nuper habitæ, astronomus adjunctus, *Horneri* nomine insignivi. Plures quoque alias nondum cognitæ, sed mox in hoc opere evulgandas species, Coreæ Kamtchatkæque ad littora legit D. Horner. Has omnes Mertensio meo, quem jamdudum algologorum hujus ævi principem \*Weberus Mohriusque salutârunt, et cui plus quàm quod verbis exprimi potest debeo, acceptas refero. Ab iis quæ in Europæ nostræ nascuntur maribus Asiaticæ hæ species formâ et indole longè recedunt, non ulla tamen longiùs quàm ea quam hic depictam sisto. De fructificatione, ut in descriptione dixi, nihil pro certo affirmare ausim, nec tamen dubito quin ab omnibus hucusque notis *Fucorum* familiis recedat, et in siliquis terminalibus elongatis, quæ extrinsecus læves, poris nullis pertusæ, eas *F. lumbricalis* referunt, contineantur. Granula pellucida in his inclusa eorum in *F. tuberculato*, *erinaceo*, et quibusdam aliis observatorum similia videntur. A crescendi modo, caule sub-ligneo, vesiculisque, huic *Fuco* cum *F. natantis* tribu similitudinem aliquam intercedere suspicari liceret, ut foliorum textura membranacea tenuis et fructificatio vetarent.

a. <i>F. Horneri</i> , nat. magn.				
b. rami pars superior, magn. auct.	-	-	-	6.
c. siliquæ sectio horizontalis	-	-	-	5.
d. alius siliquæ sectio horizont.	-	-	-	4.
e. granula pellucida	-	-	-	1.

\* Beiträge zur Naturkunde, I. p. 269.



*Fucus spinosus*, frond sub-gelatinous, cylindrical, much and irregularly branched; branches flexuose, almost horizontal, acuminate; ramuli short, conical, horizontal, bearing spherical capsules at their apices.

*Fucus spinosus*. LINN. *Mant.* p. 313. *Syst. Nat. Ed. Gmel.* II. p. 1386. (excl. Syn. Wulf.)

*F. muricatus*. GMELIN, *Hist. Fuc.* p. 111. t. 6. f. 4.

*F. lichenoides*. WILLD. *Phytog.*

At the Cape of Good Hope. *Linnaeus*.—In the Indian Ocean. *Gmelin*.—In Sumatra. *Swartz*.

ROOT, a small, expanded, whitish callus, throwing out a few fibres, and thence becoming creeping.

FROND, about nine inches long, and as thick as a goose-quill, cylindrical, much branched, the branches sometimes irregularly dichotomous, sometimes alternate, either simple, or furnished here and there, especially towards the apices, with a few shorter ones, all of them between horizontal and patent, flexuose, remarkably acuminate, and more or less copiously beset with extremely short horizontal ramuli, either conical, or between subulate and conical, disposed on every side over the whole frond, sometimes growing solitary, sometimes two or three together, occasionally studded with others much more minute, and lengthening into new branches, thus forming the natural increase of the plant.

FRUCTIFICATION, terminal, placed at the ends of the ramuli, which then swell into pale-red globular capsules, about the size of turnip seed, containing a mass of irregularly formed minute granules: two capsules are sometimes found on the same ramulus.

COLOR, in the specimens which I have seen, a dirty yellowish white, more or less tinged with green.

SUBSTANCE, between cartilaginous and gelatinous; horny when the plant is dry.

Having never had an opportunity of examining Professor Willdenow's *Phytographia*, I have admitted his Synonym, which is quoted above, wholly upon the authority of Dr. Weber and Dr. Mohr, and have borrowed from the same Botanists the information given to them by Dr. O. Swartz, that this plant is eaten by the natives of Sumatra. To the kindness of my friend, Dr. Smith, I am indebted for the being able here to figure the very specimens preserved in the Linnæan Herbarium, so that there can be no farther doubt as to the plant designed by Linnaeus under the name of *F. spinosus*, a point that has been hitherto much contested. The two individuals represented in the present plate will serve sufficiently to shew how great a difference exists between the barren and fructified state of the species before us, and the change which it undergoes in drying is scarcely less striking, as may easily be conceived from the circumstance of their having then lost near two inches of their length, and more than the half of their thickness. At the same time, I am far from intending to deny that specimens may occasionally occur, which, though barren, may be furnished with ramuli no less copiously than those which are in fructification, but I believe the contrary to be the case in general. *F. spinosus* agrees in its internal structure with *F. stiriatus*, figured above, t. 16, and unquestionably belongs to the same tribe of Fuci; its nearest affinity however is with *F. gelatinus*, Esp. and the following species, from the former of which it is principally distinguished by its habit, stature, and mode of growth, and from the latter, by the form of the ramuli and solitary capsules. The whole of the specimens that I have yet seen were, as I have observed in the description, of the same color as those here figured, but I should nevertheless be led by analogy to suspect that the natural hue of the plant is either red, or reddish brown, colors particularly liable to change. The error into which Baron Wulfen fell, and in which he has been followed by most succeeding Botanists, mistaking Hudson's *F. obtusus* for the *F. spinosus* of Linnaeus, has already been noticed in the Synopsis of the British Fuci, and may serve as a striking proof how impossible it is to convey by the very best descriptions, unless they are copious, an adequate idea of plants like these.

- a. *F. spinosus*, barren, natural size.
- b. ditto in fruit.
- c. part of the frond, magnified - - 5.
- d. capsule - - - - 4.
- e. section of ditto - - - 2.
- f. seeds - - - - 1.
- g. longitudinal section of frond - - 2.
- h. horizontal section of ditto - - 2.





*Fucus spinosus.*







*Fucus* fronde sub-gelatinosâ tereti ramosissimâ; ramis flexuosis, sub-horizontalibus, acuminatis; ramulis brevibus, conicis, apice globuliferis.

*Fucus spinosus*. LINN. *Mant.* p. 313. *Syst. Nat. Ed. Gmel.* II. p. 1386. (excl. Syn. Wulf.)

*F. muricatus*. Gmelin, *Hist. Fuc.* p. 111. t. 6. f. 4.

*F. lichenoides*. Willd. *Phytog.*

HABITAT ad Caput Bonæ Spei. Linnaeus.—In Oceano Indico. Gmelin.—In Sumatrâ. Swartzius.

RADIX callus exiguus, dilatatus, albicans, fibras aliquot crassiusculas emittens, et inde repens.

FRONS dodrantalis et ultra, pennæ anserinæ crassitie, teres, ramosissima, ramis elongatis, nunc irregularitèr dichotomis, nunc sub-alternis, vel simplicibus, vel hîc illic, præsertim apices versus, in breviores aliquot divisîs: rami omnes horizontalitèr patuli, flexuosi, insignitèr acuminati, ramulis brevissimis, conicis, aut subulato-conicis, horizontalibus, vel solitariis, vel binis ternisque, undique et ubique dispositis, nunc densè nunc sparsim obsiti: hî ramuli aliis minoribus aliquando pullulant, et in novos ramos elongantur.

FRUCTIFICATIO terminalis, ramulorum ad apices, tunc in capsulas sphæricas, solitarias, vel etiam binas, *Brassicæ Ropæ* seminum magnitudine, dilutè rubras, intumescentes, sita: congeries in his seminum minutissimorum, nullius certæ figuræ.

COLOR, in omnibus quæ vidi exemplaribus, e luteo sordidè albicans, viredine tinctus.

SUBSTANTIA gelatinoso-cartilaginea, in *exsiccatâ* cornea.

Willdenovii synonymon ex opere nondum a me viso suprà citatum Weberi Mohriique fide hûc retuli, et plantam Sumatræ ab incolis comedi eosdem viros, quibus a Swartzio est traditum, auctores habeo. Quòd exemplarium ex ipsius Linnæi Herbario depromptorum hic depingendi facultas mihi detur amicissimi Smithii singulari benevolentia debeo, unde ut icon nostra *F. spinosum* L. reverà sistat dubitationi non datur locus. Quantum stirps fructifera a sterili discrepet satis per individua hîc delineata liquet, vixque inter madentem et exsiccatam minus interest; cùm perpauca aliæ Fucorum species sese exsiccatione magis contrahat, et specimina hæc Linnæana longitudine duos pollices, crassitiem plusquam dimidiam tunc perderent: non tamen is ego sum qui asseram exemplaria sterilia nunquam dari, quæ ramulis æquè ac in fructiferis copiosè dispositis sint obsita, sed plerumque parcius instructa credo. Structurâ suâ internâ cum *F. stiriato*, supra delineato, t. 16, magnoperè convenit, et ad eandem Fucorum familiam certè attinet; plurimum autem affinitatis habet cum *F. gelatino* Esp. et cum insequente specie, quorum a primo habitus, statura, et crescendi modus, ab altero ramulorum forma et capsulæ solitariæ distinguunt. Specimina, ut in descriptione dixi, tantummodò sordidè albicantia vel virentia vidi, colorem tamen plantæ recenti proprium esse rubentem, aut subfuscum rubedine tinctum ex analogiâ crederem. Hic quoque color præ cæteris fugacissimus. Quantum de *F. spinoso* L. erravit illust. de Wulfen, botanicus summâ laude dignissimus, quem *F. obtusum* Huds. sub hoc nomine depingentem auctores plurimi sunt secuti, jampridè in *Fucorum Britannicorum Synopsi* dixi, et quàm paullùm harum plantarum descriptionibus brevibus, quamvis optimis, sit fidendum, post talem talis viri errorem, fieri nequit quin mæsti confiteamur.

- |  |   |   |   |    |
|--|---|---|---|----|
| a. <i>F. spinosus, sterilis</i> , magn. nat. |   |   |   |    |
| b. <i>idem, fructifer.</i>                   |   |   |   |    |
| c. <i>frondis portio</i> , magn. auct.       | - | - | - | 5. |
| d. <i>capsula</i>                            | - | - | - | 4. |
| e. <i>eadem dissecta</i>                     | - | - | - | 2. |
| f. <i>semina</i>                             | - | - | - | 1. |
| g. <i>frons longitudinalitèr secta</i>       | - | - | - | 2. |
| h. <i>eadem horizontalitèr secta</i>         | - | - | - | 2. |



*Fucus thyrsoides*, frond cylindrical, filiform, irregularly pinnated; branches between horizontal and patent, cylindrical, obtuse; ramuli cylindrical, horizontal, short, bearing at their apices clustered capsules.

*β. major*; frond much and irregularly branched; branches very long.

New Zealand. *Sir Joseph Banks*.—Jamaica. *Dr. Wright*.—*β* in the Red Sea. *Viscount Valentia*.

ROOT, creeping, consisting of many thickish, entangled fibres, which lengthen and rise into new fronds.

FRONDS, numerous from the same root, cylindrical, filiform, nearly equal in thickness to a crow's quill, in general simple and undivided for the half of their length nearest the base, then frequently di- or tri-chotomous, and towards their apices irregularly pinnated with a few branches between horizontal and patent, disposed in a sub-distichous manner, and mostly simple: the part of the frond nearest the base is commonly naked, but the rest thickly covered on all sides with horizontal, cylindrical, obtuse, truncated ramuli, undivided, and scarcely a line long.

FRUCTIFICATION, terminal in the ramuli, which then swell towards the apices, and bear from three to seven small, spherical, clustered, sessile tubercles, in each of which lie several purplish seeds, of an irregularly roundish form, and large when compared to the size of the capsule.

COLOR, pale brown, tinged with purplish, semitransparent.

SUBSTANCE, cartilaginous, pulpy, horny when dry.

*β*, both in size and mode of growth, is remarkably different: its length extends to above a foot, its thickness is equal to that of a goose-quill: the frond is much and irregularly branched from the very root, divided without any order into long sub-fastigate branches, and is throughout thickly clothed with ramuli.

Finding no mention of the present plant in any preceding author, I have ventured here to describe it as a new species, and have derived the name from the resemblance which fructified specimens bear in miniature to the figures of the *Thyrsi* used by the Mænades in their Bacchanalia. Its nearest affinity is with *F. spinosus*, from which, as already observed under that plant, it differs in the form of its ramuli and clustered capsules; two circumstances upon which its most essential specific characters depend, and which will also serve to distinguish it from *F. pinnatifidus*, to some varieties of which it bears a resemblance at first sight. I am not aware that there is any other *Fucus* with which it is liable to be confounded.

a. *F. thyrsoides*, barren, natural size.

b. branch, magnified - - - - 6.

c. plant in fruit - - - - 6.

d. part of the same - - - - 4.

e. cluster of capsules - - - - 3.

f. seeds - - - - 1.





*Fucus thyrsooides.*







*Fucus* fronde terete, filiformi, vagè pinnatà; ramis horizontalitèr patulis, cylindræis, obtusis; ramulis cylindræis, horizontalibus, abbreviatis, apice capsuliferis; capsulis congestis.

*β. major*; fronde ramosissimā; ramis elongatis.

HABITAT in Novā Zealandiā, *D. J. Banks, Baronet.*—In Jamaicā, *D. Wright.*—*β* in Mari Rubro. *Viccomes de Valentia.*

RADIX repens, e fibris plurimis, crassiusculis, implexis, demum elongatis, et in novas frondes assurgentibus, constans.

FRONDES ex eādem basi plurimæ, palmares, vel sesquipalmares, teretes, filiformes, pennæ corvinæ ferè crassitie, plerumque simplices et indivisæ, donec longitudinis dimidium attigerint, ibi sæpe di-tri-chotomæ, et prope apices ramis aliquot vagis, horizontalitèr patulis, sub-distichis, ut plurimum simplicibus, irregularitèr pinnatæ: frondes, quæ radici proximæ, sæpius nudiusculæ, inde ramulis horizontalibus, cylindræis, abbreviatis, vix lineam longis, obtusis, simplicibus, truncatis, undique dense obsitæ.

FRUCTIFICATIO terminalis in ramulis, qui tunc intumescunt, et tubercula tria, quatuor, vel interdum sex, septemve, globosa, congesta, sessilia, exigua ferunt: semina in singulis aliquot subrotunda, figuræ tamen sub lente incertæ, pro capsulæ ratione magna, purpurascencia.

COLOR dilutè fuscus, purpurascente tinctus, subdiaphanus.

SUBSTANTIA cartilaginea, pulposa; *exsiccata* cornea.

*β* magnitudine et crescendi modo insignitèr differt: longitudo plusquam pedalis, crassities pennæ anserinæ; frons a radice usque ramosissima, in ramos longos sub-fastigiatos abnormitèr divisa, ramulis a basi ad apices vestita.

Stirpem hanc, ab omnibus quantum reperio, auctoribus prætermisam, hic pro novā specie proponere sum ausus; nomenque indidi ab eā depromptum similitudine, quam, si parva licet componere magnis, formā præ se fert planta fructifera cum *Thyrsis* quibus Mænades in Bacchanalibus uti solitæ. Arcetissimam habet cum *F. spinoso* affinitatem, sed, ut sub illā specie jamjam est observatum, ramulorum forma et capsulæ congestæ distinguunt: his quoque nituntur characteres specifici maximè essentielles, et qui ad dignoscendum a *F. pinnatifido*, e cujus varietatibus quibusdam primo aspectu non absimilis, semper valebunt. A reliquis hactenus descriptis Fucis satis diversus.

a. <i>F. thyrsoides, sterilis</i> , magn. nat.					
b. <i>ejusdem ramus</i> , magn. auct.	-	-	-	-	6.
c. <i>stirps fructifera</i>	-	-	-	-	6.
d. <i>ejusdem portio</i>	-	-	-	-	4.
e. <i>capsularum racemus</i>	-	-	-	-	3.
f. <i>semina</i>	-	-	-	-	1.



*Fucus pinnatifidus*, frond compressed, cartilaginous, branched; branches mostly alternate, doubly pinnatifid; ramuli blunt, callous; capsules ovate, sessile, and naked seeds on the ramuli.

*Fucus pinnatifidus*. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1385. *Fl. Ang.* p. 581. *Fl. Scot.* p. 953. Linn. *Trans.* III. p. 167. WITH. IV. p. 106. *Ner. Brit.* p. 48. t. 11. *Syn. Fuc.* II. p. 267. *Eng. Bot.* XVII. t. 1202. ESPER,  *Ic. Fuc.* II. p. 44. t. 132. *Fl. Fr. Ed. 2da.* II. p. 30.

*F. corymbiferus*. ESPER,  *Ic. Fuc.* I. p. 136. t. 94. (excl. syn.)

*F. corymbifer*. WULFEN, *Crypt. Aquat.* n. 32. (excl. syn. Gmel.)

*F. multifidus*. *Fl. Ang.* p. 581.

*F. membranaceus acaulis angustior, foliis palmæ ferè in modum divis, marginibus laciniatis et veluti crispis.* MORIS. *Hist. Or.* III. p. 646. s. 15. t. 8. f. 2.

*F. Dealensis Pedicularis rubrifolio.* RAI Syn. p. 48. n. 37.

*F. ramosus piperis sapore.* RAI Syn. p. 51. n. 55.

β. *Osmunda*; frond flat, generally undivided; ramuli short and multifid.

*F. pinnatifidus*. β. *Syn. Fuc.* II. p. 267.

*F. Osmunda*. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1385. GMELIN, *Hist. Fuc.* p. 155. t. 16. f. 2. *Ner. Brit.* p. 46. t. 11. ESPER,  *Ic. Fuc.* I. p. 121. t. 62. *Fl. Fr. Ed. 2da.* II. p. 31.

*F. filicinus*. *Fl. Scot.* p. 954. (excl. syn. Huds.)

γ. *angustus*; frond roundish; ramuli cylindrical, thickened upwards, clustered, generally simple.

*F. pinnatifidus*. γ. *Syn. Fuc.* II. p. 268.

*F. pinnatifidus*. GMELIN, *Hist. Fuc.* p. 156. t. 16. f. 3.

*F. hybridus*. *Fl. Fr. Ed. 2da.* II. p. 30.?

δ. *tenuissimus*; frond flat; ramuli very thin, and much branched; the branches divaricated.

*F. pinnatifidus*. δ. *Syn. Fuc.* II. p. 268.

ε. *muricatus*; frond roundish; ramuli cylindrical, clustered, generally simple; the stem and branches here and there rough with extremely short rudiments of ramuli.

ζ. *major*; frond roundish; ramuli short, erect, every where imbricated.

α, β, and γ are sufficiently common on the shores of the British Isles, and France, and in the Mediterranean.—δ on the coasts of Devonshire and Cornwall. Mr. Stackhouse and Mrs. Griffiths.—ε in the Red Sea. Viscount Valentia.—ζ on the shores of Egypt. Sir Joseph Banks.

Annual. July—September.

ROOT, an expanded disk, here and there furnished with a few short creeping fibres.

FRONDS, numerous from the same base, growing in tufts, from three to seven, or even nine inches long, every where compressed, and preserving from root to summit an equal width of about one line. The mode of growth is different in different individuals, but in general the stems are twice or thrice dichotomous with branches of nearly equal height; sometimes they are altogether undivided. In its early stage the plant is pinnatifid throughout its whole length; when more advanced, it becomes naked towards the base, but in the upper part, and at least from the middle upwards, it is constantly pinnatifid, with branches all disposed in the same plane, distichous, patent, mostly alternate, separated by a short but very uncertain space, sometimes long, and again divided in a similar manner, sometimes short and simple; the apices always are rounded; the ramuli short, obtuse, most frequently simple, but sometimes multifid.

FRUCTIFICATION, of two kinds, each situated on the ramuli, either terminal or lateral; the one consisting of ovate, pale, diaphanous, sessile capsules, about the size of poppy seed, containing a few brown pyriform seeds; the other of naked, brown seeds, of very uncertain form, scattered over the ramuli, and immersed in their very substance.

COLOR, purplish, tinged with brown, somewhat transparent; when turning to decay pale pink; if exposed to the sun, a \* dirty greenish yellow.

SUBSTANCE, cartilaginous, juicy; thin and membranous after drying.

β has a frond of nearly the same length as α, not however every where linear and compressed, but flat, and wider towards the centre, where its diameter frequently equals three or four lines; nor is the stem divided into several long branches in a pinnated manner, but is beset with extremely short distichous, generally multifid ramuli: the color is a deep purplish brown.

In γ the frond is about two inches long, roundish, filiform, scarcely thicker than a sparrow's quill, in its lower part naked, in its upper, furnished with long, simple, crowded ramuli, cylindrical, but slightly thickened towards their apices, and less regularly distichous than in the two preceding varieties: the color is a pale purplish, very fugitive.

δ is a small variety, scarcely above an inch long; the stem flat, about a line wide; the ramuli distichous, mostly alternate, three or four times narrower than the stem, and multifid, with remarkably divaricated segments.

The red color of ε makes it a beautiful plant: the mode of growth is the same as in γ; the frond roundish, three or four inches long; the stem and branches here and there rough with very short roundish ramuli, scarcely discernible in a dried state without the aid of a glass.

ζ is

\* Gmelin Lightfoot, and DeCandolle have regarded this as the proper hue of the plant, which is certainly erroneous. Wulfen, whose description is in other respects, as usual, excellent, has erred surprisingly, in saying that the color is "at first green, then greenish red, and, when dry, blackish."





*Fucus pinnatifidus.*







ζ is thicker and larger than all the rest: its frond about five inches long, of the size of a goose-quill, roundish, much and irregularly branched; its ramuli short and erect, not disposed, as in the others, in a distichous, but rather in a tetrastichous order, or imbricated on all sides: the color is purplish, inclining to livid.

The specimens of *Fucus pinnatifidus* here figured may be regarded as intermediate between the varieties α and β, and may serve to illustrate the transition of its form from one of these appearances to the other. That a plant so extremely liable to such striking variations should have been divided by preceding authors into a number of species is far from being matter of astonishment; it would have been more surprising if it had not been so; but at the same time, I am fully persuaded from a long and attentive observation, as well as from the comparing of many specimens, that the whole of what is here included under its form in reality but one individual. I have noticed in all the varieties (excepting α alone) the double fructification, similar to that already described under *F. Hypoglossum* and *ruscifolius*, nor have I any doubt of its extending over a considerable family of the Fuci. The taste of *F. pinnatifidus* is singularly hot and biting, and the smell far from pleasant, whence the Scotch have distinguished it by the name of *Pepper Dulse*, but this, according to Lightfoot, does not prevent their eating it as a salad. I ought to mention, from my own observation, that this flavor is by no means constantly to be perceived, so that Mr. Stackhouse's attempt to separate *F. pinnatifidus* and *Osmunda*, on the ground of one being tasteless and the other acrid, necessarily fails. Among the numerous varieties of the present *Fucus*, none in point of beauty or elegance of form can vie with the *Osmunda* of Gmelin, the appearance of which, as has been justly remarked in the *Nereis Britannica*, is singularly handsome, and bears considerable resemblance to the fructified apex of *Osmunda regalis*, from which circumstance it derives its name. Stackhouse's var. β "which covers the rocks like a moss with a thick carpeting, and does not rise above an inch in height," I am persuaded, as well from his figure as from specimens sent by himself, is nothing more than the early state of the plant. There is some general resemblance between *F. pinnatifidus* and *F. dentatus*, which has led to the latter being figured under the name of the former in the *Flora Danica*: their mode of growth, however, texture, and fruit are too different for it to be necessary to dwell on the subject. Between the present and following species there is a much closer affinity, and on this some remarks will be found under *F. obtusus*. The error of Wulfen and Esper in confounding it with *F. corymbiferus* is really surprising. With regard to *F. hybridus*, of Decandolle, I would not venture to say any thing positively; for, though I have been led by the description to refer it to my variety γ, I have done it with doubt, on account of Gmelin's t. 16. f. 3. being quoted in the *Flore Française* under *F. pinnatifidus*. May it not possibly belong to *F. dasyphyllus*?

- |    |   |      |
|----|---|------|
| a  | <i>F. pinnatifidus</i> , natural size.        |      |
| b. | apex of frond with scattered seeds, magnified | - 6. |
| c. | seeds   | - 1. |
| d. | variety with capsules                         | - 6. |
| e. | seeds   | - 1. |
| f. | piece of variety γ with scattered seeds       | - 4. |



*Fucus* fronde compressâ, cartilagineâ, ramosâ; ramis sub-alternis, decomposito-pinnatifidis; ramulis obtusis, callosis; capsulis ovatis, sessilibus, seminibusque in ramulis sparsis.

*Fucus pinnatifidus*. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1385. *Fl. Ang.* p. 581. *Fl. Scot.* p. 953. Linn. *Trans.* III. p. 167. WITH. IV. p. 106. *Ner. Brit.* p. 48. t. 11. *Syn. Fuc.* II. p. 267. *Eng. Bot.* XVII. t. 1202. ESPER,  *Ic. Fuc.* II. p. 44. t. 132. *Fl. Fr. Ed. 2da.* II. p. 30.

*F. corymbiferus*. ESPER,  *Ic. Fuc.* I. p. 136. t. 94. (excl. syn.)

*F. corymbifer*. WULFEN, *Crypt. Aquat.* n. 32. (excl. syn. Gmel.)

*F. multifidus*. *Fl. Ang.* p. 581.

*F. membranaceus acaulos angustior, foliis palmæ ferè in modum divisis, marginibus laciniatis et veluti crispis.* MORIS. *Hist. Ox.* III. p. 646. s. 15. t. 8. f. 2.

*F. Dealensis Pedicularis rubrifolio.* RAII *Syn.* p. 48. n. 37.

*F. ramosus piperis sapore.* RAII *Syn.* p. 51. n. 55.

β. *Osmunda*; fronde planâ sub-indivisâ; ramulis brevibus multifidis.

*F. pinnatifidus*. β. *Syn. Fuc.* II. p. 267.

*F. Osmunda*. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1385. GMELIN, *Hist. Fuc.* p. 155. t. 16. f. 2. *Ner. Bri.* p. 46. t. 11. ESPER,  *Ic. Fuc.* I. p. 121. t. 62. *Fl. Fr. Ed. 2da.* II. p. 31.

*F. filicinu.* *Fl. Scot.* p. 954. (excl. syn. Huds.)

γ. *angustus*; fronde teretiusculâ; ramulis cylindraceis, sursùm incrassatis, confertis, sub-simplicibus.

*F. pinnatifidus*. γ. *Syn. Fuc.* II. p. 268.

*F. pinnatifidus*. GMELIN, *Hist. Fuc.* p. 156. t. 16. f. 3.

*F. hybridus*. *Fl. Fr. Ed. 2da.* II. p. 30.?

δ. *tenuissimus*; fronde planâ; ramulis ramosis, divaricatis, tenuissimis.

*F. pinnatifidus*. δ. *Syn. Fuc.* II. p. 268.

ι. *muricatus*; fronde teretiusculâ; ramulis cylindraceis, confertis, simpliciusculis; caule ramisque ramulorum rudimentis brevissimis hîc illic scabris.

ζ. *major*; fronde teretiusculâ; ramulis abbreviatis, erectis, undique et ubique imbricatis.

HABITAT, α, β, et γ in Britanniarum, et Galliæ oris, necnon in Mari Mediterraneo, satis copiosè.—δ in Cornubiæ et Devonîæ oris. D. Stackhouse et D<sup>na</sup> Griffiths.—ι in Mari Rubro. Vicecomes de Valentia.—ζ in Ægypti oris. D. J. Banks, Baronet.

*Annua.* Auctumno fert fructum.

RADIX discus explanatus; fibris tamen aliquot brevibus, repentibus hîc illic instructa.

FRONDES ex eâdem basi plurimæ, cæspitosæ, longitudine palmares, vel spithamæ, interdum etiam dodrantes, ubique compressæ, crassitiemque æqualem unius circiter lineæ a radice ad apicem servantes. Crescendi modus non omnibus idem; sæpissimè tamen caules bis terve sunt dichotomi, ramis sub-fastigiatis; aliquando omnino indivisi evadunt; stirps junior per totam longitudinem pinnatifida; adultior basin versus denudata; semper autem in parte superiore, et ad minimum a medio usque ad apices pinnatifida, ramis in eodem plano progredientibus, distichis, patulis, sub-alternis, spatio inter singulos brevi, attamen incertissimo, nunc elongatis, iterum atque iterum simili ratione divisis, nunc brevibus, simpliciusculis: apices semper sunt rotundati: ramuli breves, obtusi, ut plurimum simplices, quandoque multifidi.

FRUCTIFICATIO duplex; utraque in ramulis sita, nunc terminalis nunc lateralis; hæc e capsulis constans ovatis, diaphanis, pallidis, papaveris seminis magnitudine, sessilibus, semina aliquot fusca pyriformia includentibus; illa e seminibus nudis, fuscis, figuræ perquam variæ, per ramulos sparsis, et in ipsâ substantiâ immersis.

COLOR purpurascens, fusco tinctus, subdiaphanus; *marcescentis* dilutè roseus; *Soli exposita* e \* luteo sordidè virescens.

SUBSTANTIA cartilaginea, succosâ; *exsiccata* tenuis, membranacea.

β frondem habet ejusdem ferè quæ in α longitudinis, non tamen ubique linearem et compressam, sed planam, et centrum versus dilatatam, ubi sæpe trium quatuorve linearum est diametro; nec caulis in ramos multos longos pinnatim finditur, verum ramulis brevissimis, distichis, ut plurimum multifidis, cingitur: color intensè purpurascens.

Frons in γ circiter bipollicaris, teretiuscula, filiformis, pennâ passerinâ vix crassior, infernè nuda, supernè ramulis longis, simplicibus, approximatis, apices versus levitèr incrassatis, minùs regularitèr quam in varietatibus præcedentibus distichis obsita: color dilutè purpurascens, citissimè evanidus.

δ, quæ pusilla est varietas, et vix pollicem unum longitudine superat, caule gaudet plano, circiter lineam lato, ramulisque sub-alternis, caule ter quater angustioribus, multifidis, distichis, segmentis insignitèr divaricatis.

ι, planta est pulcherima ob colorem rubrum; crescendi modo eodem qui in γ, fronde teretiusculâ, palmari, vel sesquipalmari, caule ramisque hîc illic muriculatis ramulis brevissimis subrotundis, vix nisi lentis ope in exsiccata conspiciendis.

ζ omnibus

\* Hunc pro genuino plantæ colore habent Gmelinus, Lightfootus, et Decandollius, quod tamen certè ex errore creditum. "Colorem primum viridem, seriùs e viridi rufescentem, per desiccationem nigrescentem," quod mireris, dixit Wulfenius, cujus descriptio cæteròquin pro more, optima.



ζ omnibus crassior et major, fronde circiter sesquipalmari, pennæ anserinæ crassitie, teretiusculâ, ramosissimâ, ramulis brevibus, erectis, non, ut in reliquis, distichè, sed potius tetrastichè, vel undique dispositis: color purpurascens magis ad lividum vergens.

*Fuci pinnatifidi* exemplar hic depictum inter varietates α et β locum quasi medium obtinet, et quomodo stirpis natura ab hac in illam transeat non malè exprimit. Plantam mutationibus tantoperè obnoxiam in plures ab auctoribus distribui species nequaquam mirum; esse tamen omnes quas hic recensui reverà easdem, re diu observatâ pluribusque collatis exemplaribus, pro certo habeo. Fructum duplicem, ejus sub *F. Hypoglossò* et *ruscifolio* jam in hoc opere descripti similem, in singulis, var. , exceptâ, vidi, nec dubito quin per magnam *Fucorum* familiam diffundatur. Sapor *F. pinnatifidi* mordax piperatus, odor quoque ingratus, unde apud Scotos nomen "*Pepper Dulse*" obtinuit, quod tamen, teste Lightfootio, nequiquam prohibet quo minus ab iis oleris loco sæpe comedatur: nec ut ipse observavi, hic sapor semper adest, unde Stackhousii, *F. pinnatifidum* et *Osmundam*, quia ille gustatu acer, hic prorsus insulsus, disjungere quærentis, nil valet discrimen. Inter omnes hujus *Fuci* varietates formæ pulchritudine et elegantia longè eminet Gmelini *Osmunda*, cujus, ut notavit Stackhousius, speciosa admodum frondis forma, floridum *Osmundæ regalis* apicem non male referens, unde quoque nomen. Varietas β in Nereide Britannicâ descripta, quæ "rupes musci ad instar operit cæspite densissimo, altitudinis tamen vix uncialis," cum ex icone, tum e speciminibus ab ipso auctore missis, plantæ junior status tantummodò mihi videtur. Interest quiddam inter *F. pinnatifidum* et *F. dentatum* similitudinis, et hic illius nomine in Florâ Danicâ depictus extat: crescendî autem modo, texturâ, et fructu satis superque discrepant. Longè propiorem habet hæc species cum insequente affinitatem, de quâ sub *F. obtuso* erit dicendum. Wulfenium Esperumque cum *F. corymbifero* confudisse sanè miror. De *F. hybrido* Dec. nihil pro certo affirmare ausim: descriptione adductus sub varietate γ citavi, dubius tamen, quia Gmelini t. 16. f. 3. ad *Fucorum suum pinnatifidum* retulit.—fierine potest ut ad *F. dasyphyllum* pertineat?

- a. *F. pinnatifidus*, magn. nat.
- b. frondis apex cum seminibus sparsis, magn. auct. - 6.
- c. semina - - - - - 1.
- d. *F. pinnatifidi* varietatis portio cum capsulis - 6.
- e. semina - - - - - 1.
- f. varietatis γ portio cum seminibus sparsis - - 4.



*Fucus obtusus*, frond cartilaginous, cylindrical, filiform, repeatedly pinnated; branches generally opposite; ramuli cylindrical, short, between horizontal and patent, truncated; capsules ovate sessile, and naked seeds on the ramuli.

*Fucus obtusus*. *Fl. Ang.* p. 586. *Linn. Trans.* III. p. 191. *With.* IV. p. 119. *Syn. Fuc.* I. p. 43. *Velley.* t. 3. *Eng. Bot.* XVII. t. 1201. *Fl. Fr. Ed. 2da.* II. p. 32.

*F. spinosus*. *Wulfen*, in *Jacq. Coll.* III. p. 156. t. 15. f. 1. (excl. *Syn.*) *Wulfen*, *Crypt. Aquat.* n. 33. (excl. *Syn.* *Linn. et Burm.*) *Esper*,  *Ic. Fuc.* I. p. 76. t. 36. (excl. *Syn.* *Linn. et Burm.*)

*F. gelatinosus*. *Fl. Atl.* II. p. 427.

*F. papillosus*. *Forskål*, *Fl. Egypt.* p. 190.

*F. pistillaris*. *Wulfen*, *Crypt. Aquat.* n. 34. ? (excl. *Syn.* *Gmel.*)

*β. hybridus*; frond almost cylindrical, sub-gelatinous; ramuli slightly attenuated at the base, and rounded at the apices.

*F. obtusus*, *β.* *Syn. Fuc.* I. p. 44.

*γ. uvifer*; ramuli clustered, short, at their apices rounded and club-shaped.

*F. uvifer*. *Forskål*, *Fl. Egypt.* p. 192. ?

On the southern shores of England, especially at the Isle of Wight; and on the coasts of Ireland, France, Spain, and Egypt.—In the Adriatic. *Wulfen*.—New Zealand. *Sir Joseph Banks*.—*β* on the southern shores of England.—(Both varieties are generally found parasitical on the stems of *F. digitatus*, or some of the larger *Fuci*.)

*Annual.* May—October.

**ROOT**, a callous disk, occasionally provided with a few thick creeping fibres.

**FRONDS**, in general solitary, but sometimes growing two or three, or even more, together, from three to six inches long, filiform, cylindrical, about the thickness of a sparrow's quill, between flexuose and erect, rising with an undivided stem, loosely beset with branches, disposed in a direction between patent and horizontal, generally distichous, and most frequently placed either in pairs or by threes, though sometimes alternately, the lowest longest, and three or four inches long, the rest gradually decreasing, till the uppermost scarcely exceed two lines: all the branches are truncated at their apices, and irregularly pinnated with one or two series of others similar to them, but smaller, placed at short distances, so that the appearance of the whole plant is tri-, or quadri-, pinnate; the ramuli are very short, numerous towards the ends of the branches, somewhat thickened upwards, truncated, mostly simple, but, "occasionally," to use the words of *Wulfen*, "near their extremities proliferous on either side, with a new denticle similar to them, so that they may be called trifid or tridenticulated."

**FRUCTIFICATION**, of two kinds, both placed near the extremities of the branches; *the one*, consisting of ovate sessile capsules, about the size of *poppy* seed, containing a few brown pyriform seeds, surrounded with a pellucid limbus; *the other*, of five or six naked oblong seeds, of a deep flesh color, immersed in the frond itself.

**COLOR**, a beautiful pinkish yellow, semitransparent, extremely fugitive; if exposed to the sun, a dirty white; when decaying, pink.

**SUBSTANCE**, cartilaginous, flexible, tender; in old and dry specimens somewhat rigid and tough; in the young plant approaching to gelatinous.

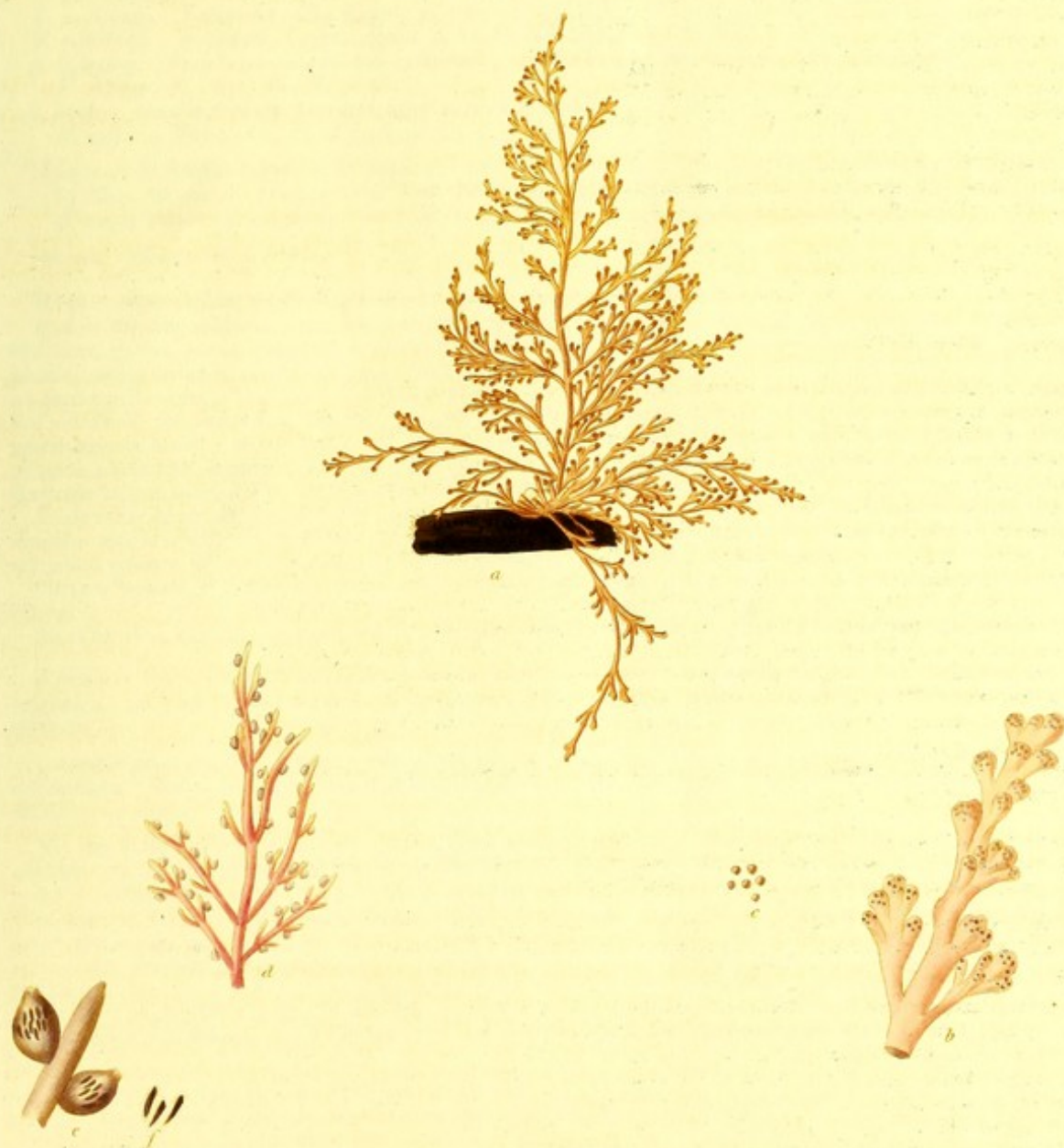
In *β* the frond is thicker throughout than in *α*; and the ramuli are longer, and not truncated at their apices, but slightly rounded. It is almost intermediate between *F. obtusus* and *dasyphyllus*, but, in my opinion, certainly a variety of the former, and sufficiently distinct from the latter.

*γ* is larger than either of the preceding varieties: its stem is equal in size to a crow's quill, and the shape of its branches bears some resemblance in miniature to the clusters of *Vitis vinifera*. I have at present seen only one specimen of it, which is preserved in the Ellisian Herbarium without any *locus natalis* annexed.

The whole catalogue of *Fuci* scarcely affords an instance of a single species, which, at the same time that it is a native of such distant parts, still, whether found towards the northern or southern poles, or within the tropics, seems liable to so little variation, either in its form or size as the present. It appears to be most abundant on the coasts of the Mediterranean and Adriatic, on which account it is singular that it should have been entirely omitted by *Gmelin*, who described so many *Fuci* from those seas. Its nearest affinity is with *F. pinnatifidus* and *dasyphyllus*, to the latter of which it approaches by its own variety *β*, and to the former by the var. *γ* of that species; but it is distinguished from both by the form and horizontal direction of its extremely short, linear, and remarkably blunt ramuli. The color, too, and habit are unlike. *M. Decandolle* is of opinion that it is allied to *F. corneus* and *hypnoides* of *Desfontaines*, to neither of which, however, does it bear the least resemblance, either in color, substance, mode of growth, or fructification. When fresh it has in general a strong smell of violets, but this, as was observed by the late *Col. Velley*, is by no means constant.

- a. *F. obtusus*. natural size.
- b. upper part of the frond, with naked seeds, magnified - 6.
- c. seeds - - - - - 1.
- d. part of the frond of var. *β* with capsules, natural size.
- e. smaller part of the same, magnified - - - 3.
- f. seeds - - - - - 1.





*Fucus obtusus*







*Fucus* fronde cartilagineâ, tereti, filiformi, decomposito-pinnatâ; ramis sub-oppositis; ramulis cylindraceis, abbreviatis, horizontaliter patulis, truncatis; capsulis ovatis sessilibus, seminibusque in ramulis sparsis.

*Fucus obtusus.* *Fl. Ang.* p. 586. *Linn. Trans.* III. p. 191. *With.* IV. p. 119. *Syn. Fuc.* I. p. 43. *VELLEY.* t. 3. *Eng. Bot.* XVII. t. 1201. *Fl. Fr. Ed. 2da.* II. p. 32.

*F. spinosus.* *WULFEN*, in *Jacq. Coll.* III. p. 156. t. 15. f. 1. (excl. *Syn.*) *WULFEN*, *Crypt. Aquat.* n. 33. (excl. *Syn. Linn. et Burm.*) *ESPER*,  *Ic. Fuc.* I. p. 76. t. 36. (excl. *Syn. Linn. et Burm.*)

*F. gelatinosus.* *Fl. Atl.* II. p. 427.

*F. papillosus.* *FORSKÅL*, *Fl. Ægypt.* p. 190.

*F. pistillaris.* *WULFEN*, *Crypt. Aquat.* n. 34. ? (excl. *Syn. Gmel.*)

*β. hybridus.* Fronde teretiusculâ sub-gelatinosâ; ramulis basi levitèr attenuatis, apice rotundatis.

*F. obtusus. β.* *Syn. Fuc.* I. p. 44.

*γ. uvifer*; ramulis confertis brevibus, apice rotundato-clavatis.

*F. uvifer.* *FORSKÅL*, *Fl. Ægypt.* p. 192. ?

**HABITAT** in Angliâ meridionalis, præsertim ad Insulam Vectis, in Hiberniâ, Galliâ, Hispaniâ, et Ægypti oris.—  
In Mari Adriatico. *Wulfen*.—In Novâ Zealandiâ. *D. J. Banks, Baronet.*—*β* in Angliâ meridionalis oris;  
(Utraque varietas in stipitibus *Fuci digitati*, vel alicujus e *Fucis* majoribus plerumque parasitica.)

**Annua.** Æstate fert fructum.

**RADIX** callus explanatus, fibrâ unâ alterâve crassâ repente interdum instructus.

**FRONDES** nunc solitariae, nunc binæ ternæve, quandòque ex eâdem radice plurimæ, palmares, aut semipedales, filiformes, teretes, pennæ passerinæ crassitie, flexuosè erectæ, caule assurgentes indiviso, ramis obsito horizontaliter patulis, sæpius distichis, plerumque oppositis, vel ternis, rariùs alternis, laxiusculè dispositis, inferioribus longissimis, tri-quadri-pollicaribus, hinc sensim decrescentibus, summis vix bilinearibus: rami omnes apice sunt truncati, aliis sibi similibus, sed minoribus, iterum atque iterum breviter per intervalla vagè pinnati, ut toti plantæ facies decomposito-pinnata evadat: ramuli brevissimi, ramorum ad apices frequentes et approximati, sursùm tantispèr incrassati, truncati, plerumque simplices, tamen et “sub apice interdum,” ut *Wulfenii* verbis uter, “novo utrinque aucti consimili denticulo ut jam trifidi etiam, aut tridenticulati dici possunt.”

**FRUCTIFICATIO** duplex, utraque ramorum prope extremitates sita, hæc e capsulis ovatis, sessilibus, *papaveris* seminum magnitudine, semina aliquot fusca angustè pyriformia limbo pellucido cincta includentibus; illa constans e seminibus quinque vel sex nudis oblongis, coloris intensè carnei, in ipsâ fronde immersis.

**COLOR** amoenè e carneo flavescens, subdiaphanus, fagacissimus; *Soli expositæ* sordidè albescens; *marcescentis* roseus.

**SUBSTANTIA** cartilaginea, lenta, tenera; *velustæ* et *exsiccatæ* rigidiuscula tenax; *junioris* ad gelatinosam accedens.

*β* frondem habet ubique crassiorem quàm *α*, ramulisque gaudet longioribus, apice non truncatis, sed levitèr rotundatis: est inter *F. obtusum* et *F. dasyphyllum* quasi media, illius tamen, uti credo, certè varietas, et satis ab hoc distincta.

*γ* utrâque præcedente est major; caule pennæ corvinæ crassitie, ramis *Fitis viniferae* racemos formâ quodammodò referentibus. Exemplar hujus varietatis unicum modò adhuc vidi, quod, loco natali nullo adjecto, in Herbario Ellisiano servatur.

Vix una datur in *Fucorum* familiâ species, quæ, marium tam longè dissitorum incola, et quæ, cùm in Septentrionalibus tùm in Australibus terræ plagis, ac inter tropicos, qui dicuntur, circulos paritèr inventa, formam tamen minùs quàm *F. obtusus* mutare videtur. In Mari Mediterraneo et Adriatico copiâ maximâ provenire crederem, quare a *Gmelino*, qui tot *Fucos* inde acceptos descripsit, prætervisum miror. Cum *F. pinnatifido* et *dasyphylo* summam habet affinitatem, per varietatem illius *γ* ad illam, per varietatem suam *β* ad hanc appropinquans; sed ab utroque ramulorum brevium linearium insignitèr obtusorum forma et horizontalis dispositio distinguunt. Color quoque habitusque diversus. A *F. corneo* et *hypnoide* *Desf.* inter quos et hunc nostrum similitudinem quandam interesse credit *cl. Decandollius*, colore, substantiâ, crescendi modo, fructificatione, denique omnibus ferè modis, differt. Recens odorem violaceum sæpius spirat, quod tamen, ut notavit *b. Velleius*, non semper adest.

a. *F. obtusus*, magn. nat.

b. frondis apex cum seminibus nudis, magn. auct. 6.

c. semina - - - - - 1.

d. varietatis *β* portio cum capsulis, magn. nat.

e. ejusdem pars, magn. auct. - - - 3.

f. semina - - - - - 1.



*Fucus dasyphyllus*, frond filiform, cylindrical, branched in an irregularly pinnated manner; branches between horizontal and patent, mostly simple; ramuli cylindrical, scattered, attenuated at the base, proliferous; capsules ovate sessile, and naked seeds on the ramuli.

*Fucus dasyphyllus*. WOODW. in Linn. Trans. II. p. 239. t. 23. f. 1.—3. Linn. Trans. III. p. 119. Syn. Fuc. I. p. 38. WITH. IV. p. 112. Eng. Bot. XII. t. 847.

β. *articulatus*; frond jointed; joints short.

On the British coast.—Both varieties among the rejectamenta of the sea at Yarmouth; and on the rocks at Cromer and Sheringham, in Norfolk.—Dorsetshire. Mr. Bryer.—Cornwall. Mr. Stackhouse.—Dawlish. Mr. Pigott.—Lossie-mouth, in Scotland. Mr. Brodie.

Annual. June—September.

ROOT, a thin expanded disk, frequently provided with a few matted creeping fibres.

FRONDS, numerous from the same root, growing in tufts, cylindrical, filiform, from three to six inches long, and about the thickness of a blackbird's quill, towards the base and apices acuminate, in other respects of equal size, rising with a stem in general undivided, but sometimes, though seldom, bifid or trifid, beset throughout its whole length with branches between horizontal and patent, most frequently alternate, loosely arranged on every side, gradually shortening from the lowest upwards, but of most uncertain lengths, in some specimens three inches or more, in others scarcely a nail long: these branches are again in a similar manner furnished with a series of smaller ones, and these again sometimes, but not often, with a third: the last branches, or ramuli, in their earliest state are roundish, after which they become oblong, at their bases they are always remarkably attenuated, at their apices obtuse, their direction is horizontal, and they are not uncommonly proliferous with one or two smaller ones.

FRUCTIFICATION, of two kinds, each placed on the ramuli, or at the extremities of the branches; the one composed of ovate, sessile capsules, about the size of poppy seed, of a light red color, paler than the rest of the frond, and containing a mass of deep-red pyriform seeds; the other, of naked spherical seeds, immersed in the substance of the frond.

COLOR, pale red, tinged with brown, extremely fugitive; when dry, much darker, and often altogether brownish; as it turns to decay, of a dirty whitish hue.

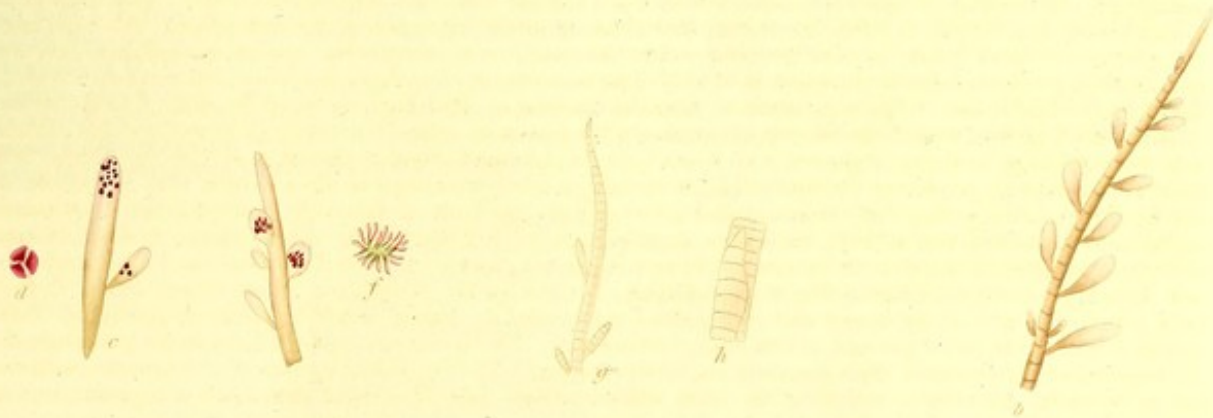
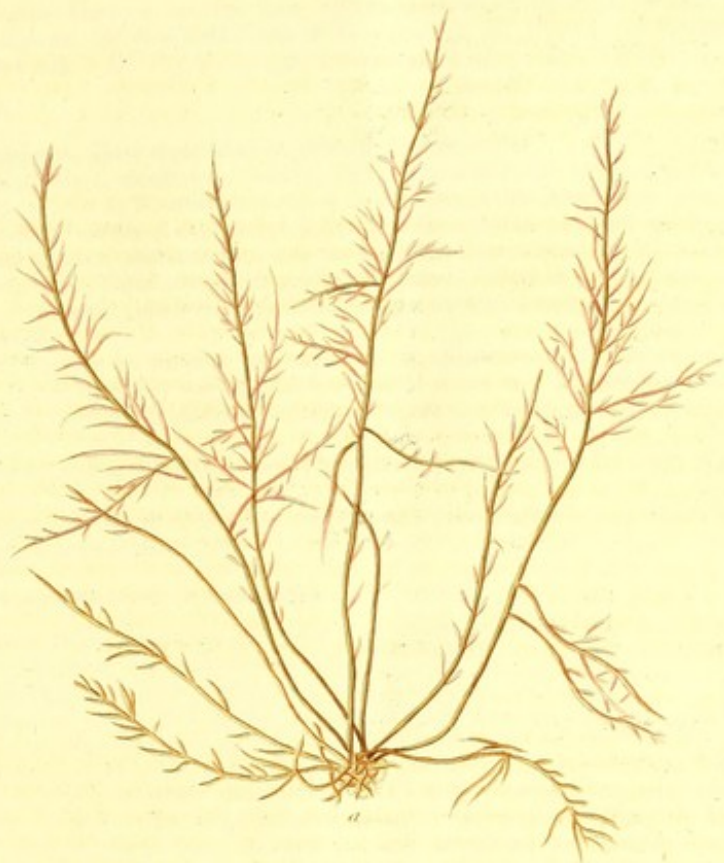
SUBSTANCE, between cartilaginous and gelatinous; when perfectly fresh not without a remarkable elasticity, which, however, it soon loses: it dries to a thin membrane.

β differs from α in no respect except the jointed structure.

With regard to the jointed appearance of this *Fucus*, figured at the letters *g*, *h*, I am altogether at a loss what opinion to entertain. I had noticed it for many years, but without bestowing upon the subject any particular attention, and even at the time of writing the Synopsis of the British Fuci, had regarded the joints as having no existence farther than in the exterior of the plant, and as being nothing more than the casual effect of advanced age or accident. A more attentive examination, however, has proved that the frond in every stage of its growth is internally divided into short and regular joints by real septa; but, what is most extraordinary, that these septa are to be found only in certain individuals, the number of which is not so great as that of those which are destitute of them. This circumstance would almost be sufficient to justify the opinion that there are in fact two species, the one jointed, the other not so, an opinion to which I should be most unwilling to lend an assent, as in every other respect the plants wholly agree, and specimens may occasionally be found in which the septa are so obsolete that it would be difficult to decide whether they actually exist or not. The same too is occasionally observed in other Fuci, on which accounts, I have considered it as the safest plan to regard the two appearances for the present as varieties, and thus to leave the matter, in hopes that the researches of future Botanists may throw light on this most singular phenomenon. *F. dasyphyllus* differs from all the Fuci by its oblong, obtuse, and short ramuli, so much attenuated at the base that their connection with the frond is scarcely perceptible: it is a species sufficiently distinguishable at first sight, except from *F. tenuissimus*, which is not more than half as thick, and has its ramuli attenuated and acuminate at either end. It does not appear to have been gathered beyond the bounds of Britain, nor can I discover that it is known to any foreign author. It was originally found by my friend, Mr. Wigg, and first described by Mr. Woodward. I am assured by Sir T. Frankland, whose opinion is of the highest authority in these points, that the suspicion which I formerly entertained, that *U. rubens* of Hudson is only a synonym of this plant, is erroneous. There is a striking peculiarity in the fructification of *F. dasyphyllus*, that some of the scattered seeds, when examined under the highest powers of a compound microscope, are quite entire, but others, and these the most numerous, split into three equal parts, with a regularity that it is impossible to consider the effect of accident.

- |  |   |   |    |
|--|---|---|----|
| a. <i>F. dasyphyllus</i> , natural size. |   |   |    |
| b. upper part of the frond, magnified    | - | - | 6. |
| c. ramulus with naked seeds              | - | - | 5. |
| d. seed                                  | - | - | 1. |
| e. apex of the frond with capsules       | - | - | 5. |
| f. seeds                                 | - | - | 1. |
| g. part of the frond jointed             | - | - | 6. |
| h. piece of the same, cut through        | - | - | 2. |





*Fucus dasyphyllus.*



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*Fucus* fronde filiformi, tereti, sub-pinnatim ramosâ; ramis horizontaliter patulis, simpliciusculis; ramulis cylindraceis, sparsis, basi attenuatis, proliferis; capsulis ovatis sessilibus, seminibusque in fronde sparsis.

*Fucus dasyphyllus*. WOODW. in *Linn. Trans.* II. p. 239. t. 23. f. 1—3. *Linn. Trans.* III. p. 119. *Syn. Fuc.* I. p. 38. WITH. IV. p. 112. *Eng. Bot.* XII. t. 847.

β. *articulatus*; fronde articulata; articulis brevibus.

HABITAT in Britanniae oris.—Utraque varietas inter rejectamenta maris apud Yarmouth; et in saxis submarinis apud Cromer, et Sheringham, in Norfolciâ.—Apud Weymouth. *D. Bryer*.—In Cornubiâ. *D. Stackhouse*.—Apud Dawlish in Devonâ. *D. Pigott*.—Apud Lossie-mouth in Scotiâ. *D. Brodie*.

*Annua*. Jun.—Septemb.

RADIX discus tenuis, explanatus, fibris repentibus implexis sæpe instructus.

FRONDES ex eadem basi plurimæ, cæspitosæ, teretes, filiformes, longitudine palmares, vel semipedales, *Merula* pennæ crassitie, basin et apices versus acuminatæ, cæteroquin æquales, caule assurgentes plerumque indiviso, rarius bi-tri-fido, per totam longitudinem obsito ramis horizontaliter patulis, sub-alternis, undequaque laxè dispositis, a basi sursùm brevioribus, longitudinis quam maximè variæ, nunc tripollicaribus et ultra, nunc vix unguicularibus: hi rami iterum simili ratione minorum serie, hique iterum aliquando, nec tamen frequentè, tertiâ sunt instructi: rami ultimi, seu \* ramuli, ætate primâ subrotundi, mox oblongi, basi semper insignitè attenuati, apice obtusi, horizontales, uno alterove minore sæpius proliferi.

FRUCTIFICATIO duplex, utraque in ramulis, vel ramorum ad extremitates sita; hæc e capsulis constans ovatis, dilutè rubentibus, reliquâ fronde pallidioribus, sessilibus, *papaveris* seminis magnitudine, seminum angustè pyri-formium, intensè rubrorum congeriem includentibus; illa e seminibus nudis globosis, in ipsâ frondis substantiâ immersis.

COLOR dilutè rubens, fusco tinctus, diaphanus, fugacissimus; *exsiccatæ* multò intensior, et sæpe totus fuscescens; *marcescentis* sordidè albescentis.

SUBSTANTIA e cartilagineâ gelatinosa, tenerima, *recentis* non sine resiliendi vi quâdam singulari, quam tamen citissimè æmittit; *exsiccatæ* membranacea.

β nequaquam ab α differt, structurâ articulata demptâ.

De articulata hujus plantæ facie, quam hic ad literas *g*, *h*, depingendam curavi, nescio omninò quid dicam aut sentiam. Credideam cum *Fucorum Britannicorum Synopsis* scriberem septa specie externâ tantùm existere, et ab ætate provectâ pendere; rem verò magis sollicitè inquirens, in omni ætatis stadio detexi, et stirpis substantiam intus verè articulatam vidi. Nec tamen sunt articuli in cunctis, vel etiam in pluribus, exemplaribus conspiciendi. Quid ergo?—an duæ sunt species, hæc articulata, illa continua?—Vix credo; in cæteris enim prorsus conveniunt, et vidi quorum septa adeò erant obsoleta, ut an reipsâ adessent ægrè diceret. In aliis quoque *Fucorum* speciebus idem sese observandum præstat, quâ de re pro varietatibus in præsens habere tutissimum duxi, sperans Botanicorum posterorum investigationes phænomeno maximè singulari lucem esse objecturas. A reliquis *Fucis* differt *F. dasyphyllus* ramulis oblongis, obtusis, brevibus, basi tantum attenuatis ut per punctum tantummodò minutissimum cum fronde connexi videantur; et est species primo visu ab omnibus dignoscenda, nisi fortè a *F. tenuissimo*, qui duplò tenuior est, et ramulos habet utrinque attenuatos acuminatosque. Extra Britanniae fines nondum reperiri videtur, nec auctorum exterorum ulli, quantum ego reperi, innotuit. Primus invenit amicissimus D. Wigg, descripsit D. Woodward. Quod in *Fucorum Britannicorum Synopsis* sum suspicatus, *Ulvam* Hudsoni *rubentem* huc pro synonymo adduci debere, est, teste D. Frankland, viro summi in his rebus ponderis, certè ex errore dictum. *F. dasyphylli* fructificationi illud notatu dignum inest, quædam e seminibus nudis per lentem maximè augmentem observatis esse integerrima, reliqua, et ea plurima, in tres æquales partes esse fissa; quod quidem nimis fit ad normam ut casu aliquo evenire credatur.

a. <i>F. dasyphyllus</i> , magn. nat.			
b. <i>pars frondis superior</i> , magn. auct.	-	-	6.
c. <i>ramulus cum seminibus nudis</i>	-	-	5.
d. <i>semen</i>	-	-	1.
e. <i>frondis apex cum capsulis</i>	-	-	5.
f. <i>semina</i>	-	-	1.
g. <i>pars frondis articulata</i>	-	-	6.
h. <i>ejusdem portio dissecta</i>	-	-	2.

\* Hi ramuli, præsertim exsiccati, folia referunt, et ita D. Woodward et alii Botanicis audiunt; perperam tamen, cum nihil sint aliud quam primordia ramorum, in quos progrediente stirpis ætate elongantur: male igitur hic *Fucus* inter eos *foliis distinctis* præditos hactenùs enumerari solet.



*Fucus cristatus*, frond membranaceous, flat, veinless, sub-dichotomous; branches alternate, decurrent, somewhat dilated upwards, cleft at the apices; segments short, obtuse, bearing small, globular, sessile capsules.

*Fucus (gigartinus?)* Fl. Dan. t. 394.

β. *Valentia*; branches all linear; tubercles both lateral and terminal.

γ. *articulatus*; branches linear, jointed; joints very short.

*F. confervoides*. GMELIN, *Hist. Fuc.* p. 147. t. 15. f. 2. ? (according to the figure.)

α in the Arctic Ocean, near Iceland. J. G. Koenig. — β in the Red Sea. Viscount *Valentia*. — γ in the Mediterranean, and in the Bay of Biscay, near Bayonne. Professor *Mertens*.

ROOT, an expanded callous disk.

FRONDS, numerous from the same base, growing in tufts, flat, wholly destitute of veins or midrib, nearly linear, about two inches long, and scarcely a line wide, divided from the very base throughout, with alternate decurrent branches, again and again divided in a similar manner; their extremities bifid or trifid with extremely short, obtuse, patent segments; their margins quite entire, except that close to the extremities they are occasionally furnished with one or two small horizontal teeth: the branches are all slightly dilated upwards.

FRUCTIFICATION, spherical tubercles, so minute as scarcely to be visible to the naked eye, of a deep-red color, sessile on the ends of the frond, and containing several oblong seeds.

COLOR, scarlet, tinged with pink, very beautiful; turning, if exposed to the sun, to a dirty yellow, or whitish.

SUBSTANCE, thin, membranaceous, extremely tender.

β has a frond considerably more narrow than α, and linear throughout: the tubercles are larger, and frequently placed on the sides as well as the ends, of the smaller branches.

γ is of so dark a color, that, unless held to the light, it looks almost black: I have never seen it in fruit: in its form and mode of growth it agrees with β, but the frond is divided by black lines throughout its whole length into extremely short joints.

For the specimens here represented at the letters a—f, I am obliged to my friend, Dr. Smith, who kindly communicated them to me from the Linnæan Herbarium, in which repository of Botanical treasures are preserved four pieces of the present plant, all fastened on one sheet of paper, which also contains four morsels of *F. alatus*, and one of *F. sinuosus*. At the bottom of this is written, by Linnæus himself, "*F. cristatus*," a name which, as I have elsewhere taken an opportunity of remarking, occurs in none of his works, so that it cannot be doubted but that he either regarded it as a new species, and intended hereafter giving it this title, or that he really meant to have written *F. crispatus*; to which latter opinion I should have no hesitation in acceding, but that the description of *F. crispatus* in the *Systema Naturæ* accords better with what has been generally so called by Wulfen and other botanists. *F. corymbiferus*, Gmel. was always regarded as a synonym of the plant before us, till Mr. Brown lately brought from New Holland another species different from this, but altogether agreeing, as well in size and fruit, as in every other particular, with Gmelin's figure. Of this, I trust, that before the conclusion of the present work, I shall, through Mr. Brown's kindness, be enabled to give a representation. Should the three appearances, here considered varieties, be regarded by future botanists as specifically distinct, I should not feel surprised, nor would I be understood as speaking with any positiveness on the subject of a plant of which I have at present seen very few specimens. Linnæus has united the two first in his Herbarium, and, if we attentively observe their parts, we shall be puzzled to point out any mark of difference between them; though it must be admitted that their habit is dissimilar, and the branches in β constantly preserve their linear form without widening upwards. This is a most beautiful and elegant plant, and, should it hereafter prove a distinct species, I should wish it to bear the name of Lord Valentia, who gathered it in the Red Sea, together with a rich harvest of other marine Algæ, and to whom botany in general, and this work in particular, lies under many obligations. Dr. Mohr is of opinion that Gmelin's *F. confervoides* ought to be quoted as a synonym of the var. γ, and the figure, though far from good, certainly agrees in many respects, but the description appears to be designed for a very different plant. In its mode of growth, form, and habit, it agrees with var. β, but differs in its color and jointed frond. The joints, however, are sometimes wanting, nor ought too much confidence to be placed in them.

a. <i>cristatus</i> , natural size.	
b. part of the frond with capsules, magnified	- 6.
c. apex of ditto	- 3.
d. tubercle	- 2.
e. seeds	- 1.
f. part of var. β, barren	- 6.
g. part of ditto in fruit	- 6.
h. part of var. γ	- 6.





*Fucus cristatus.*







*Fucus* fronde membranaceâ, planâ, aveniâ, sub-dichotomâ; ramis alternis, decurrentibus, sursùm aliquantulum dilatatis, apice incisis; laciniis brevibus, obtusis, tubercula exigua, globosa, sessilia sustentantibus.

*Fucus* (*gigartinus*)? *Fl. Dan.* t. 394.

$\beta$ . *Valentia*; ramis omnibus linearibus; tuberculis lateralibus terminalibusque.

$\gamma$ . *articulatus*; ramis linearibus articulatis; articulis brevissimis.

*F. confervoides*. Gmelin, *Hist. Fuc.* p. 147. t. 15. f. 2. ? (ex icone.)

HABITAT  $\alpha$  in Oceano Islandiam alluente. *J. G. Kanig.*— $\beta$  in Mari Rubro. *Vicecomes de Valentia.*— $\gamma$  in Mari Mediterraneo, et in Oceano Cantabrico apud Lapurdum. *D. Prof. Mertens.*

RADIX callus expansus.

FRONDES ex eâdem basi plurimæ, cæspitosæ, planæ, venarum costæve expertes, sub-lineares, longitudine bipollicares, latitudine vix unius lineæ, a basi usque ramosæ, ramis alternis, approximatis, decurrentibus, iterum atque iterum simili ratione divisus, apicibus bi- tri- fidis, segmentis perquam brevibus, obtusis, patentibus: margines frondis integerrimi, excepto quòd juxta extremitates dente uno alterove exiguo horizontali sæpe instruuntur: rami omnes sursùm aliquantulum dilatati.

FRUCTIFICATIO tubercula sphaerica, adeo minuta ut vix nisi oculo armato conspici possint, intensè rubra, frondis apicibus insidentia, et semina plurima oblonga includentia.

COLOR coccineus, roseo immixtus, amœnissimus; *Soli exposita* sordidè flavescens, vel albellus.

SUBSTANTIA tenuis, membranacea, tenerima.

$\beta$  frondem habet multo angustiore quam  $\alpha$ , et ubique linearem: tubercula seminifera sunt majora, nec tantum ramulorum apicibus insident, sed sæpius laterales evadunt.

$\gamma$  coloris est adeò intensi, ut, nisi luci objiciatur, nigricans videatur: fructiferam non vidi: formâ et crescendi modo cum  $\beta$  convenit; sed frons per totam longitudinem lineis transversalibus in articulos brevissimos dividitur.

Exemplaria hîc ad literas *a—f* depicta cl. Smithii amicitia debeat, qui in Herbario Linnæano servata mecum benevolè communicavit. Ditissimus ille plantarum thesaurus quatuor hujus Algæ includit specimina, omnia eidem agglutinata chartæ, quæ quatuor quoque *F. alati*, et unum *F. sinuosi* frustula continet. Ad basin scripserat Linnæus "*F. cristatus*," quod cum nomen, ut \* alibi occasionem observandi sum amplexus, nusquam in operibus suis, quantum reperio, occurrat, dubitari nequit quin pro novâ specie mox hoc titulo insigniendâ habuerit, nisi potius *F. crispatum* scripsisse voluisse credamus, in quam ire sententiam nullus dubitarem, ni *F. crispati* in *Systemate Naturæ* descriptio illi plantæ cui nomen idem indidit Wulfenius aptius quadraret. *F. Gmelini corymbiferum* sub hâc specie pro synonymo esse citandum diu est a Botanicis creditum, donec nuperrimè aliam Fuci speciem, magnitudine et fructu cum eâ Gmelini omnimodè convenientem et ab hâc nostrâ diversam, e Novâ Hollandiâ redux attulit D. Brown, cujus per benevolentiam, priusquàm hoc opus clausum, iconem exhibere spero. Si tres illas hîc descriptas varietates specie potius distinctas credant Botanici, fatebor libens meum in dubio esse animum, nec de plantâ cujus perpauca modò exemplaria observandi adhuc data est facultas aliquid perveracius affirmare ausim. Linnæus in phytophylacio suo priores duas conjunxerat, et si in earum partes attentè inquiramus vix ullum discrimen reperiemus. Habitus tamen eorum est longè diversus, nec sunt in  $\beta$  rami unquam sursùm dilatati: perpulchra quidem est hæc stirps, et, si pro distinctâ olim sit enumeranda, nobilissimi Vicecomitis de Valentia, qui in Mari Rubro unâ cum divite algarum messe legit, et cui, cum scientia Botanica, tum præcipuè hoc opus plurimum debet, nomine insignitam optarem. Ad varietatem  $\gamma$  censet Mohrius Gmelini *F. confervoidem* esse adducendum, nec multum sanè repugnat icon, sed descriptio plantam alienam innuere videtur. Colore et specie articulata a  $\beta$ , quâcum crescendi modo, formâ, et habitu convenit, recedit; sed articuli sæpe desunt, neque his nimis fidendum.

a.	<i>F. cristatus</i> , magn. nat.	
b.	<i>ejusdem portio cum capsulis</i> , magn. auct.	- 6.
c.	<i>ejusdem apex</i> - - - - -	- 3.
d.	<i>tuberculum</i> - - - - -	- 2.
e.	<i>semina</i> - - - - -	- 1.
f.	<i>pars varietatis <math>\beta</math> sterilis</i> - - - - -	- 6.
g.	<i>ejusdem pars cum capsulis</i> - - - - -	- 6.
h.	<i>pars varietatis <math>\gamma</math></i> - - - - -	- 6.

\* Syn. Fuc. I. p. 151.



*Fucus turbinatus*, stem sub-cylindrical, undivided, beset with short simple branches, supporting top-shaped, petiolated vesicles, terminated by a membrane larger than their surface, and toothed at its margin.

*Fucus turbinatus*. LINN. *Sp. Pl.* II. p. 1629. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. *Hort. Cliff.* p. 478. GMELIN, *Hist. Fuc.* p. 97. t. 5. f. 1. ESPEL, *Icon. Fuc.* I. p. 29. t. 9. VAHL, *Skript. af Naturhistorie-Selskabet.* V. p. 36.

*Fucus marinus vesiculas habens membranis extantibus*. SLOANE, *Hist. Jamaic.* I. p. 58. t. 20. f. 6.

*Acetabuli marini varietas*. RUMPH. *Hist. Amboin.* VI. p. 85.

♂. *ornatus*; membrane covering the vesicles furnished with a double row of spines, the outer horizontal, the inner erect.

On the shores of the East and West Indies, America, Sumatra, and Kamtschatka; also in the sea by Ceylon, and in the Red Sea.

*Perennial.*

ROOT, a thin, expanded disk, sending out several long, branched, incurved fibres, which adhere closely to the rocks.

FRONDS, numerous from the same base, a foot, or foot and half, sometimes even two feet, or more, long; provided with a filiform, flexuose undivided stem, about the size of a crow's quill, between cylindrical and compressed, beset from the root to the apex with branches disposed in an irregularly spiral direction, much more numerous in some specimens than in others: branches all simple, those nearest the root in general longest, and three inches or more long, the rest gradually shortening, so that the outline of the whole plant is sub-pyramidal; near their bases they are naked, or only rough with the remains of broken peduncles, the rest of them is covered with vesicles and fruit, as is also the top of the stem.

VESICLES, supported upon a compressed petiolus about three lines long, perforated with mucifluous pores, top-shaped, triangular, (the angles sometimes acute, slightly winged, and toothed, at other times nearly obsolete,) hollow within, terminated by a triangular or cordate membrane, either flat or convex, wider than the vesicles, and notched all round, with minute teeth.

FRUCTIFICATION, growing on the branches, and on the petioli of the vesicles, clustered, composed of cylindrical receptacles, a line, or line and half long, either simple or forked, collected into a racemus: the outside of the receptacles, when viewed through a glass, is every where uneven with innate spherical tubercles, perforated in their centre, and containing small brown irregularly globular seeds, surrounded by a pellucid limbus.

COLOR, of the plant when moistened olive-brown, when dried a perfect black: in the fresh state, according to Gmelin, yellow. I should have supposed it olive.

SUBSTANCE, coriaceous, flexible, tough; woody in the stem.

♂ has a discoid root, destitute of fibres: the whole plant is scarcely four inches long, thicker and more rigid than α; what, however, is most remarkable, is that the membrane placed upon the vesicles is concave instead of being flat, and has two rows of spines, the outer one horizontal, the inner one erect: the clusters of fructification also are more branched, and thicker, and the receptacles almost club-shaped.

The form of the \* vesicles in *F. turbinatus*, whence it derives its name, is equalled by those of no other *Fucus* that I am acquainted with, and will always be sufficient at first sight to distinguish the species. Their nature, too, is very remarkable, for they appear designed to answer the purpose not merely of air bladders, but also of leaves, no others having ever been found upon the plant, though from its affinities they might be expected. Within they are hollow, not even, as far as I have seen, containing the jointed filaments observable in those of *F. vesiculosus*, *nodosus*, &c. The size and stiffness of the teeth, with which their margin is beset, vary considerably in different individuals, as does also the circumstance of their being found upon the winged edges of the angles, along some of which they are most regularly disposed, but in others altogether wanting. Sir Hans Sloane in his History of Jamaica appears to have been the first author who noticed this plant. In the *Flora Egyptiaco-Arabica* is described a *Fucus*, under the name of *F. conoides*, which from the character must be nearly akin to *F. turbinatus*, and which I should have considered as the same, but for the assurance of Dr. Weber and Dr. Mohr, who have had an opportunity of examining Forskål's Herbarium, to the contrary. The fruit exactly resembles that of *F. natans*, to which, and its congeners, this species is most nearly allied, and it appears likely that the pods, having performed their office, become elongated into new branches, but that the vesicles also have their origin from these is more than I would venture to say †, nor do I indeed consider it probable.

\* It ought to be mentioned that Linnæus and Vahl considered these vesicles as the fruit, and the true fruit as the rudiments of branches. Gmelin was of opinion that the seeds were to be found in the triangular tube or disk.

† My reason for this opinion is, that, if I am not greatly mistaken, the vesicles exist before the fructification in the natural growth of the plant. In a new *Fucus*, which I intend soon to describe under the name of *F. ilicifolius*, the changing of the fruit into bladders is most apparent, but I am persuaded that this is not a regular law in the economy of the *Fuci*, nor do I believe that it holds good in the present species, though, as Dr. Weber and Dr. Mohr entertain contrary sentiments, I think it right here to extract what they have written on the subject.—“Vahl hat in den *Skript. af Naturh. Selsk.* a. a. O. S. 36. vom *F. natans* und diesem *F. turbinatus* schon angeführt, dass die Fruchtfäden in neue Zweige des Gewächses sich ausbilden. Dass die Luftblasen bei manchen Tangen über ausgeleerten Fruchständen, an denen sich die Pori der Warzen alsdann schliessen, das Innere aber so weit sich auflöst, dass eine räumliche Höle entsteht, werden, hat aber schon längst Prof. Mertens behauptet. Beide Beobachtungen bestätigen sich uns namentlich auch an den drei angeführten Tang specimenibus. Die Blasen dieser Tange, die die Gestalt eines Kreises, oder eines dreieckigen Hutes von alter Form haben, werden hier gewiss, in gleicher Anzahl, aus den Endspitzen der Fruchtracemi, sobald diese ihre Frucht ausgeleert haben. Man sieht auf den Blasen noch deutlich die fast verlassenen Narben





*Fucus turbinatus.*







probable. The var.  $\beta$ , above described, was found by Dr. Smith among some loose papers in the Linnæan Collection, but without any remark, or any clue that might lead to discover whence it came. There is also another variety mentioned by Dr. Weber and Dr. Mohr in the Index to their Museum, and in their \**Neue Beiträge*, called "*coronatus*," which may possibly be the same, but, as they say nothing more about it than it is a singular appearance, and as I have seen no specimens, I have no means of judging.

- a. *F. turbinatus*, natural size.
- b. vesicle, and cluster of receptacles, magnified - - - 6.
- c. vesicle of var.  $\beta$ , and cluster of receptacles, natural size.
- d. the same vesicle, cut through.
- e. cluster of receptacles, magnified - - - 5.
- f. part of the exterior of a receptacle - - - 3.
- g. horizontal section of the same - - - 3.
- h. seeds - - - 1.

Narben der Pori. Aus jedem einzelnen Fruchtracemus wird ein neuer traubenartiger, zuweilen in seinem ganzen Umriss kolbenförmiger Ast des Gewächses. Ist diese einmalige Ausbildung bewerkstelligt, so tritt eine Periode ein, wo keine Fruchtracemi da sind. (*Gmelin's Fig. des F. turbinatus* T. v. f. 1.) Dergleichen Aeste finden wir mit solchen, die, zugleich Frucht haben, auch an unsern Exemplaren." I. p. 237.

\* I. p. 236.

## 24.—FUCUS TURBINATUS.

*Fucus* caule teretiusculo, indiviso, ramis brevibus, simplicibus obsito; vesiculis in ramis petiolatis, turbinatis, membranâ extante ambitu denticulatâ terminatis.

*Fucus turbinatus*. LINN. *Sp. Pl.* II. p. 1629. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. *Hort. Cliff.* p. 478. GMELIN, *Hist. Fuc.* p. 97. t. 5. f. 1. ESPER,  *Ic. Fuc.* I. p. 29. t. 9. VAHL, *Skript. af Naturhistorie-Selskabet.* V. p. 36.

*Fucus marinus vesiculas habens membranâ extantibus*. SLOANE, *Hist. Jamaic.* I. p. 58. t. 20. f. 6.

*Acetabuli marini varietas*. RUMPH. *Hist. Amboin.* VI. p. 85.

$\beta$ . *ornatus*; membranâ vesiculas terminante spinarum serie duplici, exterioribus horizontalibus, interioribus erectis, instructâ.

HABITAT in utriusque Indiæ, Americæ, Sumatræ, et Kamtschaticæ littoribus; necnon in Freto Zeylanico, et in Mari Erythræo.

*Perennis*.

RADIX discus callosus, expansus, tenuis, fibras plurimas elongatas, ramosas, incurvas, rupibus æctè adhærentes emittens.

FRONDES ex eâdem basi plurimæ, pedales, vel sesquipedales, quandòque etiam bipedales, et ultra; *caule* instructæ indiviso, pennæ corvinæ ferè crassitie, filiformi, flexuosè erecto, e tereti compresso, a basi usque ad apices ramis subspiralitè dispositis, nunc densè nunc laxè obsito: *rami* omnes simplices, quo magis radici proximi eo plerumque longiores, tripollicares et ultra, hinc sensim breviores, ut toti stirpi peripheria sit enormitèr pyramidalis, infernè nudi, aut pedunculorum diffractorum reliquiis exasperati, supernè, ut quoque caulis apex, vesiculis fructuque copiosè onusti.

VESICULÆ petiolo circitèr trilineari compresso fultæ, turbinatæ, triquetræ, angulis nunc acutis, sub-alatis, et denticulatis, nunc ferè obsoletis, poris mucifluis pertusæ, intus cavæ, et terminatæ membranâ triangulari seu cordatâ, vel planâ, vel convexâ, vesiculis ipsis ampliore, per omnem suum ambitum emarginatâ, dentibus exiguis.

FRUCTIFICATIO ramis et vesicularum petiolis innata, racemosa; scilicet e receptaculis teretibus, lineam vel sesquilineam longis, simplicibus vel bifurcis, in racemum congregatis constans: receptacula per lentem observata tuberculis innatis globosis, centro però pertusis, undique et ubique torulosa apparent; semina in tuberculis exigua, fusca, abnormitèr sphærica, limbo pellucido cincta.

COLOR *madefactæ* olivaceo-fuscus; *exsiccatæ* nigerrimus; *recentis*, teste Gmelino, flavescens: olivaceum credidissim.

SUBSTANTIA coriacea, lenta, tenax; in caule lignea.

$\beta$  radicem habet discoideam, fibrarum expertem: tota stirps vix quadripollicaris, ubique crassior et rigidior quàm  $\alpha$ ; quod autem notatu dignissimum, membrana vesicularum apici imposita concava est, nec plana, et spinarum serie duplici,



duplice, exteriori horizontali, interiori erectâ, est prædita: fructificationis racemi quoque magis ramosi et crassiores, receptaculis sub-clavatis.

\* Vesicularum in *F. turbinato* forma, unde nomen suum aptissimum ducit, tantum ab eâ reliquorum hactenûs descriptorum Fucorum differt, ut in specie discriminandâ nulla detur dubitationi occasio. Est quoque earum natura admodum singularis, cum non modo bullarum aerearum, verum etiam foliorum, quæ, licet a stirpis indole rite expectari possint, nondum sunt detecta, officiis inservire videantur. Intus sunt omninò cavæ, nec vel fibras illas in *F. vesiculoso* et congeneribus observandas includunt. Dentes per ambitum dispositi magnitudinis et duritiæ in diversis individuis sunt diversissimæ; nec minus est incertum, an per angulorum margines ex ordine disponantur, an prorsus desint. Primus hunc Fucum in Historiâ Jamaicensi cel. Sloanius descripsit. *F. conoidem* Forsk. hujus nostri valdè esse similem e characteribus in Florâ Ægyptiaco-Arabicâ datis constat, et utrumque eundem mutato tantum nomine putavisse, nisi Weberus Mohriusque, quibus phytophylacii Forskaliani perlustrandi data est facultas, diversum statuerent. Quoad fructum *F. turbinatus* convenit cum *F. natante*, cujus familiæ certè præ cæteris affinis: verisimile quoque est receptacula jam effecta in ramos producta transire; sed vesiculas etiam hisce originem suam debere nec dicere sum ausus, nec, ut verum fatear, † possum mihi persuadere. Exemplar illud, quo nitens varietatem β suprâ descriptam struxi, in Museo Linnæano, nullo tamen nomine vel loco natali adjecto, reperit Smithius. Est quoque varietas a Webero Mohrioque in *Musei Indice*, necnon in libro, cui titulus "*Neue Beiträge*," memorata, quam "*coronatam*" nominant, et quæ forsân est eadem ac hæc nostra; sed, cum descriptionem adjecerint nullam, nec mihi specimina ulla videndi contigerit occasio, rem in medio relinquere, quantumvis invitus, cogor.

- |   |   |   |   |    |
|---|---|---|---|----|
| a. <i>F. turbinatus</i> , magn. nat.                                |   |   |   |    |
| b. <i>vesicula</i> , et <i>receptaculorum racemus</i> , magn. auct. | - | - | - | 6. |
| c. <i>var. β vesicula et receptaculorum racemus</i> , magn. nat.    |   |   |   |    |
| d. <i>vesicula eadem dissecta</i> .                                 |   |   |   |    |
| e. <i>receptaculorum racemus</i> , magn. auct.                      | - | - | - | 5. |
| f. <i>receptaculi pars, extrinsecus visa</i>                        | - | - | - | 3. |
| g. <i>idem, horizontalitèr dissectum</i>                            | - | - | - | 3. |
| h. <i>semina</i>  | - | - | - | 1. |

\* Memorari debet Linnæum Vahlumque has vesiculas pro fructificatione, contrâ veram fructificationem pro ramorum rudimentis habuisse. Semina in tubo triangulari vel disco esse reperienda censuit Gmelinus.

† Hæc receptaculorum in vesiculas metamorphosis in novâ quâdam Fuci specie, mox sub *F. ilicifolii* nomine in hoc opere describendâ, liquido patet: persuasum verò mihi habeo talem non esse fixam in Fucorum æconomia legem; et in *F. turbinato* vesiculas fructificationi præire vehementer suspicor. Diversum tamen sentientibus Webero Mohrioque, quid ipsi de hæc re scripserunt hic repetere æquum duco.—"Vahl hat in den *Skrift. af Naturh. Selsk.* a. a. O. S. 36. vom *F. natans* und diesem *F. turbinatus* schon angeführt, dass die Fruchtfähren in neue Zweige des Gewächses sich ausbilden. Dass die Luftblasen bei manchen Tangen über ausgeleerten Fruchständen, an denen sich die Pori der warzen alsdann schliessen, das Innere aber so weit sich auflöst, dass eine räumliche Höle entsteht, werden, hat aber schon längst Prof. Mertens behauptet. Beide Beobachtungen bestätigen sich uns namentlich auch an den drei angeführten Tang-speciminibus. Die Blasen dieser Tange, die die Gestalt eines Kreiseis, oder eines dreieckigen Hutes von alter Form haben, werden hier gewiss, in gleicher Anzahl, aus den Endspitzen der Fruchtracemi, sobald diese ihre Frucht ausgeleert haben. Man sieht auf den Blasen noch deutlich die fast verhaschten Narben der Pori. Aus jedem einzelnen Fruchtracemus wird ein neuer traubenartiger, zuweilen in seinem ganzen Umriss kolbenförmiger Ast des Gewächses. Ist diese einmalige Ausbildung bewerkstelligt, so tritt eine Periode ein, wo keine Fruchtracemi da sind. (Gmelin's *Fig. des F. turbinatus* T. v. f. 1.) Dergleichen Aeste finden wir mit solchen, die zugleich Frucht haben, auch an unsern Exemplaren." I. p. 237.

‡ I. p. 236.



*Fucus* fronde planâ, enervi, latè ellipticâ, simplice, apice et basi attenuatâ, papillis brevibus, subulatis, apice capsuliferis, utrinque et undique muricatâ.

*Fucus bracteatus*. Gmelin, *Hist. Fuc.* p. 212.

*F. Radula*. Herb. Banks. ESPEY,  *Ic. Fuc.* II. p. 3. t. 113.

*Folium Algæ marinæ, cribriforme, latum, orbiculare*. SEBA, *Thes.* III. p. 192. t. 103. f. 1.

*Algæ marinæ folia magna, lata, reticulata*. SEBA, *Thes.* III. p. 192. t. 103. f. 2, 3.?

HABITAT ad Caput Bonæ Spei. D. Robertson.—In America Septentrionalis oris Occidentalibus. D. Menzies.

RADIX callus discoideus, perpusillus.

FRONDES ex eâdem basi plurimæ, singulæ e folio constantes unico simplice, plano, costæ venarumque experte, longitudine spithamæo, vel dodrantali, latitudine, ubi maxima, vix palmari, lineam et ultra crasso, juniore obovato lævi, adulto elliptico, apice acutiusculo, infernè in stipitem perbreve compressum attenuato, superficie utrâque papillis teretibus acutis, lineam circitè longis, densè obsitâ, margine incrassato et integerrimo, nisi quod papillas interdum ferat, et inde incautiùs observanti serrata videatur.

FRUCTIFICATIO tubercula exigua sphærica, sita ad apices papillarum, tunc pedunculorum vice fungentium; hæc si dissecantur globulum in medio intensè purpureum reperies, e duplici corpusculorum genere, horum globosorum, illorum ellipticorum, constantem.

COLOR purpureus, fusco tinctus, sub-diaphanus; *marcescentis* dilutior, et demùm in sordidè lutescentem transiens.

SUBSTANTIA cartilaginea, succosa tamen, lenta; *exsiccatæ* cornea, tenax.

OBS. Quandòque, sed rariùs, accidit stipitem juxta radicem dividi, et duas vel tres sustentare frondes.

Videatur quamvis hæc fuci species ob formam simplicissimam primo aspectu ab omnibus dignoscenda, vereor ne reperiat in hoc dolosa; ideòque magis doleo quòd non mihi sit data facultas conferendi plurima inter se exemplaria, vel discendi a Botanico quovis qui nascentem viderit quantis qualibusque mutationibus sit obnoxia. Si ex analogiâ *F. edulis*, quem inter species Britannicas figurâ et indole maximè refert, sententiam ferre liceat, dicerem nullo modo nisi laceratam variare; et hoc forsitan verum, tametsi de re perpauillum cognitâ nihil est quod pro certo affirmare ausim: sin iconas Sebanas omnes suprâ citatas, præsertim secundam, ad hanc speciem pertinere concedatur, reverà ramosam quandoque evadere, injuriâ tamen aliquâ fortassis primùm exceptâ, fateri cogemur. Idem quoque exemplaria a D. Brown, qui maximè variabilem dicit, nuper in Angliam reportata comprobare videntur; et quædam ex his figurâ suâ hanc nostram speciem cum sequente quodammodo connectunt; distinctissimas tamen esse papillarum naturâ, ut alia taceam, ostendit. De *F. bracteati* fructu structurâque internâ multum et optimè in \*tractatu suprâ sæpe laudato disseruerunt Weberus Mohriusque, quod tamen hic omne prætermittendum duco, cùm in præfatione hujus operis de Fucorum fructificatione fusiùs tractante idem ferè reperietur. Illud quidem præter opinionem accidit, quòd duo ea corpusculorum genera, quæ sese mihi in capsulis obtulerunt, illi † microscopio accerrimo summâque curâ usi non viderint; ego autem tam evidentè perspexerim ut persuadere mihi nequeam me de hac re erravisse. Utrâque inter se mixta jacuerunt; mixta tamen figuram certam, quantum ego detegere potui, servaverunt. Fierine potest ut globosa sint *vera semina*, elliptica contrâ sint *vesiculæ* eorum in *F. tuberculato* jampridem observatorum similes, et ut hæc omnibus adsint Fucis, licet ob parvitatem aut aliam quamlibet causam visum plerumque effugiant?—Diffidentissimè quæro.—Bene observaverunt Weberus Mohriusque substantiam hujus Fuci e tribus laminis constare, et exteriores stirpe jam marcescente deglubi; quod idem aliarum etiam est proprium specierum, et in *F. rotundo* valere jamdudum in ‡ *Fucorum Britannicorum Synopsi* docui. *F. Radula* nomen huic stirpi in Herbario Banksiano inditum, et, præsertim exsiccatæ, tactu visuque convenientissimum, *bracteato* Gmeliniano, nihil, quantum reperio, significanti, sed antiquitatis jure præferendo, invitè postposui; nec enim de Gmelini, iconas Sebanas citantis, et bonas appellantis, synonymo dubitare licuit, quamvis descriptio, præcipuè quod ad caulem spithamæum attinet, nequaquam omnibus numeris conveniat. De Rumphii stirpe a Gmelino adductâ nihil est quod dicam, cùm *Herbarium* ejus *Amboinense* adeundi non detur facultas. "Folium cribrî instar foraminulis densè stipatis pertusum suæ plantæ ascribit Seba; hoc autem e casu posse pendere et ad speciem discriminandam paullum valere persuasum habeo. Idem quoque sentiunt Weberus Mohriusque, sed an, ut ipsi suspicantur, foraminula hæc e papillis fructu jam maturo delapsis originem ducant, an Fucorum pericarpia ab insectis marinis pro cibo avidissimè petantur, aliis dijudicandum relinquo. *F. papillosus* Gmel., ut sub *F. stiriato* dixi, ad hanc stirpem referri debere suspicor, nec tamen pro synonymo citare proprio Marte, aliis repugnantibus, sustinui. Multum quoque habet *F. bracteatus* cum *F. stiriato* quoad substantiam et fructum affinitatis, ejusque instar madefactus aquæ tantum haurit, ut exsiccatu ad dimidiam ferè magnitudinem contrahatur.

- |   |    |
|---|----|
| a. <i>F. bracteatus</i> , magn. nat.      |    |
| b. <i>papillæ</i> , magn. auct.           | 6. |
| c. <i>capsula horizontalitèr dissecta</i> | 4. |
| d. <i>semina</i> ?                        | 1. |
| e. <i>vesiculæ</i> ?                      | 1. |

\* *Beiträge zur Naturkunde*, I. p. 236.

† Reticulatam fibrarum seriem seminibus immixtam ab iis descriptam frustra ego in hac specie, ut et in *F. stiriato* conquisivi.

‡ II. p. 312.



*Fucus bracteatus*, frond flat, nerveless, widely elliptical, simple, attenuated at the base and summit, and muricated on each side, and all over with short subulate papillæ, bearing capsules at their ends.

*Fucus bracteatus*. GMELIN, *Hist. Fuc.* p. 212.

*F. Radula*. Herb. Banks. ESPEY, *lc. Fuc.* II. p. 3. t. 113.

*Folium Algæ marinæ, cribriforme, latum, orbiculare*. SEBA, *Thes.* III. p. 192. t. 103. f. 1.

*Algæ marinæ folia magna, lata, reticulata*. SEBA, *Thes.* III. p. 192. t. 103. f. 2, 3.?

At the Cape of Good Hope. Mr. Robertson.—On the western shores of North America. Mr. Menzies.

ROOT, an extremely small, discoid callus.

FRONDS, numerous from the same base, each consisting of a single, undivided, flat leaf, destitute of midrib or veins, about six or nine inches long, and in its broadest part near four inches wide; a line and more thick, obovate and smooth in its earliest state, but when more advanced elliptical, sharpish at the apex, and at its lowest part narrowed into an extremely short compressed stem: each side of the frond is thickly beset with cylindrical sharp papillæ, about a line long; the margin is considerably thickened, and quite entire, except that it sometimes produces papillæ, and thence to a hasty observer may appear serrated.

FRUCTIFICATION, small spherical tubercles, placed at the ends of the papillæ, which then perform the office of peduncles, on cutting these open there is observable in their centre a globule of a deep-purple color, composed of exceedingly minute granules, of two kinds, the one round, the others elliptical.

COLOR, purple, tinged with brown, semitransparent; more pale in the plant when decaying, and at last turning to a dull dirty yellow.

SUBSTANCE, cartilaginous, but full of juice, pliant; in a dry state much more thin, horny and tough.

OBS. It sometimes, though rarely, happens, that the stem is divided near the root, and bears two or three fronds.

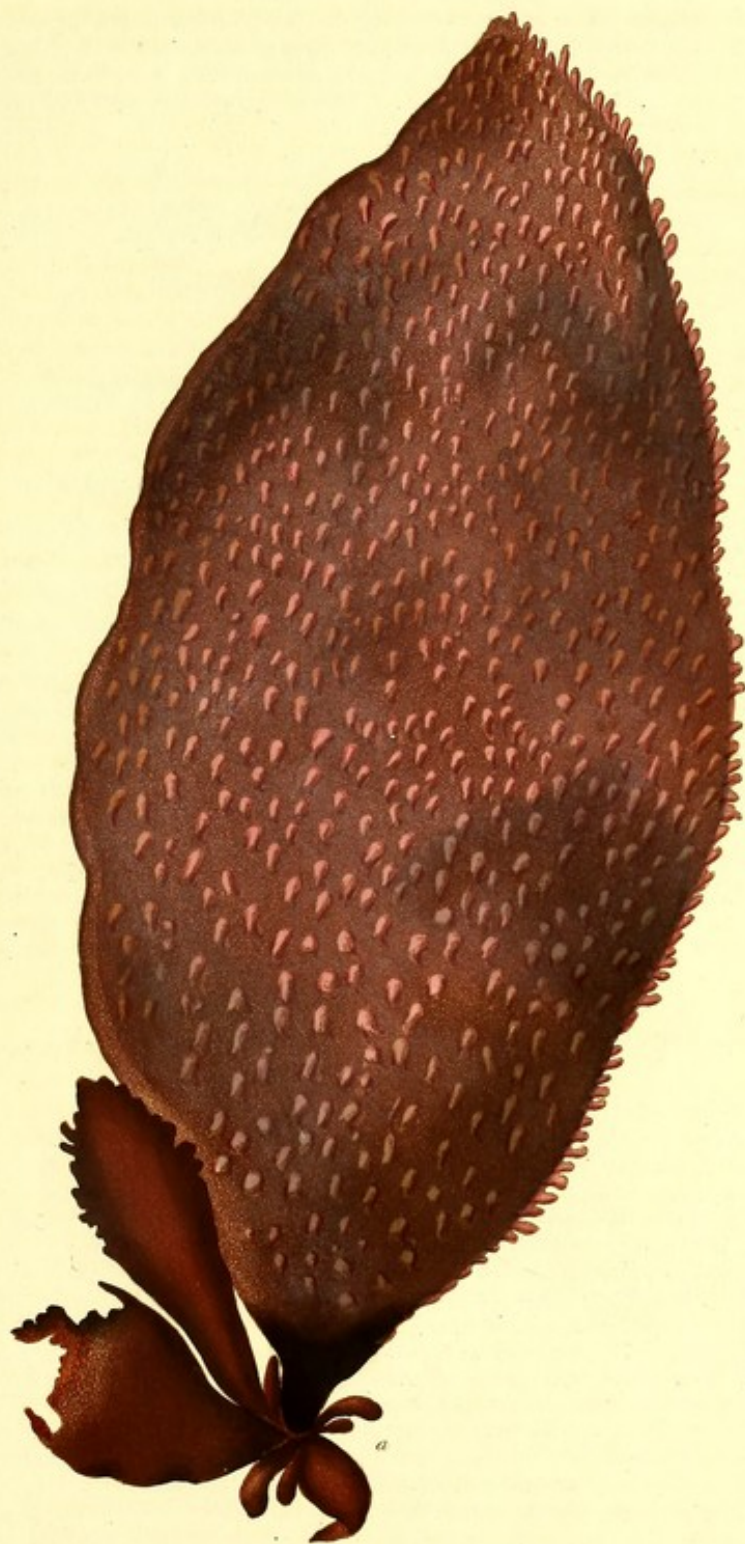
Although from the extremely simple form of the present *Fucus*, we may be led to imagine that no species may more readily be distinguished at first view, I am nevertheless apprehensive that appearances are in this respect deceitful; and I therefore particularly regret that I have not been fortunate enough to meet with the opportunity of comparing myself a number of specimens, or of learning from any Botanist, who has seen it in its place of growth, what are the changes to which it is liable. If I might be allowed to judge from the analogy of *F. edulis*, to which it bears more resemblance in figure and in nature than to any other British *Fucus*, I should say that its various forms depend only on its being torn; and such may probably be the case: but it would be rash to venture a decisive opinion upon a matter which I have had no means of determining, and, if the whole of the figures in *Seba's Thesaurus*, especially the second, really belong to this plant, we must be compelled to admit that the frond is sometimes actually branched, however such an appearance may be the result of previous injury. Some specimens lately brought to England by Mr. Brown, who says that it is a very variable *Fucus*, seem to prove the same thing, and even to tend to connect it with the following species, from which, however, the nature of the papillæ, not to mention any other circumstance, proves it sufficiently distinct. Many excellent observations upon the fructification and internal structure of *F. bracteatus* may be seen in Weber's and Mohr's\* Treatise, already frequently quoted, the whole of which I think it best here to omit, as nearly the same will be found in that part of the preface of this work which treats particularly upon the physiology of the Fuci. I was indeed surprized to find that, in spite of the great care and excellent † glasses employed by these able Botanists, in the investigation of this plant, they did not discover the two kinds of granules, which I, on the contrary, saw so plainly in the capsules, that I cannot believe it possible for me to have been in error on the subject. Both of them lay mixed together, but still preserved their separate figures. Is it possible that the globular ones should be the true seeds, and the elliptical ones vesicles, similar to those already noticed under *F. tuberculatus*; and that these really should exist in every species of *Fucus*, though on account of their diminutive size, or some other cause, they generally escape observation?—I submit this question with extreme diffidence.—Weber and Mohr have very justly remarked, that the substance of this *Fucus* is composed of three laminæ, and that the external ones peel off as the plant decays, in the same manner as happens in some other species, and was noticed in *F. rotundus* in the ‡ *Synopsis of the British Fuci*. It is with great regret that, on account of its prior date, I have been forced to substitute Gmelin's unmeaning name of *F. bracteatus* for that of *F. Radula*, which is given to the present plant in the Banksian Herbarium, and is most happy both as to look and touch. The Synonym of Gmelin, who quotes Seba's figures, and calls them good, appears to me indisputable, although some parts of his description, and especially that in which he calls the stem a span long, do not altogether apply. With regard to Rumphius's plant which he quotes, I can say nothing, having had no opportunity of consulting the *Herbarium Amboinense*. Seba observes, that what he has described, has a "leaf pierced like a sieve with a number of small holes," a circumstance which I never saw, but which I am persuaded may have arisen from accident, and can have little weight in determining a species. The same is also the opinion of Weber and Mohr, but how far their conjecture is well founded, that these holes originate from the papillæ falling out as the fruit ripens, or that the pericarps of Fuci constitute a food particularly acceptable to marine insects, I must leave others to determine. A suspicion has already been stated under *F. stiriatus*,

\* *Beiträge zur Naturkunde*, I. p. 286.

† The net-work, mixed with the seeds described by them, I have sought for in vain as well in this species as in *F. stiriatus*.

‡ *ll.* p. 312.





*Fucus bracteatus.*







*F. stiriatus*, that *F. papillosus*, Gmel. ought, as well as his *F. bracteatus*, to be referred to this plant; but I have still not ventured upon quoting it as a synonym in opposition to the opinion of others. *F. bracteatus* is in its fructification and substance nearly allied to *F. stiriatus*, and, like that species, imbibes so much water when moistened, that in drying it shrinks to little more than half its original size.

a. <i>F. bracteatus</i> , natural size.	
b. <i>papilla</i> , magnified	- - - 6.
c. <i>capsule cut through horizontally</i>	- - - 4.
d. <i>seeds?</i>	- - - 1.
e. <i>vesicles?</i>	- - - 1.

## 26.—FUCUS ERINACEUS.

*Fucus* fronde planâ, enervi, oblongo-lineari, simplice, ramentis lingulatis tuberculiferis utrinque et undique muricatâ; tuberculis in ramentis immersis.

HABITAT ad Caput Bonæ Spei. *Herb. Banks.*

RADIX callus exiguus, explanatus, fuscus.

FRONDES ex eâdem basi plurimæ, singulæ e folio constantes unico simplice, ex oblongo lineari, longitudine pedali et ultrâ, latitudine pollicari vel sesquipollicari, plano, sed hic illic rugoso, costæ venarumve experte, apice lenitè rotundato, basi aliquantùm attenuato, nec ita tamen ut stipitem ullo modo simulet, margine undulato, integerrimo, et levissimè incrassato: frons ætate primâ lævis et nuda; adultioris utrique paginæ et marginibus copiosè innascuntur *ramenta* lingulata, sub-linearia, duas tresve lineas longa, compressa, horizontalia, ejusdem cum fronde coloris et substantiæ, basi attenuata, ut pedicellata videantur.

FRUCTIFICATIO in ramulis sita; e tuberculis constans exiguis, sphæricis, immersis, plurima in singulis, foramine minutissimo extrinsecus pertusa: nihil in his, nisi corpuscula illa elliptica pellucida, jam sub *F. tuberculato* et *F. bracteato* memorata, hactenùs detegere potui.

COLOR fusco-purpurascens, sub-diaphanus; *exsiccatâ* intensior; *marcescentis* in roseum, et demùm in sordidè lutescentem transiens.

SUBSTANTIA cartilaginea, crassiuscula, tenax; *exsiccatâ* cornea.

OBS. Ramenta in longitudinem unguicularem et ultrâ aliquando producantur: exsiccatione contorta et crispa evadunt.

Similitudinem illam, quæ inter hunc *Fucum* et precedentem interest, jam sub eâ specie attigi, memorans simul papillarum figuram et indolem, ut quæ ad utramque primo aspectu dignoscendam nunquam non sufficerent. Huic quoque accedit discrimini substantia frondis, quæ in *F. erinaceo* nequaquàm ita succi est plena ut in *F. bracteato*, nec sese exsiccatione tantum contrahit; accedit etiam fructificationi, per quam *F. erinaceus* a reliquis aliis fronde planâ enervi prædiis *Fucis* insignitè discrepat, et de quâ, licet a mancis illis solis hactenùs detectis exemplaribus nihil quoad ejus naturam satis certum vel definitum asseri possit, illud tamen liquet, differre facie externâ toto cælo ab eâ *Fucorum globuliferorum*, propiusque videri accedere ad eam *Fucorum*, qui dicuntur, *propriorum*, a quibus omnibus stirps ipsa substantiâ et habitu quàm longissimè recedit. Duo modò hujus *Fuci* hucusque vidi specimina; unum in Herbario Banksiano inclusum, et *F. ramentacei* nomine, jamdudùm in *Systemate Vegetabilium* alii speciei indito, insignitum; alterum in Herbario Linnæano, eidem chartæ, cui *F. vittatus*, agglutinatum; unde constat hasce duas a Linnæo commixtas esse species, fierique potest ut, cùm *F. vittati* var.  $\gamma$ , *ornatam*, describeret, *F. erinaceum* respexerit. Favet huic opinioni quòd folia suæ plantæ oblonga et avenia ascripserit: repugnat autem quòd cilia margini tantummodò innascentia memoraverit. Costæ absentia, frondis forma, et ramentorum dispositio *F. erinaceum* a *F. vittato* distinguunt. Quoad figuram iisdem prorsùs, quibus *F. bracteatus*, mutationibus obnoxius videtur: sed, cùm unum atque alterum e ramentis, quorum singula totam plantam magnitudine comminutam referunt, reverà bifurcum viderim, adducor ut folia quandòque naturâ divisa crederem. Ex amplificatione illorum suprâ memoratâ suspicari ferè liceret, vim crescendi proliferam stirpi esse insitam.

a. <i>F. erinaceus</i> , magn. nat.	
b. <i>ramentum</i> , magn. auct.	- - - 6.
c. <i>idem horizontalitè dissectum</i>	- - - 4.
d. <i>vesiculæ?</i>	- - - 1.
e. <i>ramenti pars interioris longitudinalitè secti</i>	- - - 4.



*Fucus erinaceus*, frond flat, nerveless, between oblong and linear, simple, mucated on each side, and all over with lingulate tuberculiferous ramenta: tubercles immersed in the ramenta.

At the Cape of Good Hope. *Herb. Banks.*

ROOT, a small, expanded, brown callous disk.

FRONDS, many from the same base, each consisting of a single undivided leaf, between oblong and linear, a foot or more long, and an inch, or inch and half wide, flat, but wrinkled in places, destitute of midrib or veins, somewhat rounded at the apex, and slightly attenuated at the base, but by no means so as to give the appearance of a stipes; the margin undulated, entire, and a little thickened: the frond in its younger state is smooth and naked; when full grown each side of it, and the edges also, are copiously beset with lingulate, almost linear, compressed ramenta, two or three lines long, disposed in a horizontal direction, of the same color and substance as the frond, and so much narrowed at the base as to look pedicellate.

FRUCTIFICATION, situated in the ramuli; consisting of several minute, spherical tubercles immersed in each of them, perforated externally with an extremely small pore: in these I have hitherto been able to detect nothing but those elliptical pellucid granules, already noticed under *F. tuberculatus* and *F. bracteatus*.

COLOR, brownish purple, semitransparent; darker when the plant is dry, and turning in a state of decay to pink, and afterwards to a dirty yellow.

SUBSTANCE, cartilaginous, thickish, tough; horny in dry specimens.

OBS. The ramenta are sometimes found half an inch or more long; and in drying become variously twisted and curled.

In treating of the preceding *Fucus*, I have already noticed the resemblance which there exists between that species and the present, and have observed that the form and nature of the papillæ are sufficient to keep them distinct at first sight; in addition to which, I think it necessary here to remark that they differ no less essentially in the substance of the leaf, which in *F. erinaceus* is by no means of the same juicy gelatinous structure, or liable to the same contraction when dry, as that of *F. bracteatus*, and in the fructification, which in the plant before us is altogether very unlike what might be expected from its connection with the tribe of *Fuci* provided with a flat and nerveless frond. It is indeed impossible from the imperfect specimens that I have hitherto seen to speak with the precision that could be wished upon the subject; but thus much is certain, that it has in external appearance no affinity to that of the globuliferous *Fuci*, and seems rather to approach to that of the *Fuci proprii*, from which the plant itself is in substance and habit as widely removed as possible. The only specimens that I have yet met with of *F. erinaceus* are contained in the Banksian and Linnæan Herbaria; in the former of which, it is called *F. ramentaceus*, a name already appropriated in the *Systema Vegetabilium* to a very different plant, and in the latter it is attached to the same paper as *F. vittatus*, so that it is evident that Linnæus confounded these two species, and it is possible that he meant to allude to the present under his *F. vittatus*, var.  $\beta$ , *ornatus*, a supposition that is strengthened by his attributing to it oblong veinless leaves, though his confining the cilia to the margin seems to render it improbable. *F. erinaceus* differs most essentially from *F. vittatus* in the want of a midrib, the shape of the frond, and the disposition of the ramenta; in point of form it appears liable to precisely the same variations as *F. bracteatus*, except that, from having noticed one or two of the ramenta naturally forked, I am inclined to think that the frond itself may occasionally be found divided, as each of these ramenta resemble it in miniature. Their sometimes enlarging themselves, as mentioned above, might lead to the idea that the plant is gifted with a proliferous tendency.

- |  |   |   |   |   |    |
|--|---|---|---|---|----|
| a. <i>F. erinaceus</i> , natural size.               |   |   |   |   |    |
| b. a ramentum separate, magnified                    | - | - | - | - | 6. |
| c. horizontal section of ditto                       | - | - | - | - | 4. |
| d. vesicles?   | - | - | - | - | 1. |
| e. interior of part of a ramentum cut longitudinally | - | - | - | - | 4. |





*Fucus erinaceus.*







*Fucus* fronde coriaceâ, compressâ, lineari, ramosâ; ramis elongatis simplicibus, foliis lineari-cuneiformibus, membranaceis, distichis, approximatis, vesiculisque ellipticis obsitis.

HABITAT in Americæ Septentrionalis oris Occidentalibus, aquæ profundioris plerumque incola: apud Nootka; Trinidad; Monterrey. *D. Menzies*.

*Perennis*.

RADIX fibrosa; fibris plurimis, incurvis, ramosis.

FRONS viginti ulnarum et ultra longitudine, *stipite* assurgens brevi teretiusculo, in *ramos* diviso aliquot elongatos, sub-fastigiatos, simplices, tuberculis exiguis nigris tactu visuque scabros, planos, semiunguem latos, et latitudinem ubique æqualem servantes, nisi quòd juxta apices aliquantum sint dilatati, et inde rursus attenuati, ita ut extremitates obtusè lanceolatae evadant. Per totam ramorum longitudinem ex utroque horum latere enascuntur FOLIA approximata, disticha, horizontalia, plana, e basi filiformi sensim dilatata, figuræ elongatè et angustè cuneiformis, margine abnormitèr, minutè tamen, crenulata, rariùs dente uno alteroque instructa, longitudine bipollicaria, ea frondis basin apicesque versus breviora, superficie poris mucifluis pertusa; hisce immixtæ hic et illic occurrunt VESICULÆ, nullo certo ordine dispositæ, spatio inter singulas nunc dodrantali, nunc unguiculari, ellipticæ, *Olea Europææ* druparum magnitudine, extrinsecus læves, intra cavæ, petiolo insidentes tereti, bilineari, ramorum instar scabro, apice folio reliquorum simili mucronatæ.

FRUCTIFICATIO adhuc incognita.

COLOR in foliis olivaceus, sub-diaphanus, in ramis obscurior, opacus.

SUBSTANTIA foliorum e membranaceâ cartilaginea, tenuis; ramorum coriaceo-lignea, tenax.

Obs. Folia vesiculæque in exsiccata sæpe decidunt, unde stirps quandoque hic illic denudata apparet.

Dolendum est quòd sit impossibile in operibus ad vegetabilia depingenda destinatis plantarum omnium iconas ejusdem quâ ipsæ fruuntur magnitudinis delineatas sistere; et quòd nihil ultra restet quàm vel parte tantummodò exiguâ esse contenti, vel totam stirpem adeo usque imminutam adumbrare ut character et indoles sæpe penitus deleantur. Fucorum Historiam illustrare conanti hoc crebrò necessariè occurrit; sed Botanicos plerosque mecum consensuros spero, si in iis speciebus, quarum, sicut ejus nunc tractandæ, habitus et crescendi modus per totam frondem est uniformis, pars toti anteponatur, quod superest e descriptione supplendum relicto. Multa ex iis quæ de hoc Fuco suprâ traduntur, simul et exemplar hic depictum, amicissimo Menziesio debeo, qui post primam circa orbem expeditionem secum redux attulit, et qui solus adhuc reperisse videtur. Magno mihi fuit gaudio quòd talem stirpem talis viri nomine insigniendi sese obtulerit occasio; quoniam persuasum habeo esse paucos de scientiâ botanicâ melius promeritos, cum ob indefessum studium quo in plantis quærendis et scrutandis est usus, tum ob eximiam liberalitatem quâ quasita et scrutata dispertiit. *F. Menziesii* est stirps perelegans, maximèque singularis, et quæ ab omnibus hactenùs descriptis formâ habituque tantum abludit, ut non modo primo aspectu dignoscatur, quin etiam difficile sit dictu cuius familia rectiùs associaretur. Arctissimam, nec tamen valdè arctam, ei cum *F. natantis* tribu affinitatem intercedere censebam, fructificationemque esse eandem quâ hi gaudent crederem: nequaquam tamen hariolari licet qualis sit hujus fructûs figura, vel in quâ frondis parte reperiri possit. Crescendi modum in hoc Fuco insipienti impossibile videbitur produci in novos ramos vel folia vel vesiculas, quorum illa figurâ et substantiâ *F. esculenti* pinnas multum referunt.

- a. *F. Menziesii* frondis portio, magn. nat.
- b. vesicula folio terminata.
- c. ejusdem dissecta pars.
- d. vesiculæ petiolus, magn. auct. - - - - 5.
- e. folium - - - - - 6.
- f. ramus horizontalitèr sectus - - - - 6.
- g. tubercula ramo innata - - - - 3.
- h. rami longitudinalitèr secti partis interioris portio 1.



*Fucus Menziesii*, frond coriaceous, compressed, linear, branched; branches long, simple, beset with membranaceous, distichous leaves, between linear and cuneiform, placed near each other, and with elliptical vesicles.

On the western coast of North America, generally in deep water: at Nootka; Trinidad; Monterrey. *Mr. Menzies*.

*Perennial*.

ROOT, fibrous, with several incurved, branching fibres.

FRONDS, twenty fathoms and more long, rising with a short roundish *stipes* divided into several long simple branches, of almost equal height, rough all over both to the touch and sight with minute black tubercles, flat, every where preserving an equal width of about a quarter of an inch, except that towards the apices they are slightly dilated, and then again narrowed, so that the extremities are of an obtusely lanceolate form. The branches throughout their whole length produce on either side a series of distichous, horizontal leaves, placed near to each other, flat, gradually widening from a filiform base, so as to be of a long and narrow cuneiform figure, their margins irregularly and minutely crenulated, sometimes, but seldom, provided with one or two teeth, their length about two inches, but those near the base and end of the frond shortest, their surface perforated with mucifluous pores; mixed with these here and there grow vesicles, arranged without any certain order, and with an interval of nine inches in some cases, and of not above half an inch in others, between them, elliptical, about the size of an olive, smooth without, hollow and empty within, producing at their ends a leaf similar to the others, and supported upon cylindrical petiole, two lines long, and rough like the branches.

FRUCTIFICATION, at present unknown.

COLOR, in the leaves olive, semitransparent; in the branches darker, opaque.

SUBSTANCE, of the leaves, between membranaceous and cartilaginous, thin; of the branches, between coriaceous and woody, tough.

OBS. In a dried state the leaves and vesicles frequently fall off, which gives the plant a naked appearance in places.

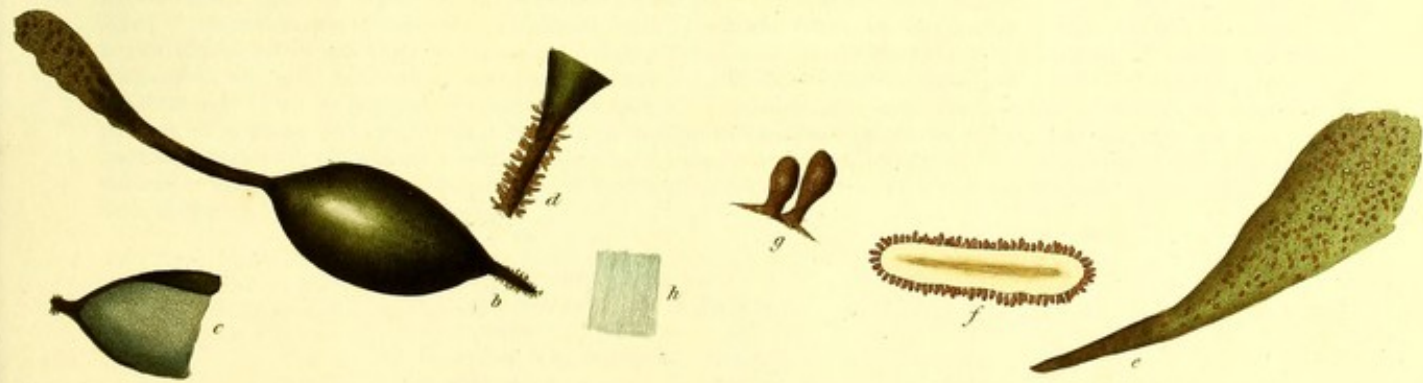
It is greatly to be lamented, that in all works containing figures of plants it is impossible to represent every species of its natural size, and that authors are consequently reduced to the alternative of either confining themselves to a part alone, or of giving a representation of the whole so much reduced that the character of the original is often altogether lost. Among the Fuci, such a case must not unfrequently occur, and I trust I shall be considered as having determined rightly, if in those instances where the mode of growth is uniform throughout, I prefer the figuring of a portion only, and leave it to the imagination of my readers to supply the remainder from the description. For many of the particulars in the account of the present *Fucus*, as well as for the specimens from which the drawing is made, I am entirely indebted to Mr. Menzies, who brought it home with him in his first expedition round the world, and after whose name I have had a peculiar pleasure in calling it, being convinced that no man better deserves to be enumerated among the promoters of botanical science, from the zeal with which he has prosecuted it, and the liberality which he has shewn in dispersing his treasures. *F. Menziesii* is a very singular and elegant species, so much removed from every other hitherto described, that there is not only no fear of confounding it, but that it would even be difficult to say to which it is most a-kin. I should be inclined to place it near to the tribe of *F. natans*, and should from its color and texture apprehend its fructification to be similar to that of the *Fuci proprii* of Weber and Mohr, but where this fructification is borne, or what is likely to be its figure, I am unable to form any conjecture. From the mode of growth of the plant, it appears impossible that either the leaves or the vesicles should lengthen into new branches: the former bear a considerable resemblance to the pinnae of *F. esculentus*.

- a. part of *F. Menziesii*, natural size.
- b. vesicle with terminating leaf.
- c. vesicle cut open.
- d. stalk of vesicle, magnified - - - - 5.
- e. leaf - - - - - 6.
- f. horizontal section of a branch - - - - 6.
- g. tubercles that grow on it - - - - 3.
- h. longitudinal section of the interior of a branch - 1.





a



*Fucus menziesii.*







*Fucus* fronde cartilagineâ, compressâ, lineari, vagè dichotomâ; ramulis subulatis, horizontalibus, sub-distichis, tuberculiferis; tuberculis globosis, sessilibus, terminalibus lateralibusque.

*Fucus gigartinus*. LINN. *Syst. Nat.* II. p. 719. *Syst. Nat. Ed. Gmel.* II. p. 1386. Linn. *Trans.* III. p. 183. t. 17. f. 3, 4. WITH. IV. p. 111. Eng. *Bot.* XIII. t. 908. *Syn. Fuc.* II. p. 280. Fl. Fr. Ed. 2da. II. p. 33.

*F. pistillatus*. GMELIN, *Hist. Fuc.* p. 159. t. 18. f. 1. LAM. *Diss. Fuc.* p. 51. t. 27.

*F. Oederi*. ESPER,  *Ic. Fuc.* II. p. 52. t. 135.

*Ceramium gigartinum*. ROTH, *Cat. Bot.* III. p. 109.

$\beta$ . *minimus*; fronde planâ, tenerâ, ramosissimâ, flexibili; tuberculis minutissimis.

*F. pistillatus*.  $\beta$ . LAM. *Diss. Fuc.* p. 51. t. 28.

HABITAT in Cornubiæ oris.—In rupibus submarinis prope Padstow. D<sup>na</sup> Hill.—In oris Franciæ secus oceanum.

Lamouroux.—Copiosissimè ad Scalas ascensûs in ponte marino St. Ubes. D. Leoffling, in *Herb. Linn.*—

In Hispaniæ oris. D. Link.— $\beta$ . in Franciæ oris. Lamouroux.

Perennis? \* Vere fert fructum.

RADIX callus tenuis, explanatus, fuscus.

FRONDES ex eâdem radice plurimæ, compressæ, in quibusdam autem individuis teretiusculæ, in aliis propemodum planæ, longitudine palmares, vel semipedales, latitudine ubique ferè æquales, et lineam unam alteramve latæ, caule assurgentes basin versus indiviso, sursum ter, quater, vel pluries vagè dichotomo, segmentis fastigiatis, dichotomiarum angulis erecto-patulis, infernè nudo, supernè, præsertim apices versus, † ramulis instructo pluribus, subulatis, dentiformibus, sub-distichis, oppositis alternisque, horizontalibus, caule multò angustioribus, plerumque simplicibus brevibusque, ut vix trium linearum longitudinem æquent, aliquandò tamen elongatis, et bifurcis, seu vagè divisis, apice semper acuminatis, excepto si sint, ut sæpe accidit, tuberculis terminati.

FRUCTIFICATIO tubercula spherica, papaveris seminis magnitudine, ramulorum nunc apici nunc lateri insidentia, sæpius solitaria, sed interdum bina vel terna, globulum e seminibus subrotundis minutissimis densè compactis constantem intus foventia.

COLOR intensè purpureus; soli objectæ lutescens, marcescentis dilutior, et sordidè fusco-virescens; tuberculorum nigricans.

SUBSTANTIA cartilaginea, lenta; exsiccata rigidiuscula.

Var.  $\beta$ , quam, nunquam a me ipso visam, cl. Lamouroux fide hic recenseo, est, ut ejus verbis utar, minor quàm  $\alpha$ , fronde magis ramosâ, ramis lateralibus, ramulis in totâ plantæ paginâ sparsis; tuberculis tenuitate tantum a var.  $\alpha$  tuberculis differentibus. Substantia tenera, submembranacea, nonnihil gelatinosa. Color a viridi ad rubro-purpureum variat.

*F. gigartinus*, species inter Britannicas omnium ferè rarissima, et a nemine, quantum scio, nisi semel a D<sup>na</sup> Hill adhuc in littoribus nostris nascens detecta, nequaquam ita infrequentè in Galliæ Septentrionalis vel Hispaniæ oris occurrit; sed in illis tantummodò quæ oceano alluuntur hactenùs est reperta, quare, quòd locum ei natalem Norvegiæ tribuerit Esperus, ex errore factum suspicor. Primus et optimè hanc stirpem in *Systemate Naturæ* descripsit Linnæus, cujus tamen descriptio eam ob causam Rothio minùs arridet, quia fructificationes terminales subjacente aristâ dixerit. Est autem hoc, pace viri accuratissimi, nota plantæ præ cæteris propria: quamvis enim capsulæ non rarò sunt terminales nihil ultra progrediente, crebriùs tamen occurrunt laterales juxta apicem ramulorum, qui sub tuberculis exerti et in mucronem longiorem producti aristæ formam mentiuntur. Nomen quoque a Linnæo impositum aptissimum, et quod in stirpe dignoscendâ tyroni multum adjuvet, cum capsulæ, licet acino (γυγάρτυς) quovis minores, eos tamen formâ insignitè referunt. Utinam sanè fieri possit ut nomina paritèr idonea cuius plantæ adaptarentur! procederet res botanica multo suaviùs quàm nunc, et synonymorum illâ multiplicatâ confusione, scientiæ maximo impedimento simul et dedecore, in posterum careremus. Exemplar modò unicum, idque parvum, fluctibus diu illisum, tempestatisque mutationibus objectum, vidit Gmelinus, unde descriptio ejus et icon necessariè manca, nec tamen idcirco est de synonymo dubitandum. Sub *F. pistillaris* nomine plantam longè alienam, *F. obtusi*, uti videtur, varietatem, sub quâ nihilominus stirpem Gmelinianam citavit, Wulfenius descripsit. Ad *F. cristatum* pertinet *F. gigartinus* Fl. Dan. ut jam sub illâ memoratur specie. Granulorum in capsulis congeriem, semper arctissimè compactam, et in pulpâ fibris parallelis undique a superficie radiantibus repletâ inclusam, pro semine unico ex errore habuit Lamouroux, qui plantæ historiam uberem sinum et accuratam tradidit. Suspiciatur idem var.  $\beta$  specie ab  $\alpha$  differre. Ramuli horizontales dentiformes in fronde dichotomâ, spinosa facies, et capsularum sphaericarum dispositio hanc stirpem a congeneribus distinguunt.

a. <i>F. gigartinus</i> , magn. nat.	-	-	-
b. rami pars superior, magn. auct.	-	-	6.
c. capsula - - - - -	-	-	4.
d. eadem longitudinalitèr dissecta - - -	-	-	2.
e. semina - - - - -	-	-	1.

\* Mense Martio 1865 capsulis maturis instructam legit D<sup>na</sup> Hill.

† Bene de ramulis dixit Lamouroux, "ces petits rameaux, simples ou rameux, presque tous fructifères, ressemblent à des aiguillons (pars sur toute la surface de la plante, lorsqu'elle est ronde ou presque ronde, et seulement sur les côtés lorsqu'elle est très comprimée."



*Fucus gigartinus*, frond cartilaginous, compressed, linear, irregularly dichotomous; ramuli subulate, sub-distichous, horizontal, tuberculiferous; tubercles globular, sessile, lateral, and terminal.

*Fucus gigartinus*. LINN. *Syst. Nat.* II. p. 719. *Syst. Nat. Ed. Gmel.* II. p. 1386. *Linn. Trans.* III. p. 183. t. 17. f. 3, 4. WITH. IV. p. 111. *Eng. Bot.* XIII. t. 908. *Syn. Fuc.* II. p. 280. *Fl. Fr. Ed. 2da.* II. p. 33.

*F. pistillatus*. GMELIN, *Hist. Fuc.* p. 159. t. 18. f. 1. LAM. *Diss. Fuc.* p. 51. t. 27.

*F. Oederi*. ESPER,  *Ic. Fuc.* II. p. 52. t. 135.

*Ceramium gigartinum*. ROTH, *Cat. Bot.* III. p. 109.

$\beta$  *minimus*; frond flat, tender, much and irregularly branched, flexible; tubercles very minute.

*F. pistillatus*.  $\beta$ . LAM. *Diss. Fuc.* p. 51. t. 28.

Shores of Cornwall.—Rocks near Padstow. Miss Hill.—Most abundantly on the Stairs of the Jetty at St. Ubes. *Leofling in Linnæan Herbarium*.—Shores of Spain. Professor Link.— $\beta$ , with  $\alpha$ , on the coast of France by the ocean. Lamouroux.

Perennial? In the \* Spring.

ROOT, a thin, expanded, brown, callous disk.

FRONDS, numerous from the same base, generally compressed, but in some specimens roundish, in others nearly flat, from three to six inches long, and preserving throughout an equal width of one or two lines, rising with a stem which is undivided near the root, but in its upper part three or four times, or still more frequently, irregularly dichotomous, the segments of equal height, the angles of the dichotomies between erect and patent: the stem is naked below, but upwards, especially towards the apices, furnished with several subulate, dentiform, sub-distichous† ramuli, placed in a horizontal direction, both alternately and oppositely, much more narrow than the stem, and generally simple, and not above three lines long, but sometimes lengthened out, and forked or divided in an uncertain manner, always acuminate at the apices, except, as frequently happens, they are terminated with a tubercle.

FRUCTIFICATION, spherical tubercles, about the size of poppy-seed, sessile either at the ends or sides of the ramuli, most frequently solitary, but occasionally growing two or three together, containing a compact globule formed of very minute roundish seeds.

COLOR, a deep purple; turning yellowish when exposed to the sun; paler and dirty brownish green as the plant decays: the tubercles are blackish.

SUBSTANCE, cartilaginous, and pliant, but rather rigid after drying.

Var.  $\beta$ , which I never saw, stands here on the authority of M. Lamouroux, and is, to use his words, less than  $\alpha$ ; the frond more branched, the branches lateral, the ramuli scattered over the whole surface of the plant; the tubercles differ from those of var.  $\alpha$  only in their smaller size; the substance is tender, sub-membranaceous, and approaching to gelatinous; the color varies from green to reddish purple.

However scarce a plant *F. gigartinus* may be regarded, if considered only as a native of the British shores, where I believe it was never found growing, except once by Miss Hill, it does not appear to be by any means equally unfrequent upon the coast of France and Spain; though even in those countries it seems to be confined to those parts alone which border upon the ocean, so that it can scarcely be doubted but Professor Esper has been mistaken in publishing it as a native of Norway. Linnæus was the first author who noticed this species, and his description of it in the *Systema Naturæ* is excellent, though Dr. Roth finds fault with it on account of his calling the fructification terminal subtended by an arista. This very circumstance, however, far from deserving censure, affords, in my opinion, the strongest character of the plant; for, though the capsules are not unfrequently terminal in the proper sense of the word, they are still more frequently sessile on the sides of the ramuli near the apices, and the points extending beyond them give them the appearance noticed by Linnæus. The name too assigned to the plant by this celebrated writer is peculiarly happy, and may be of essential service to the young botanist in distinguishing the species, as the capsules, though smaller than any grape-stones (*γυαφρον*) bear a striking resemblance to them in figure. I heartily wish it were possible to apply to every plant an appellation equally descriptive. The study of Botany would go on far more smoothly than it does at present, and we should be relieved from that eternal multiplication of synonymy which is at once the greatest disgrace to the science and impediment to its progress. The only specimen of *F. gigartinus* that Gmelin had an opportunity of seeing, was in itself small, and had sustained great injury from having been long battered about by the waves, and exposed to the action of the sun and air, which may account for the necessary imperfections in his description and figure, but there is still no room for doubt as to the synonym. The plant described by Baron Wulfen, under the title of *F. pistillaris*, to which he referred Gmelin's *Fucus* of the same name, is in reality a very different one, and apparently a variety of *F. obtusus*. The *F. gigartinus* of the Flora Danica belongs, as has already been mentioned, to *F. cristatus*. From the extreme compactness of the globule of granules in this species, which is placed in the midst of a transparent pulpy matter, full of fibres radiating in every direction from the interior to the surface, Lamouroux was led to regard it as producing only a single seed. His description

\* I know nothing as to the time of fruiting of this *Fucus*, except that Miss Hill gathered specimens with ripe capsules on the 23d March 1803.

† Lamouroux has observed well respecting these, "Ces petits rameaux, simples ou rameux, presque tous fructifères, ressemblent à des aiguillons épars sur toute la surface de la plante, lorsqu'elle est ronde ou presque ronde, et seulement sur les côtés lorsqu'elle est très comprimée."





*Fucus gigartinus.*







description is both full and accurate. The var.  $\beta$  he suspects may prove really distinct. The horizontal tooth-like ramuli placed on the dichotomous frond, joined to the thorny appearance of this plant, and to the disposition of the spherical capsules, will distinguish it from its congeners.

a. <i>F. gigartinus</i> , natural size.	-	-	-	-	-
b. upper part of a branch, magnified.	-	-	-	-	6.
c. capsule	-	-	-	-	4.
d. longitudinal section of the same	-	-	-	-	2.
e. seeds	-	-	-	-	1.

## 29.—FUCUS KALIFORMIS.

*Fucus* fronde sub-gelatinosâ, filiformi, tubulosâ, ramosissimâ; ramis ramulisque sub-verticillatis, articulato-contractis; tuberculis sessilibus, seminibusque in ramulis sparsis.

*Fucus kaliformis*. Linn. Trans. III. p. 206. t. 18. WITH. IV. p. 89. Eng. Bot. IX. t. 640. Syn. Fuc. II. p. 377. LAM. Diss. Fuc. p. 57. t. 29.

*F. verticillatus*. Fl. Scot. p. 962. t. 31. WITH. IV. p. 90.

*Ulva purpurascens*. Fl. Ang. p. 569.

$\beta$ . *diaphanus*; fronde teretiusculâ; ramulis productis, sub-simplicibus; contractionibus obsoletis.

*F. kaliformis*.  $\beta$ . Syn. Fuc. II. p. 378.

*F. diaphanus*. ESPER, Ic. Fuc. I. p. 150. t. 102.

*Ceramium tubulosum*. ROTH, Cat. Bot. II. p. 164. (excl. syn.) III. p. 124.

*Conferva tubulosa*. WULFEN, Crypt. Aquat. n. 14. (excl. syn.)

$\gamma$ . *nanus*; fronde implexâ, articulâtâ; ramis ramulisque horizontalibus articulatis; articulis fasciatis.

HABITAT in Angliæ australis et Ægypti oris.—In Galliæ oris. Lamouroux.— $\beta$  ad Insulam Monam. D. H. Davies.—In Scotiæ occidentalis oris. D. Menzies.—Prope Eblanam, cum var.  $\alpha$ . D. Scott.—In Hiberniæ septentrionalis oris, prope Belfast, cum var.  $\alpha$ . D. Templeton.—In Mari Adriatico. Wulfen.— $\gamma$  apud Torquay in Devonîâ. D<sup>na</sup> Griffiths.—Inter rejectamenta maris apud Brighton. D. Borrer.

Annua. Jun.—Sept.

RADIX callus exiguus, expansus, fibris aliquot brevibus, teretibus, ramosis saxo affixus, et inde sub-repens.

FRONDES nunc solitariae, nunc binæ ternæve, tubulosæ, filiformes, longitudine pedales aut sesquipedales, caule instructæ indiviso, crassitiem pennæ ut plurimum corvinæ, quandòque autem anserinæ, aut olorinæ, æquante, basi attenuato, cætera æquali, nisi quòd hic illic interdum vagè contractus appareat, ramis per totam longitudinem laxè obsito oppositis alternisque, sæpius autem sub-verticillatis, elongatis, iis medium versus plerumque longissimis, sed hoc incertum, apice obtusis, basi attenuatis, haud ita teretibus ut caulis, sed incerta per intervalla evidentius constrictis, minorum serie obsitis, qui eadem, quâ primarii ratione ibi copiosissimè ubi frons contrahitur sunt dispositi, seriemque tertiam non rarò gignunt: ramuli in caule ramisque sparsi, simplices, abbreviati, obtusi, ita manifestè constricti ut contractiones genicula mentiantur, et ex articulis brevibus oblongo-ovatis omninò compositi videantur; attentius tamen insipienti isthmis nullis intus sunt intercepti.

FRUCTIFICATIO duplex, utraque in ramulis sita; hæc e seminibus constans subrotundis, nudis, in ipsâ frondis substantiâ immersis; illa e capsulis sessilibus, junioribus sphaericis, adultis oburceolatis, et apice apertis, globulum intensè rubrum e seminibus oblongo-pyriformibus compositum includentibus.

\* COLOR amœnè roseus, fugacissimus; soli exposita lutescens, vel virescens, quandòque etiam albicans.

SUBSTANTIA admodum tenera, sub-gelatinosa, lubrica.

$\beta$  tenuior quàm  $\alpha$ , ramos habet pauciores, minùs evidentè constrictos, ramulosque elongatos sub-simplices, adeo obsoletè contractos ut propemodum teretes videantur.

$\gamma$  varietas est notatu dignissima, et quæ pro distinctâ specie facillè possit haberi: densis multumque implexis cæspitibus nascitur: frondes longitudine vix tres pollices crassitie vix Merulæ pennam æquant; rami omnes sparsi, horizontales,

\* Colorem huic plantæ dilutè vel albescenti-viridem Lightfootius, primùm dilutè virentem, seriùs albentem, quandoque et dilutâ rubedine tinctam Wulfenius, in juniore statâ viridem, in proveciore pallidè virentem, in perfecto album Rothius tribuit.



tales, oculo inermi nequaquam magis liquidò contracti quam in var.  $\alpha$  et  $\beta$ , sed sub lente observati verè articulati; articulis fasciatis, longitudine diametrum duplo superante.

Lightfootii, qui primus hunc Fucum in *Florâ Scoticâ* adumbravit, descriptio et icon ad exemplar exsiccatum, et absque pressurâ exsiccatum, confectæ, erroribus plurimis ansam præbuerunt, unde Witheringius *F. kaliformem* et *verticillatum* pro distinctis speciebus habuit, et cum Goodenovius Woodwardiusque eum in Societatis Linnaeanæ Actis optimè describerent hunc pro synonymo citare non sunt ausi. Hi sunt qui *F. kaliformem* primi extra dubitationem posuerunt, nec tamen, quod mireris, articulatam illam memorârunt faciem, quâ character specificus præcipuè nititur. Cum *F. clavelloso* scilicet commiscuerant, et, licet veram tabula plantam sistat, descriptio partium ex alterâ parata videtur. Sunt quidem hæc stirpes reverâ quam maximè affines; me tamen iudice certè distinctæ; in iis discrepant, quòd *F. clavellosi* habitus magis ad pinnatum accedat, quòd rami ramulique ad basin nequaquam sint attenuati, quod oppositi alternique, sed nunquam, quatenus vidi, verticillati, disponantur, et quòd contractionibus istis in *F. kaliformi* primo aspectu notabilibus omninò teretes careant. Varietas  $\beta$ , suprâ memorata, multum ad utrumque conjungendum facit, sed vel hæc habitu a *F. clavelloso* longè recedit. Discrimen quod in tuberculorum formâ positum speraveram, pluribus observatis exemplaribus, evanuit, et capsulas ortu sphaericas mox progrediente ætate oburceolatas evadere, ut primus docuit D. Borrer, non modò in hoc Fuco sed et in *F. confervoide* et aliis, nuper ex autopsiâ ipse scivi. Inter *F. kaliformem* et *F. articulatum* multum affinitatis interest, et reperiuntur aliquando frustula illisa et diffracta, de quibus difficile sit dictu utri rectius associarentur: articulorum in *F. articulato* per totam frondem ad amussim ellipticorum formâ et habitu dissimili certissimè dignoscuntur.

a. <i>F. kaliformis</i> , magn. nat.	
b. pars frondis cum capsulis, magn. auct.	- 6.
c. ejusdem portio cum capsulis jam primùm ortis	5.
d. ejusdem portio cum capsulâ ætatis provectoris	3.
e. semina - - - - -	1.
f. frondis portio cum seminibus sparsis	- 3.
g. semina - - - - -	1.
h. varietatis $\beta$ portio - - - - -	6.
i. ejusdem pars cum capsulis adultis	- 3.

## 29.—FUCUS KALIFORMIS.

*Fucus kaliformis*, frond subgelatinous, filiform, tubular, much and irregularly branched; branches and ramuli generally verticillate, contracted as if jointed; tubercles sessile, and scattered seeds on the ramuli.

*Fucus kaliformis*. Linn. Trans. III. p. 206. t. 18. WITH. IV. p. 89. Eng. Bot. IX. t. 640. Syn. Fuc. II. p. 377. LAM. Diss. Fuc. p. 57. t. 29.

*F. verticillatus*. Fl. Scot. p. 962. t. 31. WITH. IV. p. 90.

*Ulva purpurascens*. Fl. Ang. p. 569.

$\beta$ . *diaphanus*; frond roundish; ramuli long, generally simple; contractions obsolete.

*F. kaliformis*.  $\beta$ . Syn. Fuc. II. p. 378.

*F. diaphanus*. ESPER, Ic. Fuc. I. p. 150. t. 102.

*Ceramium tubulosum*. ROTH, Cat. Bot. II. p. 164. (excl. syn.) III. p. 124.

*Conserva tubulosa*. WULFEN, Crypt. Aquat. n. 14. (excl. syn.)

$\gamma$ . *nanus*; frond entangled, jointed; branches and ramuli horizontal.

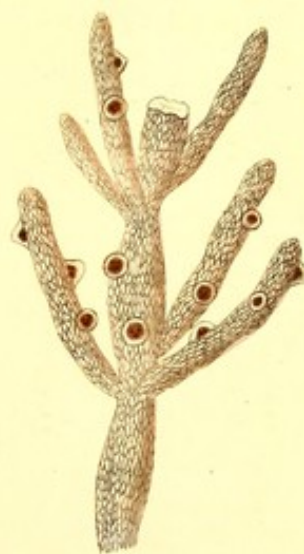
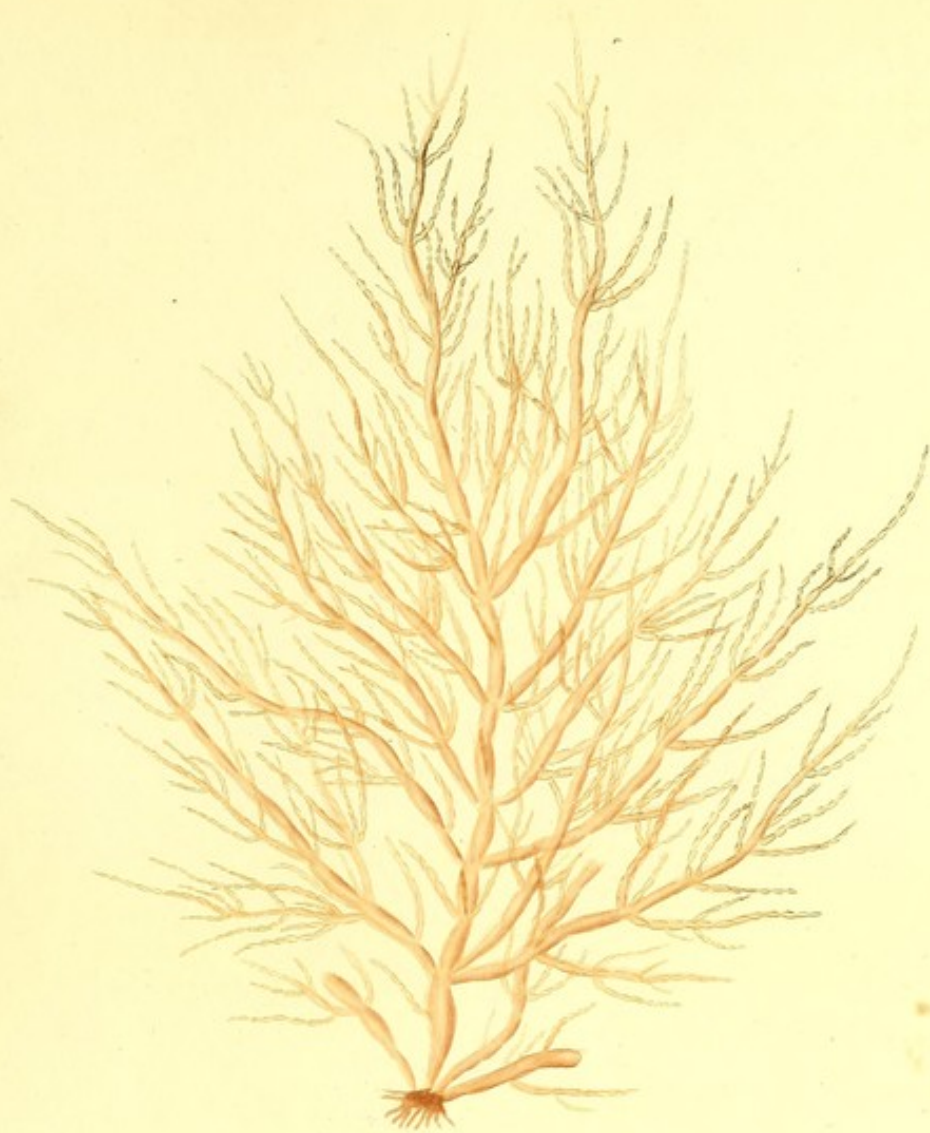
On the shores of Egypt and the South of England.—Coast of France. Lamouroux.— $\beta$  at the Isle of Anglesea. Rev. H. Davies.—Western coast of Scotland. Mr. Menzies.—Near Dublin, with  $\alpha$ . Dr. Scott.—North of Ireland, about Belfast. Mr. Templeton.—In the Adriatic. Wulfen.— $\gamma$  at Torquay. Mrs. Griffiths.—Among the rejectamenta of the sea at Brighton. Mr. Borrer.

Annual. June—September.

ROOT, a small, expanded callus, fixed to the rocks by a few short cylindrical fibres, and inclined to creeping.

FRONDS, sometimes solitary, sometimes two or three from the same base, tubular, filiform, a foot or foot and half long, furnished with an undivided stem, in general about the thickness of a crow's-quill, but occasionally equal to that of a goose or swan, attenuated near the root, in other parts equal, except that it is sometimes here and there slightly contracted:



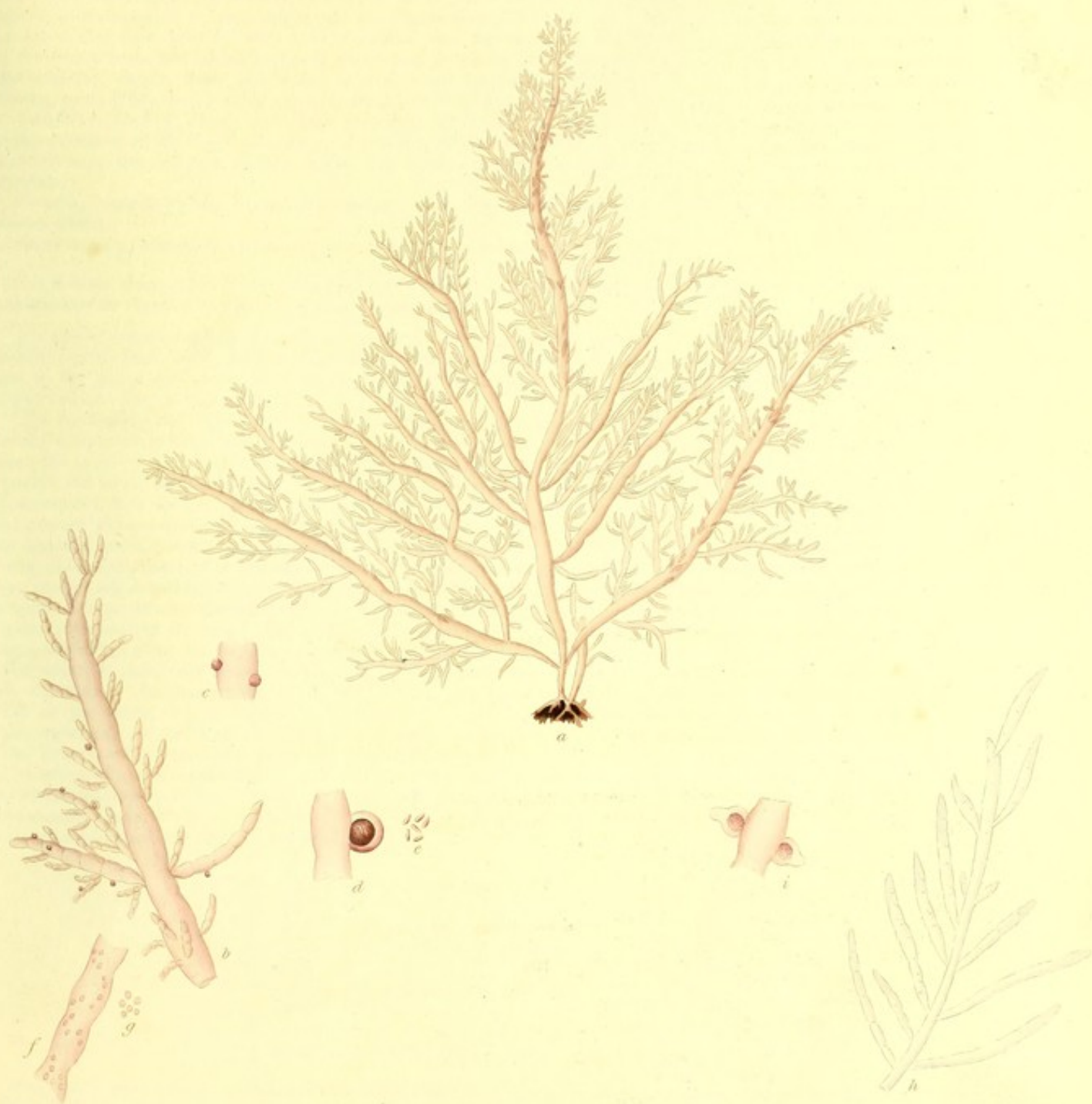


*Fucus kalifornicus.*









*Fucus kaliformis.*







contracted : this stem from base to summit is loosely beset with long branches, either opposite or alternate, or, as more commonly happens, placed in whorls, the middle ones in general longest, but this is uncertain, all blunt at their apices, and attenuated at their origin, not so cylindrical as the stem, but marked at uncertain intervals with more evident contractions, provided with a set of smaller ones, arranged like the primary ones, originating most copiously at the contractions, and not unfrequently themselves producing a third series : the ramuli are scattered over the stem and branches, simple, short, and blunt ; so visibly and regularly contracted, that they look like a string of short, oblong, ovate joints, but, if more carefully examined, they will be found to be unprovided with septa within.

FRUCTIFICATION, of two sorts, both placed on the ramuli ; *the one*, consisting of naked, roundish seeds, immersed in the substance of the frond ; *the other*, of sessile capsules, spherical in their younger state, but when full grown inversely urceolate and open at their apices, containing a globule composed of seeds of a shape between oblong and pyriform.

COLOR, beautiful pink, \* extremely fugitive ; when exposed to the sun yellowish, or greenish, and sometimes almost white.

SUBSTANCE, extremely tender, slippery, and sub-gelatinous.

$\beta$  is thinner than  $\alpha$ , has fewer branches, less evidently contracted, and long almost simple ramuli, with their contractions so obsolete that they look nearly cylindrical.

$\gamma$  is a most remarkable variety, and might easily be taken for a distinct species : it grows in densely matted tufts, with fronds scarcely three inches long, and not thicker than a blackbird's quill : the branches are all scattered, horizontal, and to the naked eye not more visibly contracted than those of  $\alpha$  and  $\beta$ , but under a glass really divided into joints about twice as long as they are wide.

The description and figure of this plant, given by Lightfoot in the *Flora Scotica*, where it was originally described, having unfortunately been taken, not only from a dried specimen, but from one dried without sufficient pressure, have been the cause of numerous errors ; so that Withering was led to regard *F. kaliformis* and *F. verticillatus* as distinct species, and when Dr. Goodenough and Mr. Woodward wrote their excellent history of the former in the *Linnaean Transactions*, they did not venture upon quoting the latter as a synonym. It was these gentlemen who first removed the present *Fucus* beyond the reach of doubt, but, what is singular, never noticed the jointed appearance, on which its essential specific character principally rests. The cause lay in their not having separated it from *F. clavellosus*, from which their description appears to have been in part taken, though their figure represents the true plant. These two species are in reality very closely allied, but still, in my opinion, unquestionably distinct. They differ in the following circumstances :—the habit of *F. clavellosus* is more inclined to pinnated ; the branches and ramuli are by no means attenuated at the base ; and, though they vary in being both opposite and alternate, are never, as far as I have seen, verticillate ; nor are they marked with those joint-like contractions, so apparent at first sight in *F. kaliformis*. The variety  $\beta$ , mentioned above, is somewhat intermediate between them, but even this has a habit very unlike that of *F. clavellosus*. An examination of several specimens has proved to me that the difference which I had hoped to find in the shape of the capsules of these two plants does not exist ; but that the tubercles in either are at first spherical, and as they ripen become inversely urceolate ; a circumstance originally pointed out to me by Mr. Borrer, and which I have since had repeated opportunities of observing myself, not only in this *Fucus*, but in *F. confervoides*, and some others. There is a considerable resemblance between *F. kaliformis* and *F. articulatus*, and battered fragments may occasionally be met with, which it would not be easy to refer positively to either of them : the exactly elliptical shape, however, of the joints of *F. articulatus* throughout the whole frond, and the very dissimilar habit will certainly distinguish them.

a. <i>F. kaliformis</i> , natural size.		
b. upper part of frond, with capsules, magnified	-	6.
c. piece of ditto with very young capsules	-	5.
d. ditto with a capsule more advanced	-	3.
e. seeds	-	1.
f. portion of frond with scattered seeds	-	3.
g. seeds	-	1.
h. portion of var. $\beta$	-	6.
i. small piece of ditto with capsules	-	3.

\* So fugitive that it has been called by Lightfoot whitish-green ; by Wulfen pale-green at first, then whitish, and sometimes tinged with a light reddish hue ; by Roth, green in its youngest state, pale-greenish when more advanced, and white in perfection.



*Fucus clavellus*, frond sub-gelatinous, filiform, cylindrical, tubular, much and irregularly branched; branches and ramuli mostly alternate and distichous; tubercles sessile, and scattered seeds on the ramuli.

*Fucus clavellus*. TURNER, in Linn. Trans. VI. p. 133. t. 9. Syn. Fuc. II. p. 373. Eng. Bot. XVII. t. 1203. (malè.)

β. *sedifolius*; ramuli between oblong and oval, crowded, undivided.

*F. clavellus*. β. Syn. Fuc. II. p. 373.

On the eastern shores of England.—In Dublin Bay. Dr. Scott.—β at Lossiemouth in Scotland. Mr. Brodie.—Cornwall. Mrs. Griffiths.—Bantry Bay, with var. α. Mr. J. T. Mackay.

Annual. July—September.

ROOT, an extremely small, blackish, callous disk.

FRONDS, in general solitary, cylindrical, filiform, tubular, from three to seven inches long, preserving from base to summit an equal thickness of about a sparrow's quill, and rising with a stem in general undivided, but occasionally forked, every where beset with elongated branches, frequently not inferior to the stem itself, but of very different length in different individuals, either opposite or alternate, but never, as far as I have seen, verticillate, furnished with a series of smaller ones disposed in a similar manner, and these again in their turns often with a third: the ramuli are two or three lines long, cylindrical, sometimes simple, and sometimes irregularly divided, in some specimens clustered, in others placed in a loose sub-pinnated manner. Neither in the branches nor the ramuli are any traces of joints or contractions observable.

FRUCTIFICATION, of two kinds, both situated on the ramuli; the one, composed of scattered, roundish, naked seeds, immersed in the very substance of the frond; the other, of capsules sessile on the sides, or at the axillæ of the ramuli, at first spherical, afterwards inversely urceolate, perforated at their apices, containing a globular mass of roundish seeds.

COLOR, pale-red, approaching to that of bricks, less fugitive than in *F. kaliformis*; when exposed to the sun, or decaying, turning to a whitish-green.

SUBSTANCE, tender, slippery, sub-gelatinous.

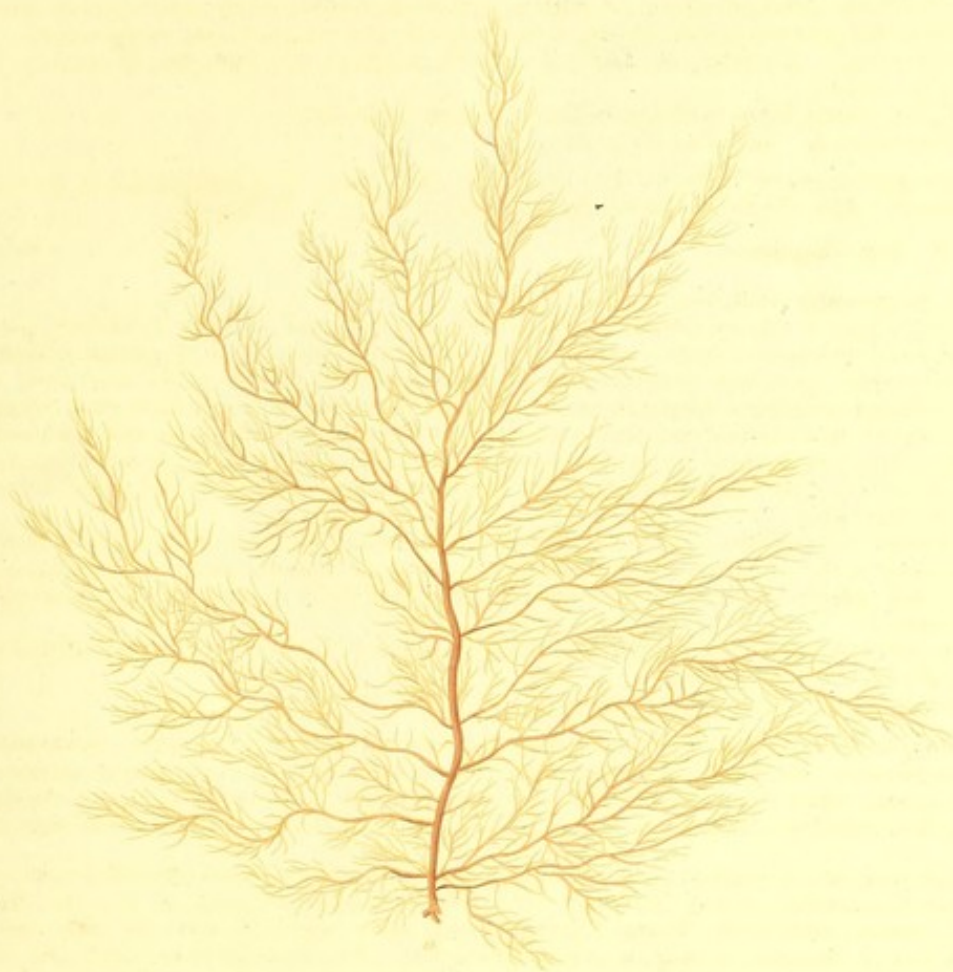
β is so singular a variety that it appears a distinct species, nor am I at present fully certain whether it ought not to be regarded as such: the frond is in general scarcely three inches long, but sometimes extends to half a foot; it is not, as in α, every where cylindrical, but thickened in the middle, and narrowed towards the base and apices: the ramuli are very numerous, arranged close to each other, between oblong and elliptical, and undivided.

Although from the circumstance of this very elegant *Fucus* having remained till within a few years undescribed, it has escaped the attention of most Botanists, there have long been specimens of it in the Linnaean and Banksian Herbaria, communicated by Sir Thomas Frankland, who found it growing upon the rocks near Scarborough, and appears to deserve the merit of being its original discoverer. The same gentleman had also sent it to Hudson and Lightfoot, both of whom acknowledged it to be a new species, and purposed introducing it in future editions of their works, the one under the name of *F. clavellus*, the other under that of *Ulva pinnata*. Nor ought we, as it has \* elsewhere been observed, to wonder that plants like the present should have been by different authors referred to different genera, their texture and habit approaching no less to the *Ulva* than to the *Fuci*, so that, if those individuals were only found which bear the scattered seeds, they would infallibly be referred to the former. Upon the marks which principally tend to separate *F. clavellus* from *F. kaliformis* enough has already been said under the preceding species, nor is there the least room for doubt of their being sufficiently distinct, although many naturalists have confounded them. The present *Fucus* may still more easily be mistaken for the following one, especially if only hastily looked at; the leading characters of distinction will be found under *F. capillaris*. Subsequently to the publication of the *Synopsis of the British Fuci*, Mr. Brodie has met with the var. β, above described, very abundantly in Scotland, where the appearance of the plant that is more common with us never occurs: the ramuli strongly resemble in form the leaves of *Sedum sexangulare*, and afford an additional proof that *F. ovalis* and its congeners ought to be separated from the tribe of *Fuci* with distinct leaves. The mode of growth in this differs from that of var. α, particularly in the branches never being multifid, but furnished with a series of smaller ones, so that the whole plant has a proliferous appearance.

- |  |   |   |   |    |
|--|---|---|---|----|
| a. <i>F. clavellus</i> , natural size.       |   |   |   |    |
| b. part of a branch, with ramuli, magnified. | - | - | - | 5. |
| c. ramulus with scattered seeds              | - | - | - | 3. |
| d. ramulus with capsule                      | - | - | - | 3. |
| e. seeds                                     | - | - | - | 1. |
| f. piece of var. β                           | - | - | - | 5. |

\* Syn. Fuc. II. p. 377.





*Fucus clavellosus.*









*Fucus clavellatus.*







*Fucus* fronde sub-gelatinosâ, filiformi, tereti, tubulosâ, ramosissimâ; ramis ramulisque sub-alternis, sub-distichis; tuberculis sessilibus, seminibusque in ramulis sparsis.

*Fucus clavellus*. TURNER, in *Linn. Trans.* VI. p. 133. t. 9. *Syn. Fuc.* II. p. 373. *Eng. Bot.* XVII. t. 1203. (malè.)

β. *sedifolius*; ramulis oblongo-ovalibus, confertis, indivisis.

*F. clavellus*. β. *Syn. Fuc.* II. p. 373.

HABITAT in Angliæ orientalis oris.—In Sinu Eblanensi. *D. Scott.*—β apud Lossiemouth in Scotiâ. *D. Brodie.*—In Cornubiâ. *D<sup>na</sup> Griffiths.*—Apud Bantry Bay, unâ cum var. α. *D. I. T. Mackay.*

Annua. Jul.—Sept.

RADIX callus perquam exiguus, nigricans.

FRONDES subsolitariæ, teretes, filiformes, tubulosæ, longitudine palmares, vel spithamææ, crassitie a basi ad apices usque æquali, pennam passerinam æquante, caule instructæ plerumque indiviso, rariùs bifurco, ubique obsito ramis elongatis, caulem ipsum sæpe æquantibus, longitudinis tamen in diversis individuis quàm diversissimæ, nunc oppositè nunc alternè, sed nunquam, quantum vidi, verticillatim dispositis, minorum simili ratione dispositorum serie instructis, qui tertiam quoque non rarò ferunt; ramuli duas tresve lineas longi, cylindracei, vel simplices vel enormitèr divisi, in quibusdam exemplaribus laxè sub-pinnatim positi, in aliis congesti.—Neque in ramis nec in ramulis articulorum vel contractionum vestigia ulla sunt detegenda.

FRUCTIFICATIO duplex, utraque in ramulis sita; hæc e seminibus constans sparsis, subrotundis, nudis, in ipsâ frondis substantiâ immersis; illa e capsulis ramulorum ad latus vel ad alas sessilibus, ortu sphaericis, mox oburceolatis, apice pertusis, seminum subrotundorum congeriem globosam includentibus.

COLOR dilutè lateritius, multo minus quam in *F. kaliformi* fugax; soli exposita aut marcescentis albo-virescens.

SUBSTANTIA tenera, sub-gelatinosa, lubrica.

β varietas est adeo singularis ut diversa species videatur, nec annon pro distinctâ haberi debeat satis mihi liquet: frons plerumque vix tripollicaris, aliquando tamen semipedalis, non, ut in α, ubique cylindracea, sed medio incrassata, et basin et apices versus attenuata, ramulis frequentissimis, approximatis, ex oblongo ellipticis, simplicibus.

Perelegans quamvis hæcce *Fuci* species ad nostrum usque tempus descriptione caruerit, idèdque Botanicorum plurimorum notitiam fugerit, extitere tamen jamdudum in Herbario Linnaeano et Banksiano exemplaria ab illust. T. Frankland, Baroneto missa, qui primus omnium multos abhinc annos rupibus submarinis prope Scarborough innascentem detexisse videtur; et qui cum Hudsono Lightfootioque communicarat, quorum uterque pro novâ plantâ agnovit, et hic *F. clavellus*, ille *Ulvæ pinnata* nomine insignire statuit. Neque, sicut\* alias est observatum, mirari debemus quòd hæc stirps eique congeneres ad diversa genera ab auctoribus diversis fuerint relatæ, quippe quæ quoad texturam et habitum tantum inter *Fucos* et *Ulvas* ambigunt, ut, si exemplaria seminibus modò sparsis prædita reperiantur, absque dubio his annumerentur. Notæ quæ *F. clavellus* a *F. kaliformi* secernunt jam sub illâ specie exponuntur, nec dubitare licet de differentiis inter utrumque specificis, quamvis sint a multis commixti: arctiorem adhuc habet hæc planta primo aspectu cum insequente affinitatem, de quâ sub *F. capillari* erit dicendum. *Fucorum Britannicorum Synopsi* jam evulgatâ, varietatem β, suprâ descriptam, in Scotiæ oris, ubi stirpis facies nobiscum magis vulgata nunquam occurrit, copiosè legit *D. Brodie*: ramuli *Sedi sexangularis* folia referunt, novumque præbent testimonium *F. ovalem* sibi affines a *Fucorum foliis distinctis* præditorum familiâ esse disjungendos. Crescedi modus in hac ab eâ var. α diversus, quoniam ramuli nunquam sunt multifidi, sed aliis minoribus instructi, adeoque proliferi.

- |  |        |
|--|--------|
| a. <i>F. clavellus</i> , magn, nat.            |        |
| b. <i>rami pars, cum ramulis</i> , magn, auct. | - 5.   |
| c. <i>ramulus cum seminibus sparsis</i>        | - - 3. |
| d. <i>ramulus cum capsulâ</i>                  | - - 3. |
| e. <i>semina</i>                               | - - 1. |
| f. <i>portio var. β</i>                        | - - 5. |

\* *Syn. Fuc.* II. p. 377.



*Fucus capillaris*, frond sub-gelatinous, filiform, much and irregularly branched; ramuli subulate, jointed; seeds imbedded in the ramuli.

*Fucus capillaris*. *Fl. Ang.* p. 591. *WITH.* IV. p. 115. *Syn. Fuc.* II. p. 370.

Rocks in the sea near Sheerness, in the Isle of Shepey; and in Devonshire and Cornwall. *Hudson*.—At Scarborough. *Sir Thomas Frankland*.—Shores of the Isle of Anglesea. *Rev. H. Davies*.

*Annual*. In the summer Months.

**ROOT**, a small, dilated, blackish, callous disk.

**FRONDS**, numerous from the same base, from seven to nine inches long, cylindrical, filiform, tubular, as thick as a blackbird's quill, rising with a single undivided stem, beset from base to summit with branches rather loosely disposed, sometimes opposite, at others alternate, an inch, or inch and half long, the central ones generally longest, the whole furnished with a series of smaller ones similar to them in every respect, except size, and these again with simple, short, subulate, jointed ramuli, for the most part rather remote, but placed without any regular order: the branches and ramuli are all between erect and patent, slightly attenuated at their bases, and remarkably acuminate at their apices.

**FRUCTIFICATION**, I have at present seen none, except largish, spherical, dark-purple seeds, internally dotted under the microscope, immersed in the middle of the substance of the ramuli, which then swell, and apparently discharge the office of capsules.

**COLOR**, a beautiful semitransparent pink: in a dried state darker and more approaching to scarlet: turning in decay to a dirty white.

**SUBSTANCE**, very tender, slippery, and almost gelatinous:—in a state of decay the ramuli break into very small oblong or elliptical granules, and the plant has then somewhat the look of a *Rivularia*.

The whole catalogue of British Fuci does not contain a single plant that has been so much involved in doubt as *F. capillaris*, for being known only by Hudson's short and \*unsatisfactory description, and being a plant of unfrequent occurrence even on the British shores, to which alone it appears to be confined, its very existence as a distinct species has been considered so questionable, that neither Dr. Goodenough and Mr. Woodward in their *Observations on the British Fuci*, nor Mr. Stackhouse in his *Nereis Britannica*, nor Professor Gmelin in his Edition of the *Systema Naturæ*, have ventured upon introducing it; and even at the time of publishing the *Synopsis of the British Fuci*, I had seen nothing more than two small specimens, so that I could say little respecting it, which might be satisfactory either to my readers or myself. I have therefore felt a particular pleasure at being now enabled to remove it beyond the reach of doubt, through the kindness of my friends, Sir Thomas Frankland, and Rev. H. Davies, both of whom, by communications with Hudson himself, know it to be the plant designed by that author, and both find it upon their own shores: to the former of these gentlemen I am indebted for the subject of the present plate, respecting which I feel it incumbent upon me to remark that the engraving is taken from a dried specimen, it being impossible to receive from any considerable distance a Fucus so extremely tender in a state fit for drawing. I am also indebted to him for the two uncolored magnified sketches at *c* and *d*, which, being done by himself in a recent state, were too valuable to be omitted. How far the fructification represented in the figure before us is the only one belonging to the plant is what I have no means of knowing: no other has yet been found, but from the natural affinities of the Fucus it may fairly be presumed that it produces also seeds in capsules. At the same time it is necessary to observe, that the granules here represented are very unlike those in *F. clavellosus*, &c. both in their shape, nature, and situation. They seem rather to resemble those produced in the lanceolate capsules of *F. dentatus*, and the ramuli, which, when barren, are remarkably jointed, lose this appearance in fructification. The whole substance of the frond, in a state of decay, is most singular; it then falls into small oblong pieces, so as to have the woolly look of a *Rivularia*. In this respect it differs strikingly from *F. kaliformis* and *clavellosus*, to which, and especially the latter, it is more nearly related than to any other of the British Fuci. Sir Thomas Frankland finds these two species growing together on the rocks at Scarborough, and says that he can distinguish them in that state from the difference in their color: that of *F. capillaris* being of the tint of lake, whilst *F. clavellosus* is more of a yellow red: the latter, too, he observes, is a firmer plant, but *F. capillaris* is extremely tender and flexible, and plays about horizontally. To place, however, the characters which distinguish the three species from each other in the strongest point of view, it may not be amiss here to repeat them.

*F. kaliformis*: color, pale pink; branches and ramuli whorled, attenuated at the base; ramuli blunt, contracted at intervals, so as to appear like a string of oblong joints.

*F. clavellosus*: color, yellowish red: branches and ramuli scattered, sub-distichous; ramuli cylindrical, blunt.

*F. capillaris*: color, pale pink: branches and ramuli scattered, sub-distichous; ramuli cylindrical, but acuminate at the apices, divided internally with very short joints.

- |   |    |
|---|----|
| a. <i>F. capillaris</i> , natural size.             |    |
| b. small branch, magnified                          | 6. |
| c. part of ditto barren                             | 5. |
| d. part of ditto in fruit                           | 5. |
| e. ramulus, with seeds                              | 3. |
| f. seeds surrounded with part of the frond decaying | 1. |

\* This description does not altogether agree with the plant, for he calls the color blackish-purple, and speaks of the branches as always alternate.



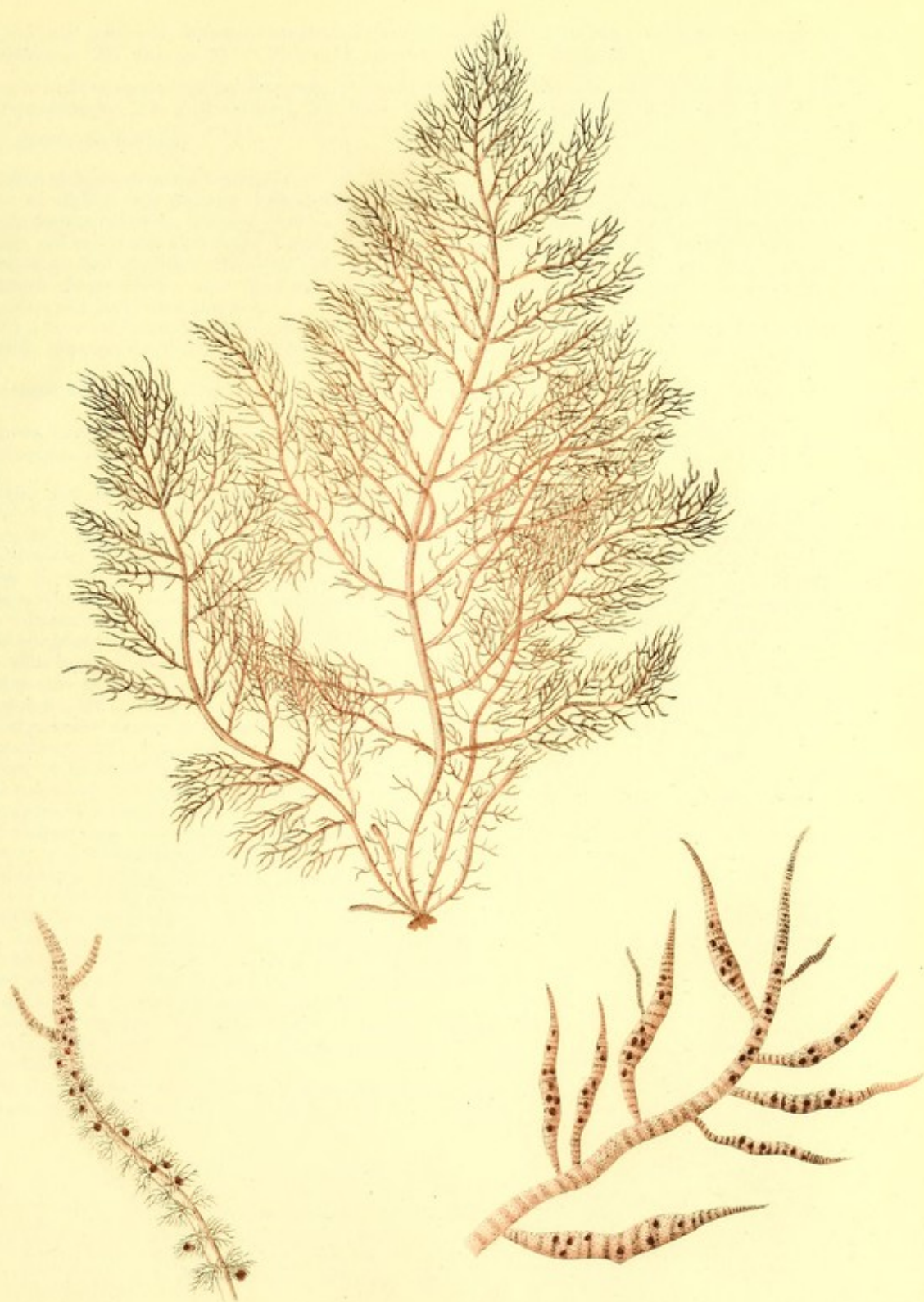


*Fucus capillaris*









*Fucus capillaris*







*Fucus*, fronde sub-gelatinosâ, filiformi, ramosissimâ; ramulis subulatis, articulatis; seminibus in ramulis immersis. *Fucus capillaris*. *Fl. Ang.* p. 591. *With.* IV. p. 115. *Syn. Fuc.* II. p. 370.

HABITAT in saxis submarinis prope Sheerness, in Insulâ Shepey; in Devoniâ et Cornubiâ, passim. *Hudson*.—Apud Scarborough. *D. T. Frankland, Baronet*.—In Insulâ Monæ oris. *D. H. Davies*.

*Annua*. Æstate fert fructum.

RADIX callus exiguus, dilatatus, nigricans.

FRONDES ex eâdem basi plurimæ, spithamææ, vel dodrantes, filiformes, teretes, tubulosæ, *Merula* pennæ crassitie, caule assurgentes unico, indiviso, obsito a radice usque ad apices ramis laxiusculè dispositis, nunc alternis, nunc oppositis, pollicem unum alterumque longis, mediisque, ut videtur, plerumque longissimis, omnibus minorum sui, magnitudine exceptâ, similium serie instructis, qui ramulos simplices, breves, subulatos, ut plurimum remotiusculos, attamen absque ordine certo dispositos, articulatos sustentant: rami ramulique cuncti erecto-patuli, basi levitèr attenuati, apice insignitèr acuminati.

FRUCTIFICATIONEM hactenus nullam vidi, exceptis seminibus majusculis sphæricis, intensè purpureis, intus sub lente punctatis, immersis in mediâ substantiâ ramulorum tunc intumescens, et, ut videtur, capsularum vice fungentium.

COLOR amœnè roseus, sub-diaphanus; *exsiccata* intensior, magisque ad miniatum accedens; *marcescentis* sordidè albicans.

SUBSTANTIA tenerrima, sub-gelatinosa, lubrica:—ramuli marcescentes in granula oblonga, vel elliptica, solvuntur, et in hoc statu planta *Rivularias* quodammodo refert.

Ne una datur inter Fucos Britannicos species dubiis tantum vexata quàm *F. capillaris*, utpote qui vix nisi per Hudsoni nimis\* brevem descriptionem hactenus sit cognitus, et, nunquam extra Angliæ oras repertus, infrequentissimè vel in iis occurrat. Inde accidit ut diu est inter Botannicos dubitatum num pro distinctâ specie jure sit enumerandus; nec vel Goodenovius Woodwardiusque, cum *Observationes de Fucis Britannicis* in Societatis Linneæanæ Actis ederent, vel in *Nereide Britannicâ* Stackhousius, vel Gmelinus in *Systemate Naturæ* pro tali censere sustinuerunt: et quando ipse, aliquot inde annis elapsis, *Fucorum Britannicorum Synopsin* scriberem duo modo specimina eaque adeò manca videram, ut nihil quod mihi ipsi aut lectori satisfaceret proferre fuit in promptu. Magnopere igitur sum gavisus, quòd per benevolentiam virorum amicissimorum, D. T. Frankland Baroneti et Reverendi H. Davies, tandem sit oblata facultas hanc stirpem ritè stabilendi. Uterque horum *F. capillarem* in littoribus suis nascentem reperit, et uterque olim cum Hudsono literarum commercio connexus plantas ab ipso designatas ad unguem cognovit. Exemplar, quod nostra sistit tabula, horum priori debeo; memorare autem necesse duco iconem exsiccatum exhibere, cum non foret possibile stirpem tam teneram ad locos longè dissitos madentem illasamque portare. Eidem quoque debeo adumbrationes lente auctas ad literas c et d exsculptas, quas ipse in statu recenti delineaverat, et quæ nimii erant momenti ut omitterentur. Præter fructificationem hic depictam nulla est hucusque in hac plantâ detecta, suspicandum autem est, ex iis quibus maximè est affinis *Fucorum* speciebus, ferè quoque semina in capsulis inclusa. Neque tamen silentio præterire debeo *F. capillaris* granula esse quoad formam indolem situmque absimilia iis in *F. clavelloso* et congeneribus occurrentibus; potiùsque referre ea quibus *F. dentati* capsulæ lanceolatæ sunt instructæ. Ramuli quoque, qui steriles insignitèr sunt geniculati, hanc faciem fructiferi exuunt. Frondis marcescentis substantia est notatu dignissima; lanatam *Rivulariæ* speciem tunc temporis præ se fert, et in frustula minutissima oblonga omnis solvitur. Toto cælo differt *F. capillaris* in hoc a *F. kaliformi* et *F. clavelloso*, cum quibus, et præsertim cum posteriore, affinitate arctiore quàm cum ullâ aliâ inter species Britannicas devincitur. Memorat D. Frankland, qui ambas unâ in rupibus submarinis prope Scarborough nascentes legere solet, se posse hanc ab illâ vel intra aquam dignoscere, cum ob colorem, qui in *F. capillari* lacæ tincturam simulat, dum *F. clavelloso* ruber luteo est immixtus, tum quia hæc planta magis firma, illa vero tenerrima et flexibilis quoquoersum horizontalitèr fluitat. Ut tamen hæc tres species nunquam in posterum commisceantur, et ut notæ quæ illas a se invicem distinguunt quàm dilucidè exponantur, characteres cujusvis proprios hic repetere operæ fore pretium existimo.

*F. kaliformis*; color dilutè roseus: rami ramulique subverticillati; ramuli basi, attenuati, obtusi per totam longitudinem articulo-contracti.

*F. clavelloso*; color ruber luteo tinctus: rami ramulique sparsi, sub-distichi, ramuli cylindracei, obtusi.

*F. capillaris*; color dilutè roseus: rami ramulique sparsi, sub-distichi, apice acuminati, intus geniculati, articulis brevibus.

- |                                      |   |   |   |    |
|--------------------------------------|---|---|---|----|
| a. <i>F. capillaris</i> , magn. nat. |   |   |   |    |
| b. rami pars, magn. auct.            | - | - | - | 6. |
| c. ejusdem portio sterilis           | - | - | - | 5. |
| d. ejusdem pars cum fructu           | - | - | - | 5. |
| e. ramulus cum seminibus             | - | - | - | 3. |
| f. semina fronde marcescente cincta  | - | - | - | 1. |

\* Neque hæc descriptio, quantumvis brevis, omnibus numeris convenit, colorem enim frondis atro-purpureascentem ramosque alternos dicit.



*Fucus acanthophorus*, frond cartilaginous, filiform, much and irregularly branched, beset with very short spine-like ramuli; on the ramuli ovate capsules, and others oblong and thorny.

*Fucus acanthophorus*. LAMOUROUX, *Diss. Fuc.* p. 61. t. 30, 31. f. 1.

*F. spiciferus*. VAHL, in *Skrift. af Naturhistorie Selskabet*. V. pars 2da. p. 44.

On the coast of North America. Lamouroux.—Island of St. Croix. Vahl.—Shores of Jamaica. Dr. Wright.  
—In the Red Sea. Lord Valentia.

Annual?

ROOT, which according to Lamouroux is a minute callus, consists in my specimens of several cylindrical, thickish, branched, matted, creeping fibres.

FRONDS, numerous from the same base, five inches and more long, \*cylindrical, filiform, provided with a stem about the thickness of a sparrow's quill, undivided in some specimens, in others bifid or trifid with long segments nearly of equal height, always beset from base to summit with branches, of which in old plants the lowermost are often broken off: branches scattered, either alternate, or subverticillate, generally numerous towards the apices of the frond, between erect and patent, most frequently simple, shortish, and furnished on all sides with ramuli: ramuli scarcely a line long, resembling thorns, patent, occasionally solitary, but more commonly growing two or three together, numerous and placed near to each other in the smaller branches, in the larger ones disposed at greater distances: sometimes they are lengthened into new branches.

FRUCTIFICATION, of two kinds, each placed at the apices of the ramuli; the one, consisting of small ovate capsules, containing a few minute roundish seeds mixed with long fibres; the other, of oblong capsules, tipped with one or two spines, inclosing rather large seeds, which under the microscope appear composed of three parts.

COLOR, a pleasing, semitransparent brown: blackish when dry; and turning to a dirty white from decay, or long exposure to the air.

SUBSTANCE, cartilaginous, but so tender as to approach to gelatinous; thin and membranaceous after it is dried.

Mr. Stackhouse received some years since from the late celebrated Spanish botanist, Cavanilles, a variety of the present *Fucus*, of a substance very nearly gelatinous, and a color far more pale than the common appearance of the plant: its branches, too, were all elongated; but what was most remarkable about it was, that the apices of the ramuli were incurved, and contained a dark-coloured globule, destitute of any membranous covering, and altogether composed of granules so minute, that the highest powers of a compound microscope were inadequate to the discovery of their form. A small piece of this specimen is represented at the letters, e, f, but whether the globules are accidental, arising from some injury received by the frond, or whether they are in any wise connected with the fructification, is what I have no means of determining. Of the two kinds of the fruit described above, it appears that one only was known to Vahl, and the other only to Lamouroux; and it is this latter alone which is noticed by Weber, and Mohr, who, in their Treatise, already often alluded to in the course of this work, have stated † many particulars respecting the present *Fucus*. To illustrate the fructification also, as well of this, as of many other marine Algæ, they have long taken infinite pains in procuring a set of highly magnified drawings, and it is earnestly to be hoped by every lover of this department of Botany that they may soon be prevailed upon to give them to the public. The prickly appearance of *F. acanthophorus* from which Lamouroux has derived his highly appropriate name, serves well to distinguish it at first sight from its congeners. The appellation given by Vahl, might, in my opinion, be improved by the changing of a single letter; thus turning *spiciferus* to *spiniferus*: it is, however, far from objectionable as it now stands, the young branches having to the naked eye something the appearance of spikes of fructification.

- a. *F. acanthophorus*, natural size.
- b. ramulus with one kind of capsules, magnified - 5.
- c. ramulus with the other kind of capsules - 5.
- d. seeds - - - - - 1.
- e. part of a variety from Cavanilles - - - 6.
- f. small piece of the same - - - - - 2.

\* Vahl says that they are angular with decurrent branches, but this is the case only in dried specimens, or in such as have not sufficiently recovered themselves in water.

† As they have observed some points which had escaped my attention, and have seen the whole matter in a different point of view from that in which it appeared to me, I think it best here to transcribe their description, which is, as usual, full and excellent.—“Der *F. spiciferus* Vahl trägt in der axillen der spinen, womit seine letzten Aeste besetzt sind, oder unter diesen spinen, oder doch sonst in ihrer Nähe, anfangs sphärische, nachher sich oval verlängernde, dann selbst wiederum mit spinen besetzt werdende, und endlich in neue Aestchen auswachsende, geschlossene Pericarprien, die, besonders in ihrer ursprünglichen sphärischen Gestalt, den Globulis der Gmelinschen *Fuci Globuliferi*, oder *Spharococci* Stackh., äusserlich völlig gleichen. Man erkennt indess schon mit starkern Loupen in den Pericarprien einzeln gestellte dunkle, verhältnissmässig ziemlich grosse Körner, und das Pericarpium ist wirklich, wie die Durchschnitte lehren, inwendig durch Scheidewände aus einem dünnen Fasergewebe in mehrere Fächer getheilt, in deren jene Körner fast-einzeln (*sub-singula*) zu liegen scheinen. Auf schon in neue Vegetationstheile ausgewachsenen ehemaligen Pericarprien fanden wir irreguläre, durch Ruption entstandne Löcher, aus denen die fortpflanzenden Körner wahrscheinlich entschlüpft waren.”—*Beiträge zur Naturkunde*. I. p. 305.





*Fucus acanthophorus.*







*Fucus* fronde cartilagineâ, filiformi, ramosissimâ, ramulis brevissimis, aculeiformibus obsitâ; capsulis oblongis spinosis, ovatisque in ramulis.

*Fucus acanthophorus*. LAMOUROUX, *Diss. Fuc.* p. 61. t. 30, 31. f. 1.

*F. spiciferus*. VAHL, in *Skrift. af Naturhistorie Selskabet*. V. pars 2da. p. 44.

HABITAT in Americæ Septentrionalis littoribus. LAMOUROUX.—In Insulâ, St. Croix. VAHL.—In Jamaicae oris. D. Wright.—In Mari Rubro. *Vicecomes de Valentia*.

*Annua?*

RADIX (quæ, teste Lamouroux, est callus minutus) in nostris exemplaribus e fibris aliquot teretibus, crassiusculis, ramosis, implexis, repentibus constat.

FRONDES ex eâdem basi plurimæ, sesquipalmares et ultra, teretes,\* filiformes, caule instructæ pennæ passerinæ crassitie, nunc indiviso, nunc bi-tri-fido, segmentis elongatis subfastigiatis, ramis a basi usque ad apices obsito; inferiores tamen in stirpe vetustâ sæpe diffracti evadunt: rami sparsi, vel alterni vel subverticillati, plerumque frondis apices versus frequentes, erecto-patuli, ut plurimum simplices, breviusculi, ramulis undequaque obsiti: ramuli brevissimi, vix lineam longi, aculeiformes, patentes, interdum solitarii, sed sæpius bini ternive, in ramis minoribus frequentes et approximati, in majoribus laxiusculè dispositi: aliquando etiam elongati occurrunt, et in novos ramos producuntur.

FRUCTIFICATIO duplex, utraque ramulorum ad apices sita: hæc e capsulis constans ovatis, exiguis, intra quas semina aliquot minutissima subrotunda fibris longiusculis immixta latent; illa e capsulis oblongis, spinâ unâ alterâve coronatis, semina majuscula sub lente tripartita includentibus.

COLOR amœnè fuscus, sub-diaphanus: *exsiccata* nigricans: *Soli exposita* aut *marcescentis* sordidè albescens.

SUBSTANTIA cartilaginea, sed ita tenera ut ad gelatinosam accedat: in *exsiccata* tenuis et membranacea.

Varietatem hujus Fuci fronde longe teneriore propemodùm gelatinosâ, et colore dilutiore quam vulgaris plantæ facies olim ad Stackhousium misit b. Cavanilles: rami quoque in hæc omnes elongati, et, quod maximè singulare, ramulorum apices erant incurvi, globulumque includebant opacum, membranâ nullâ coopertum, sed totum e granulis constantem adeò exiguis ut singulorum forma visum sub lente acerrimâ effugeret. Hujus stirpis frustulum ad literas e, f, depictum extat: anne autem globuli e casu, fronde aliquo modo læsâ, pendeant, an quiddam cum fructificatione commune habeant non est quod dicere ausim. E fructu illo duplice suprâ descripto unus modò Vahlîo alter Lamourouxio innotuisse videtur. Hunc tantummodò memorant Weberus et Mohrius, qui tradiderunt multa in tractatu† jam sæpe laudato de *F. acanthophori* fructificatione, quæ omnia, simul et plurima alia ad Fucorum fructum illustrandum destinata, jam olim depingi curaverunt, et de quorum iconibus debet Botanici cujusvis quam maximè esse in votis ut mox publici juris fiant. Aculeata plantæ facies, unde nomen aptissimum deduxit Lamouroux, optimè et statim hanc stirpem a congeneribus distinguit. Titulus a Vahlîo impositus melius quadraret, si, unâ modò literâ mutata, *spiniferus* evaderet; nec tamen *spiciferus* omninò displicet, cùm rami juniores oculo inermi spicas primo aspectu quodammodò referant.

a. <i>F. acanthophorus</i> , magn. nat.	
b. <i>ramulus cum unâ capsularum specie</i> , magn. auct.	5.
c. <i>ramulus cum alterâ capsularum specie</i> - -	5.
d. <i>semina</i> - - - - -	1.
e. <i>varietatis portio</i> - - - - -	6.
f. <i>ejusdem pars</i> - - - - -	2.

\* *Eranis decurrentibus angulatas* dicit Vahlîus, quod tantummodò de *exsiccata* vel nondum satis aquâ emollitâ valet.

† Cum illi quædam de hæc fructificatione quæ me effugerunt memoraverint, renique ipsam aliter quam ipse viderint; descriptionem ab iis datam pro more absolutam hic repetendam duco, "Der *F. spiciferus* Vahl trägt in der Axillen der Spinen, womit seine letzten Aeste besetzt sind, oder unter diesen spinen, oder doch sonst in ihrer Nähe, anfangs sphärische, nachher sich oval verlängernde, dann selbst wiederum mit Spinen besetzt werdende, und endlich in neue Aestchen auswachsende, geschlossene *Pericarprien*, die besonders in ihrer ursprünglichen sphärischen Gestalt, den Globulis der Gmelinschen *Fuci globuliferi*, oder *Sphærococci* Stackh. äusserlich völlig gleichen. Man erkennt indess schon mit starkern Loupen in den *Pericarprien einzeln gestellte* dunkle, verhältnissmässig ziemlich grosse körner, und das *Pericarpium* ist wirklich, wie die Durchschnitte lehren, inwendig durch Scheidewände aus einem dünnen Fasergewebe in mehrer Fächer getheilt, in deren jene körner fast-einzeln (sub-singula) zu liegen scheinen. Auf schon in neue Vegetationstheile ausgewachsenen ehemaligen *Pericarprien* fanden wir irreguläre, durch Ruption entstandne Löcher, aus denen die fortpflanzenden körner wahrscheinlich entschlüpft waren." *Beiträge zur Naturkunde*, I. p. 305.



*Fucus triangularis*, frond cartilaginous, three-sided, sub-dichotomous, beset with a triple series of bi- or tri-mucronated, imbricated denticles; capsules lanceolate, panicle at the axillæ of the denticles.

*Fucus triqueter*. GMELIN, *Hist. Fuc.* p. 122. t. 8. f. 4. ESPER,  *Ic. Fuc.* II. p. 15. t. 119.

*F. triangularis*. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1383.

*F. trifarius*. SWARTZ, *Prodr.* p. 148. VAHL, *Skrift. af Naturhistorie Selskabet.* V. pars 2da. p. 39.

*Fucus minimus dentatus triangularis*. SLOANE, *Jam.* p. 61. t. 20. f. 9.

Island of Jamaica. Sloane.—New Zealand. Sir Joseph Banks.—On the shores of Barbadoes. Dr. Wright.  
—On the Shores of New Holland. Mr. Brown.

*Perennial.*

ROOT, I have not yet seen.

FROND, seven inches and more long, every where of the same thickness, about equal to that of a crow's quill, irregularly divided from the very base, with \* branches alternate or dichotomous, again and again divided in a similar manner, the segments nearly of equal height; the part of the frond nearest to the root is sub-cylindrical, after which it becomes three-sided, the angles being sharp, and serrated throughout their whole length with imbricated teeth placed upon them: the teeth are scarcely a line long, patent, slightly incurved, their apices cleft into † two or three cylindrical points, of the same substance as the frond. In old specimens the frond is sometimes furnished with a short cylindrical ligneous stipes, out of which the branches issue without order.

FRUCTIFICATION, situated at the axillæ of the teeth, composed of three or four minute lanceolate capsules, supported upon an extremely short common peduncle, and each containing a few largish globular brown seeds, surrounded by a very conspicuous pellucid limbus.

COLOR, reddish-brown, soon turning to a yellowish-white, if kept in fresh water, or exposed to the sun, or approaching a state of decay; and in such cases sometimes becoming quite white.

SUBSTANCE, cartilaginous, soft, flexible.

Obs. It by no means adheres to paper when dried.—The teeth in some specimens are very evidently jointed, if observed under a microscope; the septa being dark, the joints not equal in length to their breadth.

The fructification attributed to this plant by Gmelin, who originally described it in his excellent work upon the Fuci, is so extremely † different from that observed by me, and so unlike any thing with which I have ever met among the submersed Algæ, that I am altogether at a loss to imagine what he could have seen, and consequently what opinion to entertain upon the subject. Were it allowable to form any conjecture from analogy, I should be inclined to suspect that the fruit of the present species was of two kinds, and similar to that already described under *F. subfuscus* and *dentatus*. At the same time, I am fully aware that our knowledge of these plants is at present altogether in its infancy, and that it is the part of a wise man not to give way to similar reasonings, but to confine his observations simply to the facts he sees. Not having an opportunity of referring at present to Sloane's History of Jamaica, I have introduced his synonym, above quoted, on the authority of Gmelin and VAHL; the former of whom subjoins to it a mark of doubt, but the latter says respecting it, "*Fucus minimus*, &c. of Sloane either belongs here or to *F. cupressoides*, but as its mode of growth is the same as in *F. trifarius*, I think it should rather be referred to this, although in his figure the leaves have the appearance of being undivided." The difference between *F. triangularis* and *F. triqueter*, L. is sufficiently manifest from the following plate. *F. cupressoides*, which rather belongs to the family of *F. pinnatus*, is distinguished from both of them by its creeping root and stem, its undivided leaves, and its green color, not to mention other particulars. These three Fuci alone are known to possess a triangular frond, so that this one circumstance is sufficient to separate the present from every other species. Care however must be taken lest a young botanist, in judging from dried specimens, be deceived by such as have been too much pressed, and appear consequently like a thin membrane. It was necessary to change the name given in the first instance to this plant by Gmelin, the same having been by Linnæus applied to the subject of the following plate.

- |   |   |   |   |    |
|---|---|---|---|----|
| a. <i>F. triangularis</i> , natural size. |   |   |   |    |
| b. a branch, magnified                    | - | - | - | 6. |
| c. capsules                               | - | - | - | 2. |

\* Gmelin says, that "the branches take root here and there, with branching fibres, as in *Plocamium*, and others," a circumstance that I have never seen.

† Generally bifid, sometimes trifid, and less frequently undivided, according to Vahl: Gmelin calls them bimucronate.

‡ It ought in candour to be observed, that I do not exactly understand either from his figure or language the nature of the fruit he means to describe: his words are "Fructificationes planæ, discoideæ, mucronatæ, ab uno rami latere plures in seriem congestæ, sessiles, singulares."





*Fucus triangularis.*







*Fucus* fronde cartilagineâ, triquetrâ, sub-dichotomâ, denticulis trifariâ imbricatis, bi-tri-mucronatis obsitâ; capsulis denticulorum ad alas lanceolatis, paniculatis.

*Fucus triqueter*. Gmelin, *Hist. Fuc.* p. 122. t. 8. f. 4. Esper,  *Ic. Fuc.* II. p. 15. t. 119.

*F. triangularis*. Linn. *Syst. Nat. Ed. Gmel.* II. p. 1383.

*F. trifarius*. Swartz, *Prodr.* p. 148. Vahl, *Skript. af Naturhistorie Selskabet.* V. pars 2da. p. 39.

*Fucus minimus dentatus triangularis*. Sloane, *Jam.* p. 61. t. 20. f. 9.

HABITAT in Insulâ Jamaicâ. Sloane.—In Novâ Selandiâ. D. J. Banks, *Baronet*.—In oris Insulæ Barbadoes. D. Wright.—In Novæ Hollandiæ oris. D. Brown.

*Perennis*.

RADIX nondum a me visâ.

FRONS, spithamæa, et ultrâ, crassitie ubique æqualis, pennam corvinam subæquantis, statim a basi vagè ramosa, \*ramis nunc alternis, nunc dichotomis, iterum atque iterum simili ratione divisus, subfastigiatis; frons quâ radici proxima teretiuscula, mox acutè triquetra, denticulis supra angulos per totam longitudinem imbricatis dispositis trifariâ serrata; denticuli vix lineam longi, patentes, lenitè incurvi, apice † bi- tri- mucronati, mucronibus teretibus, ejusdem cum fronde substantiæ. Frons vetusta quandoque stipite est instructa brevi, tereti, ligneo, pennæ anserinæ crassitie, unde rami absque ordine exsurgunt.

FRUCTIFICATIO, denticulorum ad alas sita, e tribus vel quatuor capsulis lanceolatis, perquàm exiguis, singulis semina aliquot globosa majuscula fusca limbo pellucido valde conspicuo cincta includentibus, pedunculo brevissimo communi fultis, constat.

COLOR rufo-fuscus; aquâ dulci retentæ, aut soli expositæ, aut marcescentis citò in albo-flavescentem transiens, quandoque etiam tunc albissimus.

SUBSTANTIA cartilaginea, mollis, flexilis.

Obs. Exsiccata chartæ nequaquàm adhæret.—Denticuli in quibusdam exemplaribus sub lente observati evidentissimè geniculati conspiciuntur, septis obscuris, articulis diametro brevioribus.

Gmelinus, qui primus hunc *Fucum* in opere eximio memoravit, fructificationem ei tribuit ‡ diversissimam ab illâ a me visâ, talemque qualis non datur, quod scio, ullum aliud inter Algas marinas exemplum: quid ille viderit prorsus nescio, remque in medio relinquo; sin liceret aliquid ex analogiâ conjicere, suspicarer hanc stirpem gaudere duplici fructu, ejus simili jam sub *F. subfusco* et *dentato* descripti. Scio tamen perbene cognitionem nostram de rebus ejusmodi adhuc in cunabulis versari, sapientisque esse nihil hariolari, nec in præsens ultrâ quàm quæ sunt oculis subjecta fidelibus progredi velle. Sloanii synonymon suprâ citatum, *Historiâ* ejus *Jamaicensi* nondum a me visâ, Gmelini et Vahlî fide huc retuli. Gmelinus quidem dubitantè citat, at de illo dicit Vahlîus, "*Fucus minimus*, &c. Sloane vel huc vel ad *F. cupressoidem* pertinet, cum verò modus crescendi idem ac in *F. trifario*, potiùs ad hunc spectare credo, quamvis folia in figurâ indivisa appareant." Quantum *F. triqueter* L. ab hoc nostro discrepat satis e sequente liquebit tabulâ: ab utroque dignoscitur *F. cupressoides*, qui ad *F. pinnati* familiam pertinere videtur, caule et radice repente, necnon foliis apice indivisis, et colore viridi, ut alia taceam. *F. triangularem* a reliquis omnibus frons triquetra, horum trium propria distinguit; cavendum verò est ne exemplar pressurâ graviore æquo exsiccatum, quando nil nisi membrana tenuis apparet, deperitque stirpis character specificus, tyronibus fucum faciat. Exsiccatione sese multùm contrahit, et plus quam dimidium magnitudinis perdit. Nomen huic stirpi primitus a Gmelino impositum mutare ideò sum coactus quia idem insequenti indiderat Linnæus.

a. *F. triangularis*. magn. nat.

b. *ramus*, magn. auct. - - - - 6.

c. *capsulæ* - - - - - 2.

\* "Ramos hinc inde radicales, fibris ramosis, ut in *Plocamio* et aliis" tradit Gmelinus, quod tamen ipse nunquam vidi.

† Plerumque bifidos, interdum trifidos, raro indivisos dicit Vahlîus: bimucronatos dicit Gmelinus.

‡ Ut verum fatear neque e descriptione nec ex icone mente bene capio quæ sit hujus Fructus natura. Dicit scilicet, "Fructificationes planæ, discoideæ, mucronatæ, ab uno rami latere plures in seriem congestæ, sessiles, singulares."



*Fucus triqueter*, frond between coriaceous and cartilaginous, linear, much and irregularly branched, winged with a triple toothed membrane, and containing oblong imbedded vesicles.

*Fucus triqueter*. LINN. *Mant.* p. 312. *Syst. Nat. Ed. Gmel.* II. p. 1332.

In the sea near the Cape of Good Hope. Koenig.

Perennial.

ROOT, I have not yet seen.

FROND, a foot and more long, preserving throughout an equal breadth of a line and half, much and irregularly branched, three-sided from its very origin, and apparently composed of slender cylindrical midrib, winged with a triple membrane the margin of which is here and there toothed with small teeth: the branches arise from the angles of the frond, and are consequently disposed in a triple row; their length is very variable, they grow either clustered or remote, some simple, others again divided, at first cylindrical and thin, but at the distance of a line from their origin, winged with a triple membrane, whence they have the appearance of being supported upon an extremely short footstalk.

VESICLES, immersed in the middle of the substance of the branches, and most frequently of the smaller ones, oblong, solitary, about the size of the seeds of the *Abrus precatorius*, separated from each other by a space, which is in some instances considerable, in others, does not exceed two lines, so that the whole branch has a moniliform appearance, three-sided like the rest of the frond from being winged with a triple membrane, which is perforated with numerous mucifluous pores, internally quite hollow.

FRUCTIFICATION, at present unknown.

COLOR, in the recent plant most probably olive, in the specimens that I have seen brown: blackish in a dry state, turning paler and reddish when too long exposed to the sun.

SUBSTANCE, between coriaceous and cartilaginous, but thin.

OBS. When dried it does not adhere in the least to paper. As many botanists may be led to suppose that there must necessarily be a considerable resemblance between the present and the preceding *Fucus*, from the circumstance of the name given by Linnæus to the one having been formerly applied by Gmelin to the other, though in reality they have scarcely any thing in common except the triangular frond, I have been induced to figure them together, for the purpose of removing such an impression; but, at the same time, I have done it with reluctance, in consequence of being still unacquainted with the fructification of *F. triqueter*. With regard to the nature of this fructification there can be no doubt that it resembles that of the *Fuci proprii*, and perhaps it would not be going too far to say, that the receptacles are most probably placed at the apices of the frond. The present plant is more nearly allied to the tribe of *F. natans* than to any other family of *Fuci* hitherto known, but even from these is separated by such strong characters, that it could not be arranged in the same subdivision: nor is there in the whole genus a single individual for which it is possible it should be mistaken. On this account I have felt less regret at figuring it without fruit, and also on account of no plate of it having ever yet been published, and of its appearing an extremely rare species; as it is not noticed either by Gmelin or Esper, nor have I seen any specimens of it excepting those preserved in the Linnæan and Ellisian Herbaria, the former of which is here represented; but with an addition of a portion of the latter, at the letters *b*, in consequence of its being in all its parts of a larger size.

- |  |   |   |   |    |
|--|---|---|---|----|
| a. <i>F. triqueter</i> ; natural size. |   |   |   |    |
| b. <i>a branch</i> , magnified         | - | - | - | 6. |
| c. <i>part of the same</i>             | - | - | - | 5. |
| d. <i>vesicle cut open</i>             | - | - | - | 4. |





*Fucus triqueter.*







*Fucus* fronde coriaceo-cartilagineâ, lineari, ramosissimâ, membranâ trifariâ dentatâ alatâ, vesiculis oblongis immersis.

*Fucus triqueter*. LINN. Mant. p. 312. Syst. Nat. Ed. Gmel. II. p. 1382.

HABITAT in Mari Capensi. Koenig.

Perennis.

RADIX nondum a me visa.

FRONS longitudine pedalis et ultra, latitudine sesquilineari, ubique æquali, absque ullâ normâ ramosa, ab ipso ortu triquetra, et, ut videtur, e costâ tenui, terete, membranâ triplice alatâ constans, membranâ margine sparsim vagèque dentatâ, dentibus exiguis: *rami* e frondis angulis orti, atque inde serie triplici dispositi, longitudinis sunt perquàm variæ, nunc conferti, nunc remoti, et vel simplices vel iterum ramosi, primùm cylindracei et tenues, sed intervallo unius ab ortu lineæ, membranâ triplice alati, unde petiolo brevissimo insidere videntur.

VESICULÆ in ipsâ ramorum, et frequentissimè in eâ minorum, substantiâ immersæ, oblongæ, solitariae, *Abri pre-catorii* seminum magnitudine, spatio inter singulas nunc longiusculo, nunc vix bilineari, ut ramus integer moniliformis appareat, membranâ triplici, poris mucifluis frequentibus pertusâ, frondis reliquæ instar, cinctæ, intus omninò cavæ.

FRUCTIFICATIO hactenus latet.

COLOR plantæ recentis verisimillimè olivaceus, in iis quæ ego vidi exemplaribus fuscus: *exsiccata* nigricans: *Soli nimum expositæ* pallidior et rufescens.

SUBSTANTIA inter coriaceam et cartilagineam, tenuis.

OBS. *Exsiccata* chartæ nequaquàm adhæret.

Nomen huic speciei a Linnæo impositum præcedenti olim indiderat Gmelinus, cum quâ præter formam triquetram nihil commune habet. Ne verò essent qui ob titulorum similitudinem reverà arctissimè conjunctos suspicarentur, ambos hic unâ exhibere statui; quod nolens quidem feci, quia *F. triquetri* fructificationem nondum vidi. De hujus fructificationis naturâ dubitari nequit quin sit ejus *Fucorum*, qui dicuntur, *propriorum* similis, nec forsàn nimis aude-rem si receptacula frondis ad apices sita conjicerem. Arctiorem cum *F. natantis* quàm cum ullâ aliâ Algarum mari- narum hactenus detectarum tribu affinitatem habet *F. triqueter*: sed vel ab his tantis modis discrepat, ut ne quidem eidem familiæ adjungi possit, nec datur una in toto *Fucorum* genere species cum quâ fieri potest ut ullo modo com- misceatur. Hâc de causâ sterilem delineare minùs sum gravatus. Accessit etiam quòd nulla ejus extet icon, et quòd perrara videatur planta, cum neque in Gmelini nec in Esperii operibus recenseatur, et ea tantummodò exem- plaria hucusque viderim, quæ in Herbario Linnæano et Ellisiano servantur. Horum prius hæc sistit tabula: alterius vero, quia omnibus partibus erat majus, portionem ad literam *b* delineatam exhibet.

a. <i>F. triqueter</i> , magn. nat.						
b. <i>ramus</i> , magn. auct.	-	-	-	-	-	6.
c. <i>ejusdem pars</i>	-	-	-	-	-	5.
d. <i>vesicula dissecta</i>	-	-	-	-	-	4.



*Fucus sinuosus*, stem cylindrical, branched, supporting oblong, membranaceous leaves, either sinuated, or pinnatifid, their margins crenate, and ciliated; spherical tubercles imbedded in the frond, and scattered seeds in the cilia.

*Fucus sinuosus*. Linn. Trans. III. p. 111. Eng. Bot. XII. t. 822. Syn. Fuc. I. p. 1.

*F. crenatus*. Gmelin, Hist. Fuc. p. 184. t. 24. f. 1. Linn. Syst. Nat. Ed. Gmel. II. p. 1388.

*F. rubens*. Fl. Ang. p. 573. Fl. Scot. II. p. 943. With. IV. p. 94. Ner. Brit. p. 18. t. 7.

*F. roseus*. Fl. Dan. t. 652.

*F. Palmetta* var. Esper, Ic. Fuc. I. p. 84. t. 42.

*F. membranaceus purpureus latifolius pinnatus*. Rall Syn. p. 47. n. 34.

$\beta$ . *incrassatus*; frond inclining to cartilaginous; cilia obovate.

*F. sinuosus*.  $\beta$ . Syn. Fuc. I. p. 2.

$\gamma$ . *quercifolius*; laciniae of the frond rounded, margins naked.

*F. sinuosus*.  $\gamma$ . Syn. Fuc. I. p. 2.

On the shores of the British Isles, not very uncommon.—In the Bay of Christiana, in Norway. Müller.—Sent from Kamtschatka to Gmelin.— $\beta$  among the rejectamenta of the sea at Yarmouth.— $\gamma$  at the Isle of Anglesea. Rev. H. Davies.

Perennial. January—May.

ROOT, a very small, brown, callous disk, occasionally furnished with one or two pink-colored, creeping fibres.

FRONDS, numerous from the same base, rising at first with a single, undivided, elliptical leaf, two or three inches long, and about one wide, the top bluntish, the margin sinuated, with sinuses in some instances slight, in others so deep that the frond is rather pinnatifid, and the laciniae frequently again sinuated in a similar manner: in addition to this the margin is here and there irregularly crenated, and fringed with minute oblong cilia: through the whole leaf passes a cylindrical nerve, not half so thick as a sparrow's quill, pinnated with other smaller ones, rather remote, between horizontal and patent, parallel, and generally simple, and opposite; these in their turn are frequently pinnated with others, so that, as the plant advances in age, when the laciniae of the leaf lengthen into new leaves, and when the membrane is worn away, the midrib wears the appearance of a branched stem, and the frond in this state is often not less than a foot long, and as much wide: specimens are not uncommonly found, in which the midrib is stripped of its leafy part every where except at the apices, and is proliferous with small leaves.

FRUCTIFICATION, of two kinds; the one, situated in the cilia above mentioned, which at that time perform the office of capsules, and are compressed, containing a number of roundish seeds, internally dotted; in a young plant they are placed only upon the margins, but in an old one also upon the midrib, and sometimes even upon the membrane itself: the other, consisting of spherical tubercles, immersed in obovate processes, sometimes growing on the margins, sometimes on the midrib, full of globular seeds surrounded with a pellucid limbus: the spherical tubercles are also occasionally, but very rarely, found immersed in the substance of the frond.

COLOR, a beautiful transparent pink; darker and more inclining to a dull red when dry: in decay turning to a dirty yellow, tinged with green.

SUBSTANCE, membranaceous, extremely tender.

OBS. In a dried state it adheres slightly to paper:—the frond under a high microscope is most beautifully reticulated with minute meshes.

$\beta$  differs in the substance of the frond being thicker, inclining to cartilaginous; in the color being darker; and the cilia obovate.

$\gamma$  is smaller than either of the two preceding varieties, and has the apices of its laciniae always rounded and naked: in form it much resembles an oak leaf.

To what remarkable changes of form the present very elegant *Fucus* is liable in different stages of growth may be sufficiently collected from the foregoing description, but will be still more strikingly apparent from a comparison of the figures in *English Botany* and the *Nereis Britannica*, of which the former represents it at an early, the latter at an advanced period of its existence. To unite both these, as far as possible, a specimen of middle age has been selected for the plate before us, in which the frond has not altogether lost its foliaceous membrane, though it has already materially changed its primary form, and the nerves of the midrib have begun to lengthen into new leaves. The representation of this plant in the *Flora Danica* is tolerably good; but that given by Gmelin exhibits it in so singular a state, and is so dissimilar to its general appearance, that it is more likely to lead to error than to answer the purpose of illustrating. I am in doubt how far I have done right in dividing *F. sinuosus* into three varieties; as the second is constantly to be found with the spherical capsules, which I \*never saw in the more tender frond of the first, so that it ought probably to be regarded as a different sex, rather than as a different variety; and many botanists may be inclined to believe that the third is nothing more than a specimen destitute of fructification: in answer to which, I have only to observe, that the several appearances are materially unlike each other at first sight, and that I am of opinion that the thus separating them may lead to the better understanding of the species. It appears certain that the obovate processes, in which the spherical tubercles are imbedded, become lengthened into leaves, after they have discharged their

\* Miss Hill, to whom I am indebted for many observations upon this *Fucus*, and many fine specimens of it, has lately informed me that she has found both kinds of fruit on the same individual.





*Fucus sinuosus.*







their office of fructification, but I can scarcely suffer myself to be persuaded that the same is the case with the marginal cilia, which may often be observed both in the very earliest and in the very latest stage of the frond, and seem liable to no variation of form. In opposition to the opinion entertained by Hudson, and most other authors, who had taken this plant for the *F. rubens* of Linnæus, Dr. Goodenough and Mr. Woodward first proved from his Herbarium that Lightfoot's *F. prolifer* was the *Fucus* really designed under that name, and that the present was unknown to that great naturalist. The description in the *Species Plantarum* appears indeed to contradict such a conclusion, and I cannot but think that too great a reliance has been placed upon his Herbarium, which with regard to *Fuci* is but of little weight. I leave the matter, however, as I found it, and must refer any botanist who wishes for more information on this head to the *Synopsis of the British Fuci*. Esper, most unfortunately, received a specimen of *F. sinuosus* growing from the same base as his *F. Palmetta*, and was hence led to consider these two as varieties of each other, though in reality they differ in almost every particular. There is no one to which the species before us is so much allied as to *F. sanguineus*, from which its ciliated and sinuated margin, as well as its mode of growth and fructification, will always be sufficient at first sight to distinguish it.

- a. *F. sinuosus*, natural size.
- b. apex of the frond with capsules, magnified - 6.
- c. capsule - - - - - 3.
- d. seeds - - - - - 1.
- e. part of the frond, to shew the reticulated structure 1.
- f. apex of the frond with tubercles - - - 6.
- g. tubercle imbedded in an obovate process of the frond 3.
- h. seeds - - - - - 1.
- i. apex of the frond with tubercles imbedded in it - 6.

## 35.—FUCUS SINUOSUS.

*Fucus* caule tereti, ramoso; foliis membranaceis, oblongis, sinuoso-pinnatifidis, marginibus crenatis ciliatisque; tuberculis sphaericis immersis, seminibusque in ciliis sparsis.

*Fucus sinuosus*. Linn. Trans. III. p. 111. Eng. Bot. XII. t. 822. Syn. Fuc. I. p. 1.

*F. crenatus*. Gmelin, Hist. Fuc. p. 184. t. 24. f. 1. Linn. Syst. Nat. Ed. Gmel. II. p. 1388.

*F. rubens*. Fl. Ang. p. 573. Fl. Scot. II. p. 943. With. IV. p. 94. Ner. Brit. p. 18. t. 7.

*F. roseus*. Fl. Dan. t. 652.

*F. Palmetta* var. Esper, Ic. Fuc. I. p. 84. t. 42.

*F. membranaceus purpureus latifolius pinnatus*. Rait Syn. p. 47. n. 54.

*β. incrassatus*; fronde subcartilagineâ; ciliis obovatis.

*F. sinuosus*; *β.* Syn. Fuc. I. p. 2.

*γ. quercifolius*; frondis laciniis rotundatis, marginibus nudis.

*F. sinuosus*. *γ.* Syn. Fuc. I. p. 2.

HABITAT in Britanniarum littoribus, haud ita infrequens.—In Sinu Christianiensi Norvegiæ. Müller.—E Kamtschatka allatum accepit Gmelin.—*β.* inter rejectamenta maris apud Yarmouth.—*γ.* in Insulâ Monâ. D. H. Davies.

Perennis. A Jan.—Majum.

RADIX callus perquam exiguus, discoideus, fuscus, fibrâ aliquando unâ alterâve roseâ repente instructus.

FRONDES ex eâdem basi plurimæ, folio assurgentes primum unico, indiviso, elliptico, duos tresve pollices longæ, et circiter unum lato, apice obtusiusculo, margine sinuato, sinubus nunc tantummodò levibus, nunc ita profundis ut frons potiùs pinnatifida evadat, et laciniæ sæpe sint iterùm similiter sinuatæ: margo quoque præter hoc enormitèr hic et illic crenatus, et ciliis minutis oblongis cinctus: folium totum percurrit nervus teres pennâ passerinâ duplò tenuior, aliis minoribus horizontalitèr patulis remotiusculis parallelis subsimplicibus plerumque oppositis pinnatus, hique non rarò aliis, unde, progrediente stirpis ætate, folii laciniis in nova folia elongatis membranâque illisâ, caulis ramosi speciem præbet, et frons longitudine pedalis latitudine vix minore quandòque evadit: haud rarò occurrunt exemplaria nervo ubique, nisi prope apices, denudato, et foliis parvis prolifero.

FRUCTIFICATIO duplex; hæc e ciliis constans suprâ memoratis, quæ tunc capsularum vice funguntur, et sunt compressa, includuntque semina plurima, subrotunda, intùs punctata; foliorum tantummodò margini in stirpe juniore, in



in adultiore nervo etiam, et quondòque ipsi membranæ insident; *illa* e tuberculis sphaericis, immersis in frondis processibus obovatis, nunc marginalibus, nunc e nervo ortis, refertis seminibus globosis nervo pellucido cinctis: tubercula sphaerica quoque interdum, sed rarissimè, in ipsâ frondis substantiâ immersa occurrunt.

COLOR amœnè roseus, diaphanus; *exsiccata* intensior, et lateritio immixtus; *marcescentis* sordidè lutescens, viredine tinctus.

SUBSTANTIA membranacea, tenerrima.

OBS. *Exsiccata* chartæ laxè adhæret:—frons sub lente acri pulcherrimè reticulata apparet, maculis minutissimis.

β differt frondis substantiâ crassiore, subcartilagineâ; colore intensiore; et ciliis obovatis.

γ varietas est minor, laciniarumque apices semper habet rotundatos et nudos: formâ folium quercinum refert.

Quantum in diversis ætatis suæ stadiis variare solet hæcce perelegans Fuci species non magis e descriptione suprâ traditâ, quàm ex iconibus Sowerbæi et Stackhousii, quarum illa juniorem hæc vetustiorē stirpem sistit, intra se collatis, liquebit. Media plantæ ætas in hac nostrâ delineatur figurâ, quum frons, membranâ nondum totâ deperditâ, jam formam primariam maximâ ex parte exuit, costæque nervi elongati in nova folia sunt transituri. Icon in *Florâ Danicâ* satis bona; contrâ ea Gmelini statum ad eò singularem repræsentat, ut, ne potiùs hallucinationibus sit causæ, quàm ad aliquid illustrandum conferat, est timendum. Dubito quidem ut rectè fecerim, quòd hanc stirpem in tres dispartiverim varietates, cum secunda \*semper capsulis sphaericis, nunquam in plantâ teneriore conspiciendis, donata occurrat, eaque de causâ forsàn rectiùs pro diverso sexu quàm pro distinctâ varietate censi mereatur; fierique potest ut sint qui credant tertiam esse tantummodò Fuci conditionem sterilem. Contra hæc nihil habeo quod arguam, nisi eas multum inter se primo aspectu discrepare, meque sic disjungendo ad plantæ cognitionem ritè obtinendam maximè prodesse credidisse. Frondis processus, in quibus tubercula sphaerica immersa jacent, fructificatione jam peractâ, in nova producuntur folia; vix tamen puto idem valere de ciliis marginalibus, quæ sese sæpe vel in primâ frondis ætate conspicienda præbent, formamque nunquam mutare videntur. *F. sinuosus* esse Linnæo incognitum, et illum *Fucum* Lightfootii *proliferum* sub *F. rubentis* nomine respicere voluisse primi e phytophylacio suo edocuerunt viri optimi, Goodenovius Woodwardiusque. Repugnat sanè descriptio in *Speciebus Plantarum*, nimiumque est, me judice, confisum Herbario exigui in his rebus momenti. Rem tamen ut reperi relinquo; et si quis plura de hoc discere velit *Fucorum Britannicorum Synopsis* consulat. Esperus infaustis avibus *F. sinuosi* exemplar eidem, cui *F. Palmetta*, agglutinatum basi accepit, et hoc adductus pro varietate ejus stirpis omnibus partibus absimillimæ habuit. Maxima autem inter hanc plantam et *F. sanguineum* similitudo interest, a quo margines sinuati, ciliatique, crescendi modus, et fructificatio statim distinguunt.

a. <i>F. sinuosus</i> , magn. nat.						
b. frondis apex cum capsulis, magn. auct.	-	-	-	-	-	6.
c. capsula	-	-	-	-	-	3.
d. semina	-	-	-	-	-	1.
e. pars frondis ut textura reticulata appareat	-	-	-	-	-	1.
f. frondis apex cum tuberculis	-	-	-	-	-	6.
g. tuberculum in frondis processu obovato	-	-	-	-	-	3.
h. semina	-	-	-	-	-	1.
i. frondis apex cum tuberculis immersis	-	-	-	-	-	6.

\* Dna Hill, cui plurimas de hoc Fuco observationes et plurima exemplaria pulcherrima debeo, se utrumque in eodem individuo reperisse fructum nuper me per literas certiorē fecit.



*Fucus* caule terete, ramoso; foliis petiolatis, membranaceis, oblongo-ovatis, simplicibus, integerrimis; e costâ tuberculis sphaericis petiolatis, seminibusque sparsis in processibus foliaceis oblongis.

*Fucus sanguineus*. LINN. Mant. p. 136. Syst. Nat. II. p. 718. Syst. Nat. Ed. Gmel. II. p. 1387. Fl. Ang. p. 573. Fl. Scot. II. p. 942. Gmelin, Hist. Fuc. p. 185. t. 24. f. 2. With. IV. p. 94. Fl. Dan. t. 349. ESPEr, Ic. Fuc. I. p. 79. t. 38. Fl. Norv. II. p. 91. Linn. Trans. III. p. 109. Ner. Brit. p. 20. t. 7. Syn. Fuc. I. p. 7. Eng. Bot. XV. t. 1041. Fl. Fr. Ed. 2da. II. p. 27. Fl. Germ. III. p. 439.

*Fucus, sive Alga, folio membranaceo purpureo, Lapathi sanguinei figurâ et magnitudine*. MORIS. Hist. Ox. III. p. 645. s. 15. t. 8. f. 6. RAI Syn. p. 47. n. 45.

HABITAT in Britanniarum oris, satis frequens. In Galliae oris, ubi alluitur Oceano; necnon in fundo Oceani Islandici.

Perennis. Jan.—Apr.

RADIX callus subconicus, figurâ tamen incertâ, ejusdem cum caule substantiæ et coloris.

FRONS longitudine nunc palmaris, nunc pedalis, et ultra, stipite instructa brevi, rarè unguiculari, crassitie pennam corvinam vel anserinam minorem æquante, ortu simplice, mox semel et sæpe iterum diviso: rami ad basin nudi et petiolorum vice fungentes, inde per folia transeuntes, et in costas immutati, stipitis principio similes, magnitudine paullum minore demptâ, fiunt sensim ut progrediuntur compressi, attenuati, et dilutiores, donec juxta apices propemodum evanescent: folia longitudine a palmari ad dodrantalem, latitudine a pollicari ad tripollicarem variant, semper indivisa, figurâ nunc oblongâ, nunc lanceolatâ, vel propemodum ovatâ, aliquando diversæ in eodem individuo, quandoque etiam utrinque acuminata, margine integerrima, et pulchrè undulata, costâ aliquando, nec tamen frequentèr, proliferâ foliis reliquorum similibus sed multo minoribus, semper pinnatâ nervis compressis, prominulis, intensioris quàm folium coloris, plerumque oppositis, spatio inter singulos circiter lineari, qui horizontalitèr ad foliorum margines paralleli excurrunt, et sunt simplices donec margini adpropinquant, ubi sæpius lenitèr ramosi evadunt.

FRUCTIFICATIO duplex, utraque costæ tunc temporis ut plurimum denudatæ insidens; hæc e tuberculis constans sphaericis, acutis, Phasci recti capsulas haud malè referentibus; pedunculo perbrevis fultis, et semina plurima, oblonga, figurâ tamen nequaquam certæ, includentibus; illa e frondis processibus oblongis, basi attenuatis, semina subrotunda foventibus.—hos jam effætos in folia produci pro certo duco.

COLOR foliorum amœnissimè roseus, diaphanus, intensior in his quàm in illis; et semper in exsiccata, quando ad sanguineum accedit; marscescentium sordidè lutescens, et demùm albicans: caulis dilutior, opacus.

SUBSTANTIA in foliis membranacea, tenuissima, et tenerrima; in caule cartilaginea, junioris tenera, vetusti rigidiuscula et tenax.

OBS. Chartæ exsiccata adhæret:—recens odorem acrem ingratum spirat:—frons sub lente nequaquam reticulata.

Pulcherrima stirps! et quæ formæ elegantia foliorumque exquisitè venosorum colore tantum omnibus aliis antecellat, ut, sicut inter plantas terrigenas rosa flos florum salutatur, hæc sibi inter marinas jure non minus æquo partes priores vindicet! Utinam sanè similem jactare posset odorem! Originem ducit, ut *F. Hypoglossum* et *F. ruscifolius*, quibus arctissimè est affinis, a folio unico, neque tamen crescendi modus omninò est idem, cum non capiat incrementa sua e costâ iterum atque iterum proliferâ, et, licet hæc folio uno alterovè minore sæpe sit instructa, videatur tamen tunc tantum vi proliferâ ad sese augendam uti, quando membrana penitus deperit, in quo statu, novâ foliorum serie per totam longitudinem editâ, frondis læsæ jacturam resarcire pergit. Longiùs adhuc quoad crescendi modum recedit a *F. sinuoso*, cujus margines ipsi proliferi evadunt; et ab omnibus his differt in eo quòd membrana foliacea caulis basin nunquam attingit, unde pars illa, quam stipitem suprâ dixi, rectiùs in hoc quam in reliquis id nomen mereatur. Varietatem, quam  $\beta$  dixit, recensuit cl. Decandollius, quam tamen hic omisi, quoniam nihil de illâ tradit, nisi foliis minoribus esse instructam; varietque licet plurimum *F. sanguineus*, cum foliorum magnitudine, tum quoque figurâ, limites intra varietates nullos unquam statuere potui. Variat etiam stipitis longitudine, et an ramosus necne evadat; semper tamen sibi ita constat, tantumque a reliquis recedit, ut nullus detur in specie discriminandâ dubitationi locus, nisi fortè caules hyeme prorsus denudati tyronem decipiant.

a. <i>F. sanguineus</i> , magn. nat.							
b. frondis apex, magn. auct.	-	-	-	-	-	-	1.
c. costæ pars cum tuberculis	-	-	-	-	-	-	5.
d. tuberculum dissectum	-	-	-	-	-	-	3.
e. semina	-	-	-	-	-	-	1.
f. costæ pars cum processibus foliaceis semina includentibus	-	-	-	-	-	-	5.
g. unus e processibus	-	-	-	-	-	-	3.
h. semina	-	-	-	-	-	-	1.

\* Vidi quidem quorum apices erant bifidi, sicut in *Scolopendrio vulgari*, cujus frons simplicissima, quandoque conspicitur: sed hoc ex injuriâ accidisse persuasum habeo.



*Fucus sanguineus*, stem cylindrical, branched, supporting simple, membranaceous, petiolate leaves, between oblong and ovate, quite entire; the midrib producing spherical, pedunculated capsules, and scattered seeds in oblong leafy processes.

*Fucus sanguineus*. LINN. *Mant.* p. 136. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. *Fl. Ang.* p. 573. *Fl. Scot.* II. p. 942. GMELIN, *Hist. Fuc.* II. p. 185. t. 24. f. 2. WITH. IV. p. 94. *Fl. Dan.* t. 349. ESPER,  *Ic. Fuc.* I. p. 79. t. 38. *Fl. Norv.* II. p. 91. *Linn. Trans.* III. p. 109. *Ner. Brit.* p. 20. t. 7. *Syn. Fuc.* I. p. 7. *Eng. Bot.* XV. t. 1041. *Fl. Fr. Ed. 2da.* II. p. 27. *Fl. Germ.* III. p. 439.

*Fucus*, sive *Alga*, folio membranaceo purpureo *Lapathi sanguinei* figurâ et magnitudine. MORIS. *Hist. Or.* III. p. 645. s. 15. t. 8. f. 6. RAI *Syn.* p. 47. n. 45.

On the shores of the British Isles, not uncommon. On the coast of France opposite to the Ocean, and at the bottom of the Northern Ocean.

Perennial? January—April.

ROOT, a callus, inclining to conical, but of no fixed form, of the same substance and color as the stem.

FROND, varying in length from three inches to a foot or more, furnished with a stipes seldom half an inch long, and equal in thickness to a crow's quill, or small goose-quill, simple at first, but soon once or twice divided: branches naked at their base, and performing the office of petioli, then passing through the leaves, and becoming midribs, similar in their origin to the stipes, except their somewhat smaller size, but, as they advance, gradually growing compressed, and more thin, and pale, till towards the apices they nearly vanish: leaves from three to nine inches long, and from one to three wide, always \*undivided, either oblong or lanceolate, or approaching to ovate, sometimes acuminate at both ends, and occasionally of different shape on the same individual; their margins quite entire, but beautifully undulated; their midrib sometimes, though not frequently, proliferous with leaves like the others, but smaller, always pinnated with compressed, rather prominent nerves, of a deeper color than the leaf, generally opposite, placed at intervals of about a line from each other, running parallel in a horizontal direction to the margins, and simple till they approach them, when they are commonly a little branched.

FRUCTIFICATION, of two kinds, both placed on the midrib, which at the season of the year when it is produced is most frequently quite naked; the one consisting of spherical pointed tubercles, not unlike the capsules of *Phascum rectum*, supported upon an extremely short peduncle, and containing several irregularly oblong seeds; the other, of oblong processes of the frond, attenuated at the base, and full of roundish seeds.—I have no doubt but these latter after the seeds are fallen turn into leaves.

COLOR of the leaves, a most beautiful transparent pink, darker in some than in others, and always deepest in a dry state, when it approaches to a blood-red, turning in decay to a dirty yellow, and finally to white; of the stem, paler and opaque.

SUBSTANCE, membranaceous, extremely thin, and tender in the leaves; in the stem cartilaginous, tender while young, but stiff and tough when old.

OBS. When dry, it adheres to paper:—when fresh, it has an unpleasant pungent smell;—the leaf under the microscope exhibits no reticulations.

In the elegance of its appearance, and the exquisite color of its most delicately veined leaves, this beautiful *Fucus* so much excels all its congeners, that it carries away the palm with no less justice from the vegetables of the ocean, than the rose, the flower of the poets, from its rivals in the garden. It is a pity, indeed, that it is unable to boast an equally delicious perfume! With regard to its mode of growth, it so far agrees with *F. Hypoglossum* and *ruscifolius*, that all equally take their origin from a single leaf, but, however closely allied to these species, *F. sanguineus* does not like them depend for its increase upon the repeatedly proliferous midrib; for this, though frequently furnished with one or two smaller leaves, seems never materially to affect the growth of the plant, except when the foliaceous membrane is altogether destroyed, in which case it strives to repair the injury it has sustained, by throwing out a series of new leaves, that soon equal in size the primary ones. It differs still more strikingly in this particular from *F. sinuosus*, of which the principal proliferous tendency lies in the margins, and it has a separate character from all these, in the membrane never reaching the base of the stem, so that the part, which is above called a stipes, receives that name with more propriety in the present plant than in the others. Decandolle, in the *Flore Française*, has mentioned a variety  $\beta$ , which I have been under the necessity of omitting, as he says nothing farther respecting it than that it has smaller leaves; and, though *F. sanguineus* is liable to considerable variations, both as to the figure and size of the leaves, I never found it possible to prescribe to these appearances any certain limits. It varies also in the length of the stem, and in its being either branched or simple, but preserves so much in all cases its own character, and approaches so little to that of any other *Fucus*, that there can be no difficulty in discriminating the species, except it should happen that battered stems, quite stripped of their leafy part, chance to puzzle a beginner.

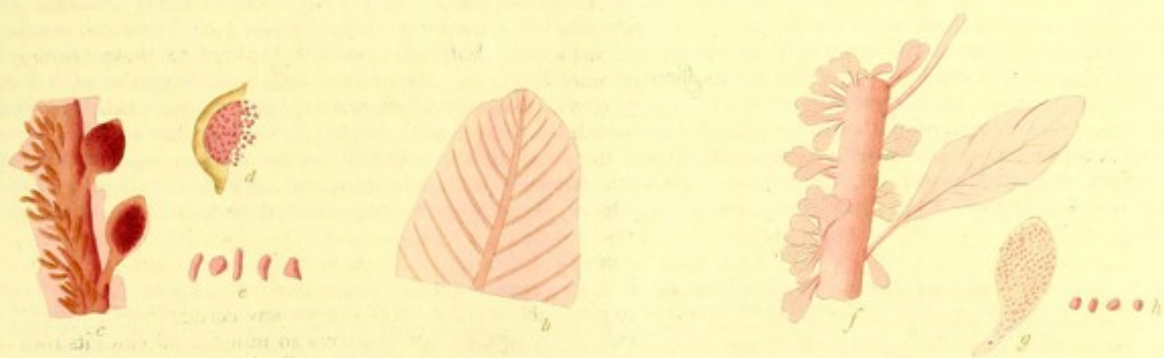
a. *F. sanguineus*, natural size.

b. apex of the frond, magnified - - - - - 1.

c. piece

\* I have indeed seen specimens, the apices of which were bifid, as is sometimes the case in *Scolopendrium vulgare*, a plant in general remarkably simple; but there can be no doubt of this having been the effect of injury.





*Fucus sanguineus.*



The first of these was the discovery of gold in California in 1848. This discovery led to a great influx of people to California and the establishment of the state of California in 1850. The second was the discovery of gold in Colorado in 1859. This discovery led to the establishment of the state of Colorado in 1876.

The third was the discovery of gold in Nevada in 1859. This discovery led to the establishment of the state of Nevada in 1864. The fourth was the discovery of gold in Idaho in 1860. This discovery led to the establishment of the state of Idaho in 1890.

The fifth was the discovery of gold in Montana in 1865. This discovery led to the establishment of the state of Montana in 1889. The sixth was the discovery of gold in Wyoming in 1869. This discovery led to the establishment of the state of Wyoming in 1890.

The seventh was the discovery of gold in Utah in 1871. This discovery led to the establishment of the state of Utah in 1896. The eighth was the discovery of gold in Arizona in 1876. This discovery led to the establishment of the state of Arizona in 1909.

The ninth was the discovery of gold in New Mexico in 1878. This discovery led to the establishment of the state of New Mexico in 1906. The tenth was the discovery of gold in Texas in 1881. This discovery led to the establishment of the state of Texas in 1901.

The eleventh was the discovery of gold in Oklahoma in 1889. This discovery led to the establishment of the state of Oklahoma in 1906. The twelfth was the discovery of gold in Kansas in 1891. This discovery led to the establishment of the state of Kansas in 1891.

The thirteenth was the discovery of gold in Nebraska in 1893. This discovery led to the establishment of the state of Nebraska in 1893. The fourteenth was the discovery of gold in Iowa in 1895. This discovery led to the establishment of the state of Iowa in 1895.

The fifteenth was the discovery of gold in Missouri in 1897. This discovery led to the establishment of the state of Missouri in 1897. The sixteenth was the discovery of gold in Arkansas in 1899. This discovery led to the establishment of the state of Arkansas in 1899.

The seventeenth was the discovery of gold in Louisiana in 1901. This discovery led to the establishment of the state of Louisiana in 1901. The eighteenth was the discovery of gold in Mississippi in 1903. This discovery led to the establishment of the state of Mississippi in 1903.



c. piece of the midrib with tubercles	-	-	-	3.
d. tubercle cut open	-	-	-	3.
e. seeds	-	-	-	1.
f. part of the midrib with seeds in the foliaceous processes	-	-	-	5.
g. one of these processes	-	-	-	5.
h. seeds	-	-	-	1.

## 37.—FUCUS GRIFFITHSII.

*Fucus* fronde cartilagineâ, tereti, filiformi, dichotomâ, fastigiatâ; tuberculis oblongis frondem amplectentibus.

HABITAT apud Sidmouth, in Devoniâ, prope rupem, "Chit-Rock" dictam. *Dna Griffiths*. Apud Balbriggen, prope Eblanam. *D. R. Scott, M. D.*

*Annua?*—Oct.—Dec.

RADIX callus exiguus, dilatatus, nigricans.

FRONDES ex eâdem basi plurimæ, teretes, filiformes, longitudine bi-tri-pollicares, crassitie setam porcinam non ita multum superantes, dichotomis juxta radicem incipientibus, et inde sexies septiesve repetitis, divisæ, intervallo inter singulas brevi, attamen incerto, furcis patentibus, summis divaricatis, et quandòque deflexis, segmentis fastigiatis, apicibus haud rarò incrassatis, et compressis.

FRUCTIFICATIO tubercula oblonga, atro-purpurescencia, vel etiam atra, ramos superiores annulorum instar amplectentia, sæpe duo aut tria in singulis, eâdem quâ frons epidermide tecta, et verrucas simulantia: hæc si dissecantur, e filamentis articulatis, articulis oblongis, parallelis, densissimè compactis,\* seminibus subrotundis immixtis tota constare videntur.

COLOR purpurascens, subdiaphanus, quandòque etiam atro-purpurascens: *exsiccata* intensior: *Soli exposita* albescens.

SUBSTANTIA cartilaginea, lenta, tenax: *exsiccata* cornea.

Obs. Frons ramis aliquot lateralibus, brevibus, horizontalibus, interdum, sed, ut videtur, rarò, instructa evadit: —*exsiccata* chartæ nequaquam adhæret.

Ex omnibus iis qui in Fucorum Anglicorum historiâ illustrandâ navaverunt operam, ne unum datur nomen quod honore mereatur majore affici quam illud *Dnæ Griffiths*, de Ottery, in Devoniâ, cujus indefesso in his plantis detegendis studio, eximiaque in perscrutandis sagacitati, incrementa plurima Nereis Britannica debet. Hanc stirpem, ei jure optimo dicatam, primum ipsa aliquot abhinc annis nascentem reperit; perrara tamen videtur, quoniam hactenus in uno tantum invenerit loco,† neque extent, quod scio, ulla alia ejus exemplaria, præter unum quod in littore Hibernico prope Balbriggen legit vir amicissimus, D. Scott, Botanicus in Academiâ Eblanensi Professor, et quod illa in Devoniâ detecta magnitudine duplò exsuperat. *F. Griffithsii* est planta, quam, cum *F. rotundum* tractarem, dixeram medium quasi locum inter eam speciem et *F. plicatum* tenere, diuque, ut verum fatear, dubius hæsi an satis ab his differret. Differt verò certissimè; et per colorem purpureum substantiamque corneam ab illo, per ramos omnes fastigiatos crescendique modum semper dichotomum ab hoc, per fructificationem ab utroque dignoscitur. Nota longè certissima e fructu depromitur, nec mirum si, hoc deficiente, vel cautos exercitosque in his rebus fallat. Suspicio sanè sic fefelisse Wulfenium,‡ iconemque suam, quam *F. fastigiatum* ipse dixit, et quam ego § suprâ sub *F. rotundo* citavi,

\* An ea quæ hic semina dixi sint reverà semina dubito, fieri enim potest ut sint tantummodò filamentorum diffractorum articuli soluti; sin ita se res habeat fateri necesse est me semina nulla in hac stirpe detexisse, nisi forte concedatur filamenta esse semina. Utut hoc sit, filamenta certè quiddam cum fructu commune habere videntur, quoniam reperiuntur in plurimorum Fucorum capsulis, nec in tuberculis *F. crenulati*, t. 40, vel *F. Norvegici*, t. 41, aliquid præter hæc occurrit. *F. Griffithsii* tubercula dissecta, eorum *F. Norvegici* instar e duobus stratis diversæ substantiæ sub lente contexta sunt visa, sed differentiam nullam inter hæc detegere potui.

† Descriptione hujus Fuci typis jam mandatâ, certior me fecit amicus suavissimus, J. Gulielmus Hooker, cui hoc opus quicquid habet pulchrum quoad iconas debet, esse quoque a D. J. Jervis prope Exmouth nascentem detectum.

‡ Haud omnino ex icone pendet hæc suspicio; mirè enim consentit descriptio, cujus partem hic subjungo, ut pro se judicent lectores, quos tamen iterum monitos velim, *F. Griffithsii* cum *F. rotundo* quoad crescendi modum in plurimis convenire. "Non solitarium modo, sed omnino caespitose aggregatum vidi; cauliculus tamen quisque propria semper super placenta radicali coriacea, et orbiculari attollebatur ad unum et sesquialterum pollicem, fastigiatus. Is cartilagineo-coriaceæ naturæ, grossiorisque fili linei crassitudine, teres primum, tum extereti compressiusculus, ad dimidium fere pollicem erectus (alias non nisi unam ad lineam) assurgit simplicissimus, statimque dichotomus, per sexies, et octies iteratas deinceps dichotomias, flabelliformis ad instar frondis, distentus dividitur, subdividiturque ramosissimus, dichotomis extimis ad eandem omnibus altitudinem exaltatis, fere fastigiatus: lacinulis dichotomiarum nonnihil compressis, lineari filiformibus. Color primum dilute, tum olivaceo-virens, ex viridi dein pallidus, aut saturatius rubens, atro denique purpureus, et niger."

§ p. 9.



citavi, reapse *F. Griffithsii* exprimere. Hanc profectò optimè refert, sin ita sit, plantas tres certè distinctas commiscuit; quoniam *F. fastigiatum* verum in Herbario suo vidit Mertensius, et *F. rotundi* var.  $\gamma$ . ab ipso acceptam olim ad me misit Esperus.

a. <i>F. Griffithsii</i> , magn. nat.	
b. <i>pars frondis superior</i> , magn. auct.	6.
c. <i>pars frondis cum tuberculo</i>	4.
d. <i>tuberculum horizontalitèr dissectum</i>	3.
e. <i>filamenta</i>	2.
f. <i>eadem</i>	1.
g. <i>semina?</i>	1.

## 37.—FUCUS GRIFFITHSII.

*Fucus Griffithsii*, frond cartilaginous, cylindrical, filiform, dichotomous; branches of equal height; tubercles oblong, embracing the frond.

At Sidmouth, in Devonshire, near the *Chit Rock*, in a little channel formed by sea-water, as it runs off during the ebb tide. *Mrs. Griffiths*. Shore at Balbriggan, near Dublin. *Dr. Scott*.

*Annual?*—October—December.

**ROOT**, a small, expanded, blackish, callous disk.

**FRONDS**, numerous from the same root, cylindrical; filiform, two or three inches long, and in thickness but little exceeding a hog's bristle, branched with dichotomies beginning near the root, and afterwards six or seven times repeated at short, but uncertain distances, the forks patent, the upper ones divaricated, and occasionally deflexed, the segments all of equal height, the apices not unfrequently thickened and compressed.

**FRUCTIFICATION**, oblong, blackish purple, or even black, tubercles, surrounding the upper branches in an annular form, and often two or three upon a single one, covered with the same epidermis as the frond, and in appearance resembling warts: if dissected they appear wholly to consist of parallel, jointed filaments, their joints oblong, very closely placed together, and mixed with roundish seeds.\*

**COLOR**, purple, subdiaphanous, sometimes blackish-purple: much darker when dry: turning white if exposed to the sun.

**SUBSTANCE**, cartilaginous, pliant, tough: horny in a dry state.

**OBS.** Specimens are now and then, but, as it appears, by no means commonly found, provided with a few short lateral horizontal branches:—when dried the plant does not adhere in the least to paper.

Among the many Botanists who have lately directed their attention to the investigation of the submersed Algae of Britain, I am acquainted with no one to whom this department of science is under greater obligations than to Mrs. Griffiths, of Ottery, in Devonshire, or to whose unwearied zeal and extraordinary acuteness I shall in the course of the present work have more repeated occasions to bear testimony. It is to her that we are indebted for the discovery of the *Fucus* before us, which I feel myself happy in the opportunity of laying before the public under her name. It appears to be a very scarce species, as, though some years are passed since she originally found it, she has not hitherto succeeded in detecting any second station for it;† nor have I seen any specimens of it besides those communicated by her, excepting a single one, which was gathered on the Irish coast near Balbriggan by my friend, Dr. Scott, Professor of Botany to the University of Dublin, and in the size of all its parts greatly exceeded those produced by the shores of Devonshire. *F. Griffithsii* is the plant alluded to under *F. rotundus*, as being intermediate between that *Fucus* and *F. plicatus*, nor indeed could I for some time satisfy myself that it ought to be considered as in reality distinct. It, however, certainly differs from the former in its purple color and horny substance; from the latter, in its regularly dichotomous mode of growth and branches of equal height; and from both in its fructification, when destitute of which it is not to be denied that it may escape the notice even of an attentive and experienced observer. I am much

\* I am in doubt whether what I have here called seeds are so in reality, and whether they ought not rather to be considered the scattered joints of broken filaments; in which case I must acknowledge that I have at present met with no seeds in this species, unless I may be allowed to regard the filaments as such. However this may be, I feel no scruple in saying, that I consider the filaments as connected with the fructification, since they are found in the capsules of many *Fuci*, and nothing else is observable in those of *F. circulatus*, t. 40, or *F. Norvegicus*, t. 41. —The tubercles of *F. Griffithsii*, when dissected and examined under a microscope, resemble those of *F. Norvegicus* in being apparently composed of two strata of dissimilar substances; between which, however, I have not been able to detect any difference.

† Since the account of this *Fucus* was written, I learn from my friend, Mr. W. J. Hooker, to whom this work is so much indebted for the drawings from which the engravings are made, that it has also been found growing by the Rev. J. Jervis, near Exmouth.





*Fucus Griffithsii.*



THE HISTORY OF THE UNITED STATES

OF THE UNITED STATES OF AMERICA

FROM THE FIRST SETTLEMENTS TO THE PRESENT TIME

BY

JOHN F. JOHNSON

OF THE

UNIVERSITY OF CHICAGO

CHICAGO

1890

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much inclined to \*suspect that Baron Wulfen was deceived by it in this barren state, and that the figure of the plant which he has called *F. fastigiatus*, and which I have quoted †above under *F. rotundus*, was actually taken from a specimen of *F. Griffithsii*. It certainly agrees best with this species; but, if such a suspicion be admitted, it must be allowed that the noble author had confounded three distinct species; since Professor Mertens saw the true *F. fastigiatus* of Hudson under that name in his Herbarium, and Dr. Esper sent me some time ago *F. rotundus*, var.  $\gamma$ , which he had received from him under the same denomination.

- |  |   |   |   |    |
|--|---|---|---|----|
| a. <i>F. Griffithsii</i> , natural size. |   |   |   |    |
| b. upper part of the frond, magnified    | - | - | - | 6. |
| c. portion of the frond with a tubercle  | - | - | - | 4. |
| d. tubercle cut through horizontally     | - | - | - | 3. |
| e. filaments                             | - | - | - | 2. |
| f. ditto                                 | - | - | - | 1. |
| g. seeds?                                | - | - | - | 1. |

\* This suspicion does not indeed altogether rest upon the figure, for the description also agrees remarkably well, and I here subjoin a part of it, that my readers may be enabled to judge for themselves; but I must beg leave again to observe to them, that the mode of growth is almost in every respect the same in *F. Griffithsii* as in *F. rotundus*.—"Non solitarium modo, sed omnino cæspitose aggregatum vidi; cauliculus tamen quisque propria semper super placenta radicali coriacea, et orbiculari attolebatur ad unum et sesquialterum pollicem, fastigiatus. Is cartilagineo-coriaceæ naturæ, grossiorisque fili lineæ crassitudine, teres primum, tunc ex tereti compressiusculus, ad dimidium fere pollicem erectus (alias non nisi unam ad lineam) assurgit simplicissimus, statimque dichotomus, per sexcies, et octies iteratas deinceps dichotomias, flabelliformis ad instar frondis, distentus dividitur, subdividiturque ramosissimus, dichotomiis extimis ad eandem omnibus altitudinem exaltatis, fere fastigiatus: lacinulis dichotomiarum nonnihil compressis lineari-filiformibus. Color primum dilute tum olivaceo-virens; ex viridi dein pallidus, aut saturatius rubens, atro denique purpureus, et niger."

† p. 9.

### 38.—FUCUS GLANDULOSUS.

*Fucus*, fronde membranaceâ, planâ, enervi, lineari, ramosâ; ramis alternis, decurrentibus, summis bifidis, incurvis; seminibus ramorum in apicibus oblongo-lanceolatis.

*Fucus glandulosus*. *Herb. Banks. MSS.*

HABITAT in Oceano Anglicano. *Herb. Banks.*—Inter rejectamenta maris apud Budleigh et Torquay, in Devonâ, rarissimè. *D<sup>na</sup> Griffiths.*—In littore prope Gades. *D. Simon de Roxas Clemente.*

*Annua?* Septembri fructiferam legit *D<sup>na</sup> Griffiths.*

RADIX callus perpusillus.

FRONS duos tresve pollices longa, compressa, vix semilineam lata, et latitudine ubique æquali, nervi venarumque expers, \*fibras minutissimas radicales per totam longitudinem e margine emittens, et inde repens, ramosissima, ramis alternis, remotiusculis, obsitis aliis brevioribus simili ratione dispositis, hisque non rarò tertiâ serie instructis, omnibus patulis vel horizontalitèr patulis, ultimis perbrevis, apicibus bifidis acutis, plerumque lenitèr incurvis, quandòque autem reflexis.

FRUCTIFICATIO ramorum ad apices sita, qui tunc intumescunt, et capsulas lanceolatas vel oblongas referunt, seminaque aliquot subrotunda, e rubro fusca, serie interdum duplici, interdum absque ordine disposita, includunt.

COLOR coccineus, roseo immixtus, diaphanus; *exsiccatæ* coccineus.

SUBSTANTIA membranacea, debilis, tenerima.

OBS. *Exsiccata* chartæ vel vitro adhæret.—†Frons tota sub lente pulcherrimè et manifestè reticulata, maculis subrotundis, serie triplici ut plurimum dispositis, interstitiis reliquâ fronde dilutioribus.

Diu extitit in Herbario Banksiano pulchelli hujus *Fuci* exemplar, cui *F. glandulosi* nomen, caractere quoque specifico adjecto, indiderat cl. Solander; cùm tamen sit parvum, nec tantum a reliquis primâ facie distinctum ut perlustrantium oculis ad se traheret, sitque chartæ agglutinatum, unde structura interna perspicere nequeat, diu forsân indescritum Botanicorum notitiam effugisset, nisi in oris Britannicis iterùm detexerit *D<sup>na</sup> Griffiths*, et pro novâ specie agnovit. Hujus benevolentia exemplar hic depictum debeo, quod cum aliquot aliis legit post procellam vehementem

\* Hæ fibræ, earum in *F. bifidi varietate*  $\beta$  *Syn. Fuc.* observatarum similes, non modo stirpi ad sese sustentandam inserviunt, sed sæpe aliis ramorum partibus affiguntur, frondemque totam hic illic per anastomosin conjungunt.

† "Medius quasi inter *Fucos* et *Confervas*, internè enim glandulis subpellucidis repletur, sed triplici serie plerumque dispositis." *MSS. Herb. Banks.*



vehementem mense Septembri, MDCCCIII, in littore ejectum, nec nisi semel ab eo inde tempore reperit. Mandavit mihi per literas unum ex individuis *Fuco rubenti* esse innatum, eique perrepsisse, ut *Ericæ vulgari Cuscuta Epithymum*; frondes quoque implicitas sibimet ipsis, in plurimis locis, per fibras jam suprâ memoratas adhæsisse; plantamque, dum recens in arenâ jaceret, *Confervæ rubræ* fasciculum primo aspectu retulisse. Specimina, quæ ex Hispaniâ accepi, erant Britannicis longè minora, nec unum pollicem longitudine superabant. Affinitatem maximam habet *F. glandulosus* cum *F. coronopifolio* juniore, et cum eâ stirpe, quam pro *F. alati* var.  $\gamma$  in *Fucorum Britannicorum Synopsi* descripsi, quæ verò fortè est distincta species. Ab utroque horum differt substantiâ membranaceâ, fructificatione, et structurâ interiore, quæ nota est maximi ad discriminandum ponderis. Distinguitur etiam, vel in primâ ætate et sterilis, a *F. coronopifolio*, quodd ramos omnes lineares patulosque habeat, nec sint primarij reliquis longè crassiores, nec seriores in illis horizontalitèr disponantur.

a. <i>F. glandulosus</i> , magn. nat.			
b. <i>frondis pars superior</i> , magn. auct.	-	-	5.
c. <i>ejusdem pars cum seminibus</i>	-	-	2.
d. <i>semina</i>	-	-	1.

### 38.—FUCUS GLANDULOSUS.

*Fucus glandulosus*, frond membranaceous, flat, nerveless, linear, branched; branches alternate, decurrent, the ultimate ones bifid, and incurved; seeds immersed in the oblongo-lanceolate apices of the branches.

*Fucus glandulosus*. *Herb. Banks. MSS.*

In the English Ocean. *Herb. Banks.*—Among the rejectamenta of the sea at Budleigh and Torquay. *Mrs. Griffiths.*—On the shore near Cadiz. *Don Simon de Roxas Clemente.*

*Annual?* In September *Mrs. Griffiths* gathered it in fruit.

**ROOT**, a very small callous disk.

**FROND**, two or three inches long, compressed, scarcely half a line wide, and every where linear, destitute of midrib or veins, putting forth throughout its whole length extremely minute \*root-like fibres from its margin, and consequently creeping, much branched; branches alternate, rather remote, beset with shorter ones disposed in the same manner, and these not unfrequently with a third series, all of them patent, or between horizontal and patent, the extreme ones very short, the apices bifid, acute, and generally slightly incurved, but occasionally reflexed.

**FRUCTIFICATION**, placed at the ends of the branches, which then swell, and resemble lanceolate or oblong capsules, containing a few reddish brown, roundish seeds, arranged sometimes in a two-fold series, but more commonly without any order.

**COLOR**, bright-red, strongly mixed with pink, semitransparent; when dry, bright red.

**SUBSTANCE**, membranaceous, flaccid, extremely tender.

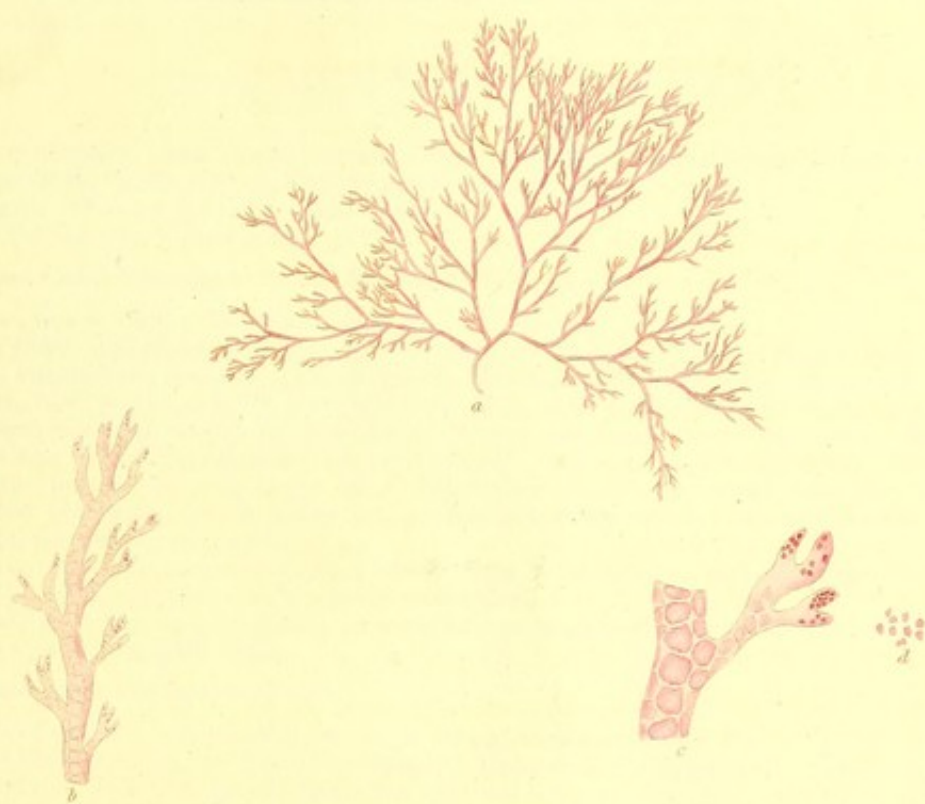
**OBS.** It adheres, when dry, either to paper or glass.—†The whole frond under the microscope is most beautifully and evidently reticulated, with roundish meshes generally arranged in a triple row, the interstices being considerably paler than the rest of the plant.

There has long been in the Banksian Herbarium a specimen of this pretty *Fucus*, to which the name of *F. glandulosus* was originally given by the late celebrated Dr. Solander, who had also prepared for it a specific character; but, as the specimen was small, and not so strikingly different from other species as to attract notice, and was also fastened on paper, whence it was impossible to observe the singularity of its internal structure, it would in all probability long have continued to escape the observation of botanists, had not *Mrs. Griffiths* fortunately discovered it again upon the shores of Britain, and known it to differ from all that were previously described. I am indebted to her kindness for the specimen here figured, which was gathered by herself at Budleigh, where she first found it among other rejectamenta of the sea in very small quantity, after a violent storm in September 1803, subsequently to which time she has only once observed it, and then also sparingly. She informs me, that one of the plants was growing upon *F. rubens*, over which it crept in the same manner as *Cuscuta Epithymum* does over the common heath, and that the entangled frond adhered so strongly together in different places, by means of the fibres already mentioned in the description, that it was impossible to separate it without laceration. She says also, that, when fresh on the beach, it looked at first sight like a small mass of *Conferva rubra*. The specimens sent me from Spain were of less size than those found

\* These fibres, similar to those observed in the variety  $\beta$  of *F. bifidus*, not only help the plant to support itself, but also frequently adhere to other parts of the branches, and cause the frond to anastomose in various places.

† The observation upon its magnified appearance in the Banksian Herbarium is, "that the plant is intermediate between the *Fuci* and *Confervæ*, and is internally filled with subdiaphanous glands, generally disposed in a triple series."





*Fucus glandulosus.*







found in England, and did not exceed an inch in length. The plants, to which *F. glandulosus* is most nearly allied, are *F. coronopifolius*, in an early stage of its growth, and the *Fucus* which is described in the *Synopsis of the British Fuci* as *F. alatus*, var.  $\gamma$ , but which ought probably to be regarded as a distinct species. From both these, it is distinguished by its thin membranous substance, its fructification, and its internal structure, which latter is the strongest character of the species. It may also be known from *F. coronopifolius*, even when that plant is in its youngest state and destitute of any fruit, by the circumstance of its having all its branches linear or patent, instead of the primary ones being much thicker than the rest, and the ramuli often arranged in a horizontal direction along them.

a. <i>F. glandulosus</i> , natural size.				
b. upper part of the frond, magnified	-	-	-	5.
c. part of ditto, with fruit	-	-	-	2.
d. seeds	-	-	-	1.

## 39.—FUCUS PRISTOIDES.

*Fucus* fronde cartilagineâ, planâ, obsolete costatâ, lineari, denticulatâ, apice in folium oblongo-cuneiforme dilatâ, e margine proliferâ, foliis subrotundis, crispis, tuberculiferis.

*Fucus serrulatus*. WEBER et MOHR, *Musei Index*.

*F. nitidus*. *Beiträge zur Naturkunde*. I. p. 276.

HABITAT apud Caput Bonæ Spei. D. Robertson, in *Herb. Banks*.

RADIX fibrosa, repens, fibris coloris dilute carnei, incurvis, ramosis.

FRONDES ex eadem basi plurimæ, bi- tri-pollicares, planæ, aveniæ, caule instructæ lineari, latitudine unius circiter lineæ, per totam longitudinem denticulato, dentibus tamen interdum vetustate obsoletis, indiviso, sed obsito, præsertim in parte superiore, ramis sparsis, distichis, e margine exeuntibus, nunc confertis, nunc remotis, horizontalibus, longitudinis incertissimæ, ortu elongato-cuneiformibus simplicibusque, mox, progrediente ætate, basi caulem referentibus, et ramorum minorum simili ratione dispositorum serie instructis: rami omnes apice dilatantur in folium, ut ita dicam, oblongo-cuneiforme unguiculare, caule duplò latius, \*nervo lato obsoleto percursum, e margine crenato-denticulato lenitèrque undulato proliferum, foliis fasciculatis, perbrevis, rotundato-cuneiformibus, crispis, dentatis, basi insignitèr attenuatis, non rarò iterum proliferis.

FRUCTIFICATIO tubercula perquam exigua in foliis posita, hemisphærica, rubra, intus seminum minutissimorum, oblongorum, vel enormitèr pyriformium congeriem includentia.

COLOR obscure ruber purpureo immixtus; exsiccata atro-purpurascens; soli expositæ citò albescens.

SUBSTANTIA cartilaginea, lenta, tenax.

OBS. Exsiccata chartæ nequaquam adhæret.

Quadraginta licet anni jam propemodum sint elapsi ex quo exemplaria hujus Fuci in Herbario Banksiano servata detexit ad Caput Bonæ Spei, in sinu *False Bay* dicto, D. Robertson, et licet post id tempus eundem ibi legerint Thunbergius et alii, nulla tamen, quoad scio, extat ejus vel icon, vel descriptio, vel etiam character specificus; solique illum inter auctores memoraverunt Weberus Mohriusque, qui obitèr modò, et tantum ut nomen imponerent, perstrinxerunt. Cum verò hoc nomen neutiquam sit inter botanicos receptum, et nihil plantæ proprium exprimat, non dubitavi mutare, et in ejus locum substituere aliud, quod tyroni ad speciem discriminandam adjuvare potest, depromptum a similitudine, quæ, magnitudine demptâ, interest inter formam frondis illamque rostri piscis, quem *Squalum Pristin* Linnæus, *Pristin* antiqui, et nuper †Lathamius, nominaverunt. *F. pristoides* est species pulchella, licet crescendi modus sit inelegans; adeoque vel primo aspectu differt ab aliis, ut vix ulla sit quâcum affinis videatur. Quoad texturam suam proliferamque crescendi rationem quodammodò cum *F. rubente* convenit; eademque est utrique costa lata tam obsoleta ut dubitationi detur locus an *Fucus fronde alata* an *iis fronde planâ nervi* præditis rectius associarentur; longè tamen in reliquis recedunt, et recedit *F. pristoides* ab omnibus aliis hucusque notis *Fucorum* speciebus.

a. <i>F. pristoides</i> , magn. nat.				
b. ramus, magn. auct.	-	-	-	6.
c. foliolum cum tuberculis	-	-	-	4.
d. tuberculum longitudinalitèr dissectum	-	-	-	2.
e. semina	-	-	-	1.

\* Hic licet nervus semper adsit frondi hujus Fuci æquè ac illi *F. rubentis*, pauci eum auctores memoraverunt, quia dum prorsus jacent plantæ, vel madidæ vel siccæ, vix est conspicendus, idèque necessariè ex icone excluditur. Optimè de illo dicunt Goodenovius Woodwardusque, "The nerve we have spoken of as visible in the branches is discovered by holding the plant before a very strong light. Indeed this is the best mode of examining *Fucus* in general: the fructification, and original color of any plant, be it to outward appearance, from drying, what it will, are most surely detected by this method. When a plant has been once bleached by its exposure to wind and weather, no art can restore its color or discover it."—*Act. Soc. Linn.* III. p. 166.

† Ad avissimam pyriformiam, secundum Weberum et Mohrium.—*Beiträge zur Naturkunde*. I. p. 276.

‡ *Act. Soc. Linn.* II. p. 273.



*Fucus pristoides*, frond cartilaginous, flat, obsoletely ribbed, linear, toothed, its apex extended into an oblongo cuneiform leaf; its margin proliferous with small roundish, curled, leaves, producing tubercles.

*Fucus serrulatus*. WEBER and MOHR, Index.

*F. nitidus*. Beiträge zur Naturkunde, I. p. 276.

At the Cape of Good Hope. Mr. Robertson in the Banksian Herbarium.

ROOT, fibrous, creeping, composed of pale flesh-colored, incurved, branching fibres.

FRONDS, numerous from the same base, two or three inches long, flat, veinless, furnished with a linear stem about one line wide, fringed throughout its whole length with minute teeth, which, however, are sometimes obsolete by age, undivided, but beset, especially towards the upper part, with scattered distichous branches, originating from the margin, in some cases clustered, in others remote, horizontal, of extremely uncertain lengths, of an elongated cuneiform shape at first, and simple, afterwards, as they grow older, similar to the stem at their base, and furnished with a series of smaller ones disposed in the same manner: all the branches are at their apices expanded into a leaf, if it may be so called, between oblong and cuneiform, half an inch long, twice as wide as the stem, furnished with a broad obsolete midrib,\* the margin between crenate and toothed, slightly undulated, and proliferous with very short, clustered, curled leaves, of a roundish shape, approaching to cuneiform, remarkably attenuated at their bases, and not unfrequently again proliferous.

FRUCTIFICATION, minute, hemispherical tubercles placed upon the small leaves, of a red color, containing a mass of extremely small seeds, either oblong, or between †oblong and pyriform, but not of a regular figure.

COLOR, a dark dull red tinged with purple; turning when dry to blackish purple; and when exposed to the sun soon becoming white.

SUBSTANCE, cartilaginous, flexible, tough.

OBS. It does not in the least adhere to paper when dry.

It is now nearly forty years since the specimens of this *Fucus*, preserved in the Banksian Herbarium, were collected in False Bay, at the Cape of Good Hope, by Mr. Robertson; subsequently to which time, the plant has been gathered in the same place by Thunberg and other botanists; yet, notwithstanding this, I am not aware that any figure, or description, or even specific character of it has ever been published; nor do I find it mentioned by any author, excepting Weber and Mohr, who have noticed it in the most cursory manner, merely for the sake of giving it a name by which it might afterwards be known. With regard, however, to this name, as it is not at present adopted among botanists, I have felt no hesitation in changing it; and have done so the more readily as it expresses no peculiarity of the plant, whereas the one here proposed may be serviceable in the discrimination of the species, being taken from the resemblance which the outline of the upper part of the frond bears in miniature to the beak of the fish called by Linnaeus the *Squalus Pristis*, but by the more ancient writers only the *Pristis*. The habit of *F. pristoides* is indeed far from elegant, but it is nevertheless a pretty species, and even at first sight so unlike the others, that it would be difficult to say which it most approaches. If considered as to its texture and proliferous mode of growth, it agrees in some degree with *F. rubens*, and also agrees with it in the wide and obsolete midrib, which makes it doubtful whether these species should be arranged among the division of *Fuci* whose fronds are winged, or that of those which have a flat and nerveless frond: in most other points, however, the two plants differ, and *F. pristoides* differs also no less widely from the whole of this extensive family.

a. <i>F. pristoides</i> , natural size.					
b. branch, magnified	-	-	-	-	6.
c. small leaf, with tubercles	-	-	-	-	4.
d. tubercle cut through longitudinally	-	-	-	-	2.
e. seeds	-	-	-	-	1.

\* Although this midrib always really exists in the frond of this *Fucus*, as well as in that of *F. rubens*, it has even in the latter species escaped the notice of most writers, because it is scarcely to be discovered, when the plant is lying flat, either in a wet or dry state, and consequently is omitted in representations of the species. Dr. Goodenough and Mr. Woodward have remarked upon this subject very happily; "the nerve we have spoken of as visible in the branches is discovered by holding the plant before a very strong light. Indeed this is the best mode of examining the *Fuci* in general: the fructification, and original color of any plant, be it to outward appearance from drying what it will, are most surely detected by this method. When a plant has been once bleached by its exposure to wind and weather, no art can restore its color or discover it."—Act. Soc. Linn. III. p. 166.

† Exactly pyriform according to Weber and Mohr.—Beiträge zur Naturkunde, I. p. 276.





*Fucus pristoides.*



# THE HISTORY OF THE

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*Fucus* fronde cartilagineâ enervi, dichotomâ; ramis linearibus, acutiusculis, margine incrassatis crenulatisque; tuberculis hemisphaericis disco insidentibus.

*Fucus crenulatus*. TURNER, in *Linn. Trans.* VI. p. 130. t. 8.

*F. Norvegicus*. ESPER,  *Ic. Fuc.* II. p. 89. t. 153. f. 2.

HABITAT prope Durium flumen in Lusitaniæ littoribus.

Perennis? Augusto, Septembri.

RADIX callus expansus, fibrarum aliquot crassiuscularum rudimentis plerumque instructus.

FRONDES ex eadem basi plurimæ, longitudine bi- tri-pollicares, quâ radici proximæ teretes, pennâque passerinâ tenuiores, sese dilatantes priusquam lineæ unius alteræve altitudinem attigerunt, et, primùm compressæ, ferè statim planæ, inde latitudinem circiter bilinearem ubique æqualem ad apices usque servantes, nervi venarumque expertes, divisæ dichotomiis juxta basin incipientibus, mox sexies septiesve repetitis, intervallo inter singulas nunc brevissimo, nunc longiusculo; dichotomiarum anguli acuti; apices bifidi, segmentis oblongo-lanceolatis, acutis, erecto-patulis; margines hic illic, præsertim apices versus, lenitèr incrassati, et minutissimè, sed perquam manifestè, crenati.

FRUCTIFICATIO \*tubercula hemisphærica, *Brassica Rapa* seminum ferè magnitudine, utriusque frondis paginæ, præcipuè in segmentis superioribus, satis copiosè insidentia, albida, exsiccata autem nigricantia, eadem quâ frons epidermide nequaquam tecta, intus e fibris tenuissimis, parallelis, densissimè compactis constantia.

COLOR saturatè sanguineus, fusco immixtus; *marcescentis* aut *Soli objectæ* in sordidè flavescens transiens.

SUBSTANTIA coriaceo-cartilaginea, lenta, tenax.

OBS. Exsiccata chartæ nulla frondis pars, tuberculis exceptis, adhæret.

Ex eo inde tempore quo hunc *Fucum* in *Societatis Linnæanæ Actis* primùm memoravi nulla ejus exemplaria accepi, unde nihil est quod sese descriptioni ibidem datæ nunc adjiciendum præstat, nisi quòd, propter causas sub specie insequente notandas, has stirpes hic secernere sit visum. Non me equidem id fugit tubercula utriusque fructifera haud esse iisdem omninò verbis expressa: lectores autem monitos velim me persuasum habere hasce differentias verbis modò, non re ipsâ, existere, et inde pendere, quòd fuerint in diversis ætatis stadiis observata, atque ea *F. crenulati* esse principio frondi concolora, atque etiam ejus epidermide tecta, per quam maturescentia perrumpunt, et adulta speciem suprâ memoratam præ se ferunt. In hoc statu referunt *F. rotundi* fructum, cùm colore, tùm substantiâ spongiosâ et glutinosâ, sed insignitèr ab hoc discrepant seminibus nullis intus instructa. Quoad formam externam multum habet *F. crenulatus* affinitatis cum *F. crispo* et *F. rubente*, et est quasi medius inter hasce duas species naturâ parum connexas: texturâ et substantiâ cum illâ, habitu cum hac convenit, sed ab ambabus primo aspectu dignoscitur, non modò ramis ubique linearibus, apicibusque, earum *F. bifidi* quodammodò instar, bifurcis, verùm etiam colore utriusque dissimili, et margine incrassato minutissimè crenulato, notâ plantæ præ cæteris propriâ. Tubercula quoque ab iis *F. crispis*, quantumvis mutabilis, semper in eo discrepant, quòd sint nequaquam in ipsâ plantæ substantiâ immersæ, sed superficiei semper insideant, unde frondem decadentibus illæsam manere versimillimum videtur.

a. <i>F. crenulatus</i> , magn. nat.					
b. frondis apex, cum tuberculis. magn. auct.	-	-	-	-	6.
c. tuberculum seorsum	-	-	-	-	4.
d. idem longitudinalitèr dissectum	-	-	-	-	2.
e. filamenta	-	-	-	-	1.

\* In *Societatis Linnæanæ Actis* hæc tubercula, microscopio haud satis acri adhibito, seminibus repleta dixeram; attentius autem nunc inspicies nihil in iis nisi filamenta reperio, et hæc filamenta nequaquam sunt ita manifestè articulata ut illa in cæteris observanda, quod tamen forsan e tuberculorum nimis provectorum ætate pendet.



*Fucus crenulatus*, frond cartilaginous, nerveless, dichotomous; branches linear, rather sharp, thickened and crenulated at their margin; tubercles hemispherical, sessile on the disk.

*Fucus crenulatus*. TURNER, in Linn. Trans. VI. p. 130. t. 8.

*F. Norvegicus*. ESPER, Ic. Fuc. II. p. 89. t. 153. f. 2.

On the coast of Portugal near the river Douro.

Perennial? August, September.

ROOT, an expanded callous disk, generally furnished with the rudiments of a few thickish fibres.

FRONDS, numerous from the same base, two or three inches long, cylindrical in the part nearest the root, and not so thick as a sparrow's quill, but becoming compressed before they are more than a line or two high, and then almost immediately flat, after which they preserve throughout their whole length an equal width of about two lines; they are altogether destitute either of midrib or veins, and are branched with dichotomies that begin near the base, and are afterwards six or seven times divided, the interval between each being in some cases extremely short, in others rather long: the angles of the dichotomies are acute: the apices bifid, their segments oblongo-lanceolate, sharpened, between erect and patent: the margin here and there, especially towards the apices, is slightly thickened, and very minutely, but at the same time very evidently, crenate.

FRUCTIFICATION, hemispherical \*tubercles, almost as large as turnip seed, situated plentifully on both sides of the frond, particularly in the upper branches, whitish, but black when dry, by no means covered with the epidermis of the frond, consisting internally of extremely thin, parallel fibres, very closely matted together.

COLOR, a deep dull blood-red, tinged with brown; turning, when in decay or exposed to the sun, to a dirty yellowish hue.

SUBSTANCE, between coriaceous and cartilaginous, pliant, tough.

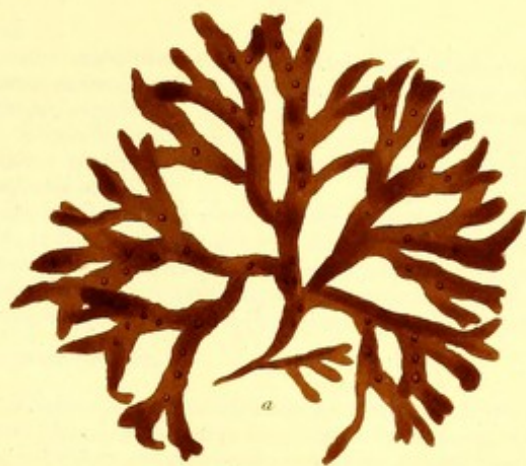
Obs. When dried no part of the frond adheres to paper, excepting the tubercles.

Having received no specimens of this *Fucus* since the time when I first described it in the Linnæan Transactions, I am unable to add any thing to the account there given, except that, for the reasons mentioned under the following plant, it has appeared best to separate it as a distinct species. With respect to the difference observable in speaking of the fructification of the two, I think it right to mention, that I am convinced it arises only from their having been noticed in different periods of their growth; and that the tubercles of *F. crenulatus* are at first of the same color as the frond, and even covered with its epidermis, through which they burst as they ripen, and then take the appearance mentioned in the description, resembling in their color, and in their spongy and glutinous nature, those of *F. rotundus*, from which they differ so strikingly in the want of seeds within them. *F. crenulatus* in its external appearance is allied to *F. crispus* and *rubens*, thus connecting two species that have very little in common: in texture and substance it agrees with the former, in general habit with the latter; but may easily be distinguished from either at first sight, not only by the branches always preserving their linear form, and being divided at the extremities in a manner somewhat resembling those of *F. bifidus*, but by its color, which is different from that of either of them, and by the strong peculiarity of its thickened and minutely crenated edges. The tubercles, too, unlike those of any variety of *F. crispus*, are not immersed in the substance of the plant, but sessile upon its surface, so that in all probability their falling off is not attended with any injury to the frond.

- |   |    |
|---|----|
| a. <i>F. crenulatus</i> , natural size                |    |
| b. upper part of the frond, with tubercles, magnified | 6. |
| c. tubercle separate                                  | 4. |
| d. ditto cut through longitudinally                   | 2. |
| e. filaments  | 1. |

\* In describing this plant for the Linnæan Transactions, I had, from not employing sufficiently high microscopical powers, been led to regard the tubercles as filled with seeds; but now, upon a more careful examination, I find nothing in them except filaments, and even these are by no means so evidently jointed as those observable in other species. This circumstance, however, may probably depend upon the too advanced state of the tubercles.





*Fucus crenulatus.*



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*Fucus*, fronde cartilagineâ, enervi, dichotomâ; ramis linearibus, integerrimis, apice rotundatis; tuberculis hemisphaericis, disco insidentibus.

*Fucus Norvegicus*. *Fl. Norv.* II. p. 122. t. 3. f. 4. *Syn. Fuc.* II. p. 222. *Eng. Bot.* XV. t. 1080.

ESPER,  *Ic. Fuc.* II. p. 89. t. 153. f. 1. 3. 4.

*F. crenulatus*.  $\beta$ . TURNER, in *Linn. Trans.* VI. p. 130.

*F. polymorphi* var. LAMOUROUX, *Diss. Fuc.* t. 8. f. 19?

HABITAT in Oceano Norvegico. Gunner.—Apud Dubrem. D. Dillwyn.—Copiosè nascentem prope Exmouth detexit D. T. Frankland, Baronet.—Apud Torquay, et Sidmouth, et in Cornubiæ oris. D<sup>na</sup> Griffiths.—E Mari Mediterraneo accepit D. Prof. Mertens.

Perennis? Septemb.—Mart.

RADIX callus tenuis, expansus.

FRONDES ex eâdem basi plurimæ, nervi venarumque expertes, tri-quadri-pollicares, quâ radici proximæ teretes, pennâque passerinâ tenuiores, intra duarum triumve linearum a basi spatium compressæ, moxque planæ, et inde latitudinem circiter bilinearem ubique æqualem ad apices usque servantes: frons juxta basin bifurca, et postea dichotomiis sexies repetitis, intervallo inter singulas nunc brevissimo nunc longiusculo, divisa; rami patentes; apices bifidi, segmentis horizontaliter patulis rotundatis; margines semper integerrimi, nec ullo modo incrassati:—frons plerumque contorta et subspiralis evadit.

FRUCTIFICATIO tubercula hemisphærica, papaveris seminis magnitudine, utrique frondis paginæ, præsertim in segmentis superioribus, insidentia, et sæpe tria vel quatuor in singulis, ejusdem quo frons coloris.

COLOR intensè sanguineus fusco aliquantùm tinctus, in surculis junioribus, et quandoque ad apices, pulchrè roseus et diaphanus; exsiccata intensior; soli exposita aut in aquâ dulci retenta in sordidè flavescentem transiens.

SUBSTANTIA cartilaginea, lenta, tenax, vetustioris ad coriaceam, junioris ad membranaceam accedens.

Obs. Exsiccata chartæ nequaquam adhæret.

Tot licet tantisque formæ mutationibus *F. crispus* sit obnoxius ut optimè de illo prædicaverint Goodenovius Woodwardiusque "quidquid tangere esse idem," datur tamen huic regulæ exceptio quoad *F. Norvegicum*, qui multum cum illo congruit substantiâ et habitu, sed colore et fructu tantum recedit ut cautè observantibus se primo aspectu dignoscendum reddat. Neque tamen eo secius temperare mihi possum quin suspicer Lamourouxium, qui ad *F. crispum* sub *F. polymorphi* nomine illustrandum quadraginta iconas impendit, utrumque aliquo modo commiscuisse, quoniam figura ejus supra citata *F. Norvegicum* formâ optimè repræsentat. Dubitantèr tamen citatur, cum nihil de illâ in descriptione dixerit, nec vel pro varietate insigni habuisse videatur. Spero me rectè fecisse discernendo speciem hic depictam a præcedente, quâcum primùm conjunxeram: in plurimis quidem, iisque maximi momenti, notis arctissimè conveniunt, sed differunt substantiâ in *F. Norvegico* tenuiore, frondis margine integerrimo, nequaquam incrassato crenulato, dichotomiis magis divaricatis, et apicibus rotundatis obtusis, quæ notæ in omnibus a me hactenus visis exemplaribus stabiles permanserunt. Esperî verò icon mala inter utrumque ambigit, et, quamvis ipsi insequens figuram secundam ad *F. crenulatum* reliquis ad *F. Norvegicum* retulerim, neutiquam illis fidendum existimo. Gunnerus primus hanc stirpem in *Florâ suâ Norvegicâ* descripsit, adjecit iconem, quæ, quantumvis haud optima, plantæ characterem satis exprimit. In descriptione profitetur se dubitare an sit a *F. divaricato* distincta, sed quid sub \**F. divaricati* nomine vellet haud nobis liquet: quærit quoque vir cautissimus suique diffidentissimus annon sit *Fucus* quidam jam notus ætate juniore, quod tamen tubercula, vix unquam in ullâ nisi maturâ conspicienda, vetant.

a. <i>F. Norvegicus</i> , magn. nat.					
b. frondis pars superior, magn. auct.	-	-	-	-	6.
c. tuberculum longitudinaliter dissectum	-	-	-	-	3.
d. filamenta	-	-	-	-	2.
e. eadem	-	-	-	-	1.

\* Unus modò, quod scio, *Fucus* sub *F. divaricati* nomine hactenus descriptus extat, qui tantummodò *F. vesiculosi* varietas, cui eum titulus indiderat Linnæus: cum hoc autem nihil ferè habet *F. Norvegicus* commune.



*Fucus Norvegicus*, frond cartilaginous, nerveless, dichotomous; branches linear, entire, rounded at their apices; tubercles hemispherical, sessile on the disk.

*Fucus Norvegicus*. *Fl. Norv.* II. p. 122. t. 3. f. 4. *Syn. Fuc.* II. p. 222. *Eng. Bot.* XV. t. 1080. *ESPER*,  *Ic. Fuc.* II. p. 89. t. 153. f. 1. 3. 4.

*F. crenulatus*.  $\beta$ . *TURNER*, in *Linn. Trans.* VI. p. 130.

*F. polymorphi* var. *LAMOUROUX*, *Diss. Fuc.* t. 8. f. 19.?

In the sea near Norway. *Gunner*.—At Dover. *Mr. Dillwyn*.—At Exmouth, where it grows in plenty. *Sir T. Frankland*.—Torquay, and Sidmouth, and on the Cornish shores. *Mrs. Griffiths*.—Sent from the Mediterranean to *Professor Mertens*.

*Perennial?* September—March.

**ROOT**, a thin, expanded, callous disk.

**FRONDS**, numerous from the same base, destitute of midrib or veins, three or four inches long, cylindrical, and thinner than a sparrow's quill in the part nearest the root, but becoming compressed within the distance of two or three lines from the base, and then almost immediately flat, after which they preserve to the apices an everywhere equal breadth of about two lines, they are forked near their origin, and afterwards six or seven times dichotomous, the space between each division being in some instances extremely small, in others rather long: the branches are patent: the apices bifid, with segments between horizontal and patent, rounded at their extremities; the margins always quite entire, and in no degree thickened:—the habit of the frond is in general twisted and approaching to spiral.

**FRUCTIFICATION**, hemispherical tubercles, about the size of poppy-seed, sessile upon both sides of the frond, especially in the upper segments, and often three or four on each, of the same color as the frond.

**COLOR**, deep blood-red, somewhat tinged with brown, a beautiful transparent pink in the younger shoots, and sometimes at the apices; darker when dry; and soon turning to a dirty yellowish hue, if exposed to the sun, or kept in fresh water.

**SUBSTANCE**, cartilaginous, pliant, tough, approaching to coriaceous in the older, and to membranaceous in the younger plants.

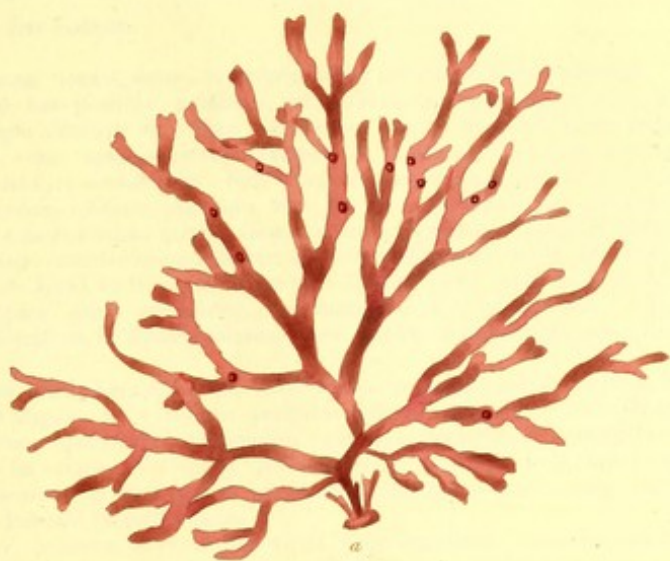
**OBS.** When dried it does not adhere in the least to paper.

With whatever propriety the observation was made by Dr. Goodenough and Mr. Woodward, that *F. crispus* was liable to so many and to such extraordinary variations in its appearance, "that every thing that approached it was the same," it must nevertheless be allowed, that an exception is to be granted with respect to this rule in favour of *F. Norvegicus*; the substance and general habit of which strongly agree with those of that species, but the color and fructification are so strikingly different, that a careful observer can have no difficulty in distinguishing them at first sight. I am nevertheless inclined to suspect that they have been in some degree confounded by Lamouroux, who, in the illustration of *F. crispus*, under the name of *F. polymorphus*, has employed no less than forty figures, of which the one quoted above is an excellent representation of *F. Norvegicus*; though, as he has said nothing in his description relative to it, nor even pointed it out as a remarkable variety, I have not ventured upon referring to it without a sign of doubt. I trust that I have done right in separating the present plant from that which is the subject of the preceding plate, with which it had originally been united. They agree indeed in most points, and those of the greatest importance, but differ in the substance of *F. Norvegicus* being more thin, in the margin of its frond being quite entire, and neither thicker than the rest, nor crenulated, in the angles of the dichotomies being more obtuse, and in the apices being blunt and rounded; the whole of which characters have held good in all the specimens that have at present fallen under my observation. *Esper's* figure, however, which is in itself far from excellent, seems to represent plants of an intermediate appearance; and though, in conformity to his own directions, I have referred his N° 2. to *F. crenulatus*, and the rest to *F. Norvegicus*, I should still be sorry to see too much confidence reposed upon them. The first account of *F. Norvegicus* is that by Bishop *Gunner* in the *Flora Norvegica*, where a figure is also given, which, though by no means the best possible, is at the same time not deficient in character. The learned author acknowledges in his description that he is in doubt whether it be distinct from \**F. divaricatus*, a question which we can now have no means of solving, as it is impossible to know what he meant to allude to under that name: and he also inquires with extreme caution and diffidence whether it may not possibly be some well known species in an early stage of its growth: this conjecture, however, the tubercles, the most certain proof of its maturity, forbid us to entertain.

- |   |   |   |    |
|---|---|---|----|
| a. <i>F. Norvegicus</i> , natural size. |   |   |    |
| b. upper part of the frond, magnified   | - | - | 6. |
| c. tubercle cut through longitudinally  | - | - | 3. |
| d. filaments                            | - | - | 2. |
| e. ditto.                               | - | - | 1. |

\* I do not know that more than one *Fucus* has ever been described under the name of *F. divaricatus*, which is merely a trifling variety of *F. vesiculosus*, which was so called by *Linnaeus*, but with this *F. Norvegicus* scarcely agrees in a single point.





*Fucus Norvegicus.*







*Fucus*, fronde sub-membraceâ, obsolete costatâ, e superficie catenato-prolifera; ramis ellipticis, simplicibus bifurcisque; foliis subrotundis peltatis, tuberculisque hemisphaericis extrinsecus rugosis disco insidentibus.

*Fucus rubens*. LINN. *Sp. Pl.* II. p. 1630. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. Linn. *Trans.* III. p. 165. *Syn. Fuc.* II. p. 216. (excl. *Syn. Morisoni et Ginanni.*) *Eng. Bot.* XV. t. 1053. ESPER,  *Ic. Fuc.* II. p. 39. t. 129. *Fl. Lus.* II. p. 437.

*F. crispus*. *Fl. Ang.* p. 580. (excl. *syn. Linn.*)

*F. prolifer*. *Fl. Scot.* II. p. 949. t. 30. WITH. IV. p. 105. *Fl. Fr. Ed. 2da.* II. p. 29.

*F. laciniatus*. GMELIN, *Hist. Fuc.* p. 182. t. 22. f. 2. (excl. *syn. Huds.*) icon pessima.

*F. epiphyllus*. *Fl. Dan.* t. 708.

\* *F. miniatus*. *Fl. Dan.* t. 769.

*F. membranaceus purpureus variè ramosus*. RAI *Syn.* p. 47. n. 36.

HABITAT in Britanniarum oris, satis frequens.—In Oceano Galliam septentrionalem alluente. Decandolle.—In sinibus Norvegiæ. Oeder. Ad ostia Tagi et Durii. Brotero.

Perennis. Hyeme fert fructum.

RADIX callus expansus, tenuis, durus, ut propemodum corneus videatur, albicans.

FRONDES ex eadem basi plurimæ, palmares, vel spithamæ, stipite instructæ tereti, lineam unam alteramve longo, sursum compresso, seque dilatante in folium longitudine circiter sesquipollicem latitudine tres lineas æquans, nunc ellipticum et simplex, nunc apicem versus dilatatum et bifurcum, furcarum angulis acutis obtusisque, segmentis sæpius rotundatis, quandoque acutiusculis: folii ad apices, nunquam tamen ex ipso margine, sed semper e superficie, oriuntur folia alia, interdum solitaria, interdum bina vel terna, primariorum omnimodè similia, et ipsa aliis simili ratione prolifera, quæ seriem tertiam quoque ferunt, et ita ad quintam vel sextam planta, progrediente ætate, pervenit: foliorum horum longitudo incertissima a bilineari ad sesquipollicarem variat, nec sunt superiores semper brevissimi: aliquando etiam, sed hoc haud ita frequens, e mediâ foliorum parte nova folia germinant; ortu cuncta sunt subrotunda; omnium margines plani, integerrimi; medium percurrit costa lata, reliquâ fronde crassior, colorisque intensioris, maximè manifesta in foliis primariis, inde sensim magis magisque obsoleta, et in summis vix aut ne vix detegenda.

FRUCTIFICATIO tubercula hemisphærica, dilutè rosea, papaveris semine minora, utrique frondis paginæ copiosè insidentia, extrinsecus rugosa, ut e foliis perquam exiguis implexis contortuplicatisque constare videantur, intus seminum minutissimorum abnormitèr oblongorum congeriem includentia: præter hoc occurrunt quoque abundanter in frondis superficie folia exigua, subrotunda, peltata, frondi appressa, in quibus haud rarò, ut etiam aliquando in reliquâ fronde, conspiciuntur granula sparsa atro-rubentia:—anne autem vel folia peltata vel granula aliquid cum fructu commune habeant prorsus nescio.

COLOR dilutè ruber, interdum in foliis junioribus roseo immixtus; exsiccata multo intensior et sanguineus; marcescentis pallidè fusco-flavescens.

SUBSTANTIA tenuis, attamen tenax, media quasi inter membranaceam et cartilagineam.

Obs. Ex aquâ extracta nitet dum madet quasi vernice obducta:—exsiccata chartæ nequaquam adhæret:—habitus saepe crispatus:—vix ulla datur Fuci species cui copiâ majore inhaerent, non modo *Flustra pilosa* aliæque minores Zoophytorum species, sed etiam quidam e Fucis et Confervis; sæpe quoque *Serpula spirorbis*.

E descriptione hujus Fuci suprâ datâ liquet eum duplici gaudere formâ, foliis in unâ ellipticis simplicibusque, in alterâ sursus versus dilatatis et bifurcis. Harum utraque paritèr vulgaris, et plerumque ambarum exempla in eadem fronde occurrunt. Reperiuntur tamen quandòque specimina, quorum folia certæ sunt ubique figuræ: et interdum, sed rarò, et nunquam nisi in immaturo ætatis stadio, vidi quæ non erant prolifera. † Neutiquam autem, me judice, ex injuriâ aliquâ pendet hæc prolifera crescendi ratio, ejus in *Cacto Opuntia* haud dissimilis, sed est ipsi stirpis naturæ insita, notamque speciei quàm maximè propriam suppeditat, et quæ ab omnibus aliis, insequente modò demptâ, distinguit; unde fieri nequit quin doleamus extitisse ullam necessitudinem mutandi id nomen quod indiderat b. Lightfootius, qui, descriptione et icone optimâ in *Florâ Scoticâ* traditis, primus hanc plantam extra dubitationem posuit: *F. rubentis* synonymia multum et diù vexata haud faciliè extricari potest; ad diversam enim stirpem Linnæi synonymon diversi auctores traxerunt; e quibus plurimi *F. sinuosum* crediderunt, donec, ut jam sub illâ memoratur specie Goodenovius Woodwardiusque ex Herbarii Linnæani autopsiâ solverunt litem, docendo hanc esse stirpem ab ipso designatam. Hos ego secutus pro tali accepi, licet descriptio in *Speciebus Plantarum* non bene quadret, quâ de re nequeo non suspicari summum virum plus unâ specie sub illo nomine commiscuisse. Esperus in § primo *Iconum Fucorum* tomo *F. palmatum* pro *F. rubente* depixit, et *Florâ Danicâ* auctores *F. rubentem* citaverunt, ut synonymon

\* Dubitationis signum huic synonymo in *Fucorum Britannicorum Synopsi* subjeci, quòd crescendi modum proliferum haud bene in icone delineatum prætermiserim; huc tamen certissimè pertinet, plantæque sistit statum vix minus vulgarem quàm exemplar illud sub *F. epiphylli* nomine depictum exprimit.

† De hæc costâ consule quæ suprâ sunt dicta sub *F. pristoidi*, p. 83.

‡ Dubitant de hoc Goodenovius Woodwardiusque, et dicunt, "it is a matter of curious inquiry whether the proliferous tendency of this plant be its natural growth, or whether it be its natural power of repairing any injury (to which its tender and brittle quality exposes it at all times) which it may have received. We have found entire plants bearing no proliferous division at all."—*Act. Soc. Linn.* III. p. 166.

§ t. 75. p. 148.



mon *F. membranifolii*, quem *F. Palmettam* appellant. Erravi et ipse, ut mihi nunc videtur, cum in *Fucorum Britannicorum Synopsi* Ginannii *Epatica spirale* ad hanc speciem referrem, utpote quæ melius insequentem mihi tunc temporis ignotam sistit. Morisoni quoque Synonymon semper pro dubio habitum nunc ad *F. palmati* varietatem quandam pertinere existimo. De Buxbaumii figurâ (*Cent. I. t. 60. f. 2.*) ab Espero citatâ nihil est quod dicam, nisi quodd sit, sicut plurimæ aliæ *Fucorum* in ejus *Centuriis* icones, tam manca ut minus detrimenti a neglectis rei botanicæ proventurum credam. Diversissimè de *F. rubentis* fructu judicaverunt auctores diversi; qui tamen ferè omnes pro re dubiâ in medio reliquerunt. Cùm verò semina, eorum in *F. purpurascente* similium, in tuberculis inclusa tandem repererim, nullus dubito quin hæc sint vera fructificatio; \* suspicorque folia peltata tantummodò e proliferâ plantæ vi oriri, novisque ramis producendis inservitura, si satis ætatis vel roboris stirpi suppeditetur. Forsan etiam fronde pereunte decidunt, et, bulborum instar in *Alliis* aliisque plantis phænogamis occurrentium, in novas frondes progerminant.—Quis scit?—pauca sanè, eaque tenebosè, nos adhuc de hujusmodi rebus scimus.—Granula in foliolis depicta, a nemine antehac, quod scio, observata, potius e casu pendere quàm aliquid cum fructu commune habere crederem.

- |  |    |
|--|----|
| a. <i>F. rubens</i> , magn. nat.   |    |
| b. <i>frondis pars cum foliolis peltatis et granulis sparsis</i> , magn. auct. | 6. |
| c. <i>foliolum peltatum granulis aspersum</i> - - - - -                        | 3. |
| d. <i>frondis pars in quâ costa cernitur cum tuberculis</i> , magn. nat.       |    |
| e. <i>ejusdem portio</i> , magn. auct.   | 5. |
| f. <i>tuberculum dissectum</i> - - - - -                                       | 3. |
| g. <i>semina</i> - - - - -   | 1. |

\* Cùm analogia e specie insequente deprompta aliter suadeat, aliterque ipse in *Fucorum Britannicorum Synopsi* credideram; neque omnino idem sentiat Dna. Griffiths, cui optima fuit facultas hunc *Fucum* nascentem observandi, sententiam suam suis verbis expressam hic repetendam existimo.—“I am inclined to think that the orbicular leaves on the surface produce the fructification, by what is at first a purple spot becoming in time a solid substance or tubercle, and at length a granulated wart (the skin of which is strongly curled or plaited) containing seeds, when the membrane which before concealed or protected it falls off, and the warts only remain, in which, when near decay, pores may be seen: out of these I have squeezed a pinky substance, like minute grains in a transparent mucus, which I take to be the seeds. The warts are placed on the surface of the frond precisely in the same situation as the flat orbicular leaves, from under which they appear to come out, and some may be observed surrounded with the membrane.”

## 42.—FUCUS RUBENS.

*Fucus rubens*, frond submembranaceous, obsolete ribbed, proliferous from the surface; branches elliptical, simple and forked; roundish peltate leaves, and hemispherical externally uneven tubercles, sessile on the disk.

*Fucus rubens*. LINN. *Sp. Pl.* II. p. 1630. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. *Fl. Norv.* II. p. 69. *Linn. Trans.* III. p. 165. *Syn. Fuc.* II. p. 216. (excl. syn. Morisoni et Ginanni.) *Eng. Bot.* XV. t. 1053. *ESPER, Ic. Fuc.* II. p. 39. t. 129. *Fl. Lus.* II. p. 437.

*F. crispus*. *Fl. Ang.* p. 580. (excl. syn. Linn.)

*F. prolifer*. *Fl. Scot.* II. p. 949. t. 30. *WITH.* IV. p. 105. *Fl. Fr. Ed. 2da.* II. p. 29.

*F. laciniatus*. GMELIN, *Hist. Fuc.* p. 182. t. 22. f. 2. (excl. syn. Huds.) figure very bad.

*F. epiphyllus*. *Fl. Dan.* t. 708.

\* *F. miniatus*. *Fl. Dan.* t. 769.

*F. membranaceus purpureus variè ramosus*. RAI *Syn.* p. 47. n. 36.

On the shores of the British Islands, common.—Northern coast of France. *Decandolle*.—In the Bays of Norway. *Oeder*.—Mouths of the Tagus and Douro. *Brotero*.

*Perennial*. In the winter months.

**ROOT**, an expanded, thin, whitish, callous disk, so hard as to appear almost horny.

**FRONDS**, numerous from the same base, from three to seven inches long, furnished with a cylindrical stipes, not more than a line or two in length, compressed at its upper part, and expanding into a leaf about an inch and half long, and three lines wide, in some cases elliptical and simple, in others, dilated towards its apex, and forked, the angle of the division being either acute or obtuse, and the segments, though most frequently rounded at their extremities, occasionally sharp: towards the end of the leaf, but constantly from the surface, and never from the margin, are produced other leaves, solitary in some instances, in others, growing two or three together, precisely similar to the primary ones, and themselves again in the same manner proliferous with others, which in their turns give birth to a third

\* I had subjoined a mark of doubt to this synonym in the *Synopsis of the British Fuci*, having overlooked the proliferous mode of growth, which is indeed by no means clearly expressed in the figure. It, however, certainly belongs to *F. rubens*, and is designed to represent a state of the plant scarcely less common than that figured under the name of *F. epiphyllus*.





*Fucus rubens.*







third series, so that the plant, in course of time, arrives at a fifth or even a sixth: the length of these leaves is variable from two lines to an inch and half, and the uppermost are by no means always the shortest: it happens sometimes, but not often, that new leaves spring from the central part of the others: the whole of them at their origin are roundish: the margins of all are flat and quite entire: through their centre runs a wide \*midrib, of a thicker substance and darker color than the rest of the frond, most conspicuous in the primary leaves, after which it grows gradually more and more obsolete, and in the upper ones is scarcely, if at all, to be perceived.

FRUCTIFICATION, hemispherical tubercles, of a pale pink color, smaller than poppy-seed, disposed plentifully on each surface of the frond, externally wrinkled, so as to look as if composed of minute leaves twisted together, internally containing a mass of extremely small seeds of an irregularly oblong form: besides these, but whether connected or not with the fructification is what I have no means of knowing, there are found in great abundance lying flat on both sides of the frond, small, roundish, peltate leaves, on which are frequently observable minute, dark-red, scattered granules, some of which are also sometimes to be seen on other parts of the plant.

COLOR, a pale, but dull and opaque, red, in the young leaves occasionally tinged with pink; much darker and blood-red when dry; and in decay turning to a light yellowish brown.

SUBSTANCE, thin, but tough, almost intermediate between membranaceous and cartilaginous.

Obs. The frond shines while it is wet as if varnished:—in a dry state it by no means adheres to paper:—its habit is frequently curled:—scarcely any *Fucus* is more infested, not only with *Flustra pilosa*, and the lesser Zoophytes, but also with small *Fuci* and *Confervæ*, and often with *Serpula spirorbis*.

From the description above given of this *Fucus* it is evident that it is subject to two different appearances, the one producing elliptical and simple leaves, while in the other the leaves are widened towards their apices, and forked: both of these are equally common, and both generally to be met with upon the same frond. It, however, sometimes happens that individuals occur, the whole of the leaves of which are of one regular form; and I have occasionally seen plants that were not at all proliferous; but instances of this kind are very rare, and, I believe, never to be found where the plant has attained to its full size. †This proliferous mode of growth, which is not unlike that observable in *Cactus Opuntia*, ought, in my opinion, by no means to be regarded as accidental, or the effect of injury, but rather as a peculiar property innate in the species, and as one that affords its most striking characteristic, it being in itself sufficient to distinguish it from every other, except the following; so that it is impossible not to lament the necessity of changing the appellation given to it by Lightfoot, by whose admirable description and figure in the *Flora Scotica*, it was first removed beyond the reach of doubt. The synonymy of *F. rubens* has always been much perplexed, the name having been attributed to very different species by different authors, each of whom supposed his own to be the true plant so called by Linnaeus: by most, however, it had been given to *F. sinuosus*, and this opinion would probably have prevailed, had not Dr. Goodenough and Mr. Woodward, by an examination of the original specimens, at length determined the point, and, upon the authority of the Linnaean Herbarium, declared the present to be the plant actually intended. With their decision I have judged it best to comply, although, as has been already noticed under *F. sinuosus*, the description in the *Species Plantarum* does not exactly suit, for which reason it is impossible not to suspect that more than one species was there confounded under the same name. Professor Esper, in the first volume of his ‡*Icones Fucorum*, has figured *F. palmatus* for *F. rubens*, and this latter is in the *Flora Danica* quoted as a synonym of *F. membranifolius*, the *F. Palmetta* of that work. It also appears to me that there is in the *Synopsis of the British Fuci* an error, in referring to the *Fucus* before us the *Epatica spirale* of Ginanni, as his figure seems better to express the subject of the following plate, with which I was not till lately acquainted. The synonym also of Morison, there quoted, but quoted as doubtful, I am now inclined to think was rather intended for one of the varieties of *F. palmatus*. With regard to Buxbaum's figure, (*Cent. I. t. 60. f. 2.*) applied to this plant by Esper, I have nothing farther to say, than that, like most of the plates of *Fuci* in his *Centuria*, it is so imperfect that less injury is likely to arise to science from their being altogether neglected than from any attempt to illustrate them. The opinions of various authors relative to the fruit of *F. rubens* have been widely different, but the point has been looked upon by most of them as so obscure, that they have left it in the same uncertainty in which they found it. As, however, I have clearly seen in the tubercles seeds similar to those of *F. purpurascens*, &c. I can entertain no doubt of these being the true fructification, and I suspect the peltate leaves owe their origin only to the proliferous tendency of the species, and would lengthen into branches, were the plant endued with sufficient vigor, or were its duration sufficiently protracted. It is also possible that, like the bulbs of *Allia*, and other phænogamous vegetables, they fall off

\* Concerning this midrib refer to what has already been remarked under *F. pristoides*, p. 84.

† Upon this subject Dr. Goodenough and Mr. Woodward express doubts, and say, "it is a matter of curious inquiry whether the proliferous tendency of this plant be its natural growth, or whether it be its natural power of repairing any injury (to which its tender and brittle quality exposes it at all times) which it may have received. We have found entire plants bearing no proliferous division at all."—*Act. Soc. Linn.* III. p. 166.

‡ t. 75. p. 148.

§ An opposite opinion would indeed be suggested by the analogy of the following species, and such was entertained by me in the *Synopsis of the British Fuci*. Mrs. Griffiths too does not altogether view the matter in the same light as I have done here, and, as she has had the best opportunities of examining the plant while growing, I think it right to repeat her observations in her own words. "I am inclined to think that the orbicular leaves on the surface produce the fructification, by what is at first a purple spot becoming in time a solid substance or tubercle, and at length a granulated wart, (the skin of which is strangely curled or plaited) containing seeds, when the membrane which before concealed or protected it falls off, and the warts only remain, in which, when near decay, pores may be seen: out of these I have squeezed a pinky substance, like minute grains in a transparent mucus, which I take to be the seeds. The warts are placed on the surface of the frond precisely in the same situations as the flat orbicular leaves from under which they appear to come out, and some may be observed surrounded with the membrane."



off when the frond decays, and shoot up into new individuals.—Who can tell?—Certain it is that in all these matters we see but little, and that little but very darkly. With respect to the granules represented on the small peltate leaves, and, I believe, never before noticed, I would rather attribute them to accident, than regard them as connected with the fructification.

- |  |              |
|--|--------------|
| a. <i>F. rubens</i> , natural size.  |              |
| b. part of the frond, with peltate leaves, and scattered granules, magnified | - 6.         |
| c. peltate leaf, and scattered granules on it                                | - - - - - 3. |
| d. part of the frond, with midrib visible, and tubercles, natural size.      |              |
| e. portion of the same, magnified  | - - - - - 5. |
| f. tubercle cut through  | - - - - - 3. |
| g. seeds   | - - - - - 1. |

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### 43.—FUCUS NERVOSUS.

*Fucus nervosus*, frond sub-cartilaginous, flat, obsolete midribbed, proliferous from its surface; branches linear, both simple and forked, producing small peltate leaves, and sessile spherical tubercles.

*Fucus nervosus*. Fl. Fr. Ed. 2da. II. p. 29.

*Epatica spirale*. GINANNI, Op. Post. I. p. 26. t. 26. n. 61. (excl. syn. Raii.)

In the Mediterranean. Decandolle.—Near Agde. Professor Mertens.

Perennial?

ROOT, a pale-red, expanded, callous disk.

FROND, a foot or more long, furnished with a short, cylindrical stipes, about the thickness of a crow's quill, and irregularly divided; branches nearly cylindrical at their base, but becoming compressed as soon as they attain to the height of a line, or a line and half, and almost immediately dilated into a flat leaf, preserving every where an equal width of about half an inch, nearly a foot long in some cases, in others much shorter, either simple or forked, or twice or thrice dichotomous, rounded at its apex, and quite entire at the margin, though so remarkably undulated as to appear sinuated, provided with a wide midrib, thicker than the rest of the frond, most visible at the base, but obsolete towards the apices: from the surface of the leaf spring other leaves like the primary one, which are themselves proliferous with others, and these again with others, thus proceeding in repeated series, and forming the natural increase of the plant: they grow either singly, or two or three together.—It sometimes happens that in old plants the midrib is stripped of its foliaceous membrane for the length of some inches, and looks like an old stem irregularly pinnated with scattered leaves.

FRUCTIFICATION, spherical tubercles, situated at the base of small, roundish, peltate leaves, which are found plentifully on both sides of the frond, so as sometimes almost to cover it: these on dissection appear internally to consist altogether of extremely minute, parallel, jointed fibres, very closely matted together.

COLOR, bright red, exceedingly fugitive: turning, when exposed to the sun or kept in fresh water, to a dull, dirty yellow, and at last to white.

SUBSTANCE, between cartilaginous and membranaceous, thin, flexible, and tough.

OBS. The habit of this plant is much curled and twisted, and, if confidence may be placed in Ginanni's name, is spiral:—when dry it does not adhere to the least to paper:—it is extremely liable to be infested with the smaller species of Fuci, Confervæ, and Zoophytes.

What small confidence is to be reposed upon analogy in matters so little understood as the fructification of the Fuci, must, I think, be sufficiently obvious to every one, who will compare together the tubercles of the present species and those of *F. rubens*; for it is scarcely possible to conceive two plants gifted with such strong peculiarities more strikingly

\* These leaves agree with those of *F. rubens* in never originating from the margin, but always from the surface, but they differ from them in being generally situated on the midrib, and in being scattered indiscriminately over the whole leaf, instead of being confined to the part nearest the apices.

† I have not been able to detect in these tubercles any seeds, nor any difference between the two strata, of which, under the microscope, they seem to be composed.—See Note to *F. Griffithsii*, p. 81.

‡ There are many Fuci, particularly of the division *fronde tereti*, of which the structure is so simple and uniform that their resembling each other is far from extraordinary, and it will perhaps never be known whether they are distinct species or only varieties; but if the peculiar substance, wide midrib, proliferous mode of growth, and round peltate leaves of *F. rubens* and *nervosus* are considered, this coincidence must appear very singular.





*Fucus nervosus.*







strikingly resembling each other in all important points, while at the same time, the fructification observed in them is widely different. It is, however, a curious fact that the fruit here figured exactly agrees with what has been said by \*Mrs. Griffiths under the preceding *Fucus*, and I am therefore almost inclined to suspect that two kinds of tubercles must in reality exist in both these species. For my specimens of *F. nervosus* I am indebted to the kindness of Professor Mertens, who observed to me, that it was the *F. crispus* of Draparnaud, and the French authors, to whom, however, I am unable to refer, as I do not find it published under that name in any work in my possession. The description given by Decandolle is too exact to leave any doubt of its being his *F. nervosus*, but both that †author and Professor Mertens have in my opinion been in error in referring it to the *F. caulescens* of Gmelin, the description and figure of which I cannot but consider as taken from some strangely battered specimens of *F. vittatus*, though I am at the same time by no means indisposed to admit that Gmelin probably confounded the two species, and borrowed some parts of his character from *F. nervosus*. Seba's figures also, (III. t. 102. f. 11. and III. t. 103. f. 5.) on which he places great reliance, appeared to me, when I had an opportunity of consulting that work, to belong to *F. vittatus*; but, not having it now at hand, I would not be understood as placing much confidence upon them, especially as I could account for what the learned author says of the latter, that "*tenuia ejus folia de sua superficie undequaque germina emittunt flosculis similia*", only upon the supposition that this appearance was caused by some parasite. It has already been remarked under *F. rubens*, that *F. nervosus* is distinguished from every known *Fucus*, excepting that alone, by its proliferous mode of growth: from that it differs in its greater size, its crisped margin, its much more visible midrib, and the form of its leaves, which appear never to be dilated upwards, but constantly to preserve their linear form.

- a. *F. nervosus*, natural size.
- b. upper part of the frond, barren.
- c. upper part of the frond with peltate leaves and capsules, magnified 6.
- d. portion of the same - - - - - 5.
- e. peltate leaf and capsule separate - - - - - 4.
- f. capsule cut through longitudinally - - - - - 3.
- g. filaments - - - - - 2.
- h. some of the same - - - - - 1.

\* See the Note to *F. rubens*, p. 90.

† M. Decandolle, in the *Flore Française*, has divided *F. nervosus* into two varieties, which he separates thus, "*a. Marginibus undulatis*.—*β. Marginibus ciliato-tuberculatis*," and it is to the latter of these that he quotes Gmelin's *F. caulescens*, t. 20. f. 2.—If, indeed, he has seen specimens of this latter, and traced their connection with the other, I have nothing farther to say, than that I am surprised it should be so; but if, as I suspect, he has only introduced his var. *β* for the sake of including Gmelin's synonym from the general resemblance of the two plants, I must persist in my opinion that he has done wrong, and that *F. nervosus* is never proliferous from the margin.

## 43.—FUCUS NERVOSUS.

*Fucus*, fronde sub-cartilagineâ, planâ, obsolete costatâ, e superficie proliferâ; ramis linearibus, simplicibus bifurcisque, foliola peltata, tuberculaque spherica sessilia gerentibus.

*Fucus nervosus*. Fl. Fr. Ed. 2da. II. p. 29.

*Epatica spirale*. GINANNI, Op. Post. I. p. 26. t. 26. n. 61. (excl. syn. Raii.)

HABITAT in Mari Mediterraneo. Decandolle.—Prope Agde. D. Prof. Mertens.

*Perennis*?

RADIX callus explanatus, dilutè ruber.

FRONS pedalis, et ultra, stipite instructa pennæ corvinæ crassitie, brevi, tereti, vagè diviso; rami basi teretiusculi, priusquam lineæ unius alteræ altitudinem attigerunt compressi, et ferè statim dilatati in folium planum, unguem ferè latum, et ubique lineare, nunc propemodum pedale, nunc multo brevius, vel simplex, vel bifurcum, vel etiam bis terve dichotomum, apice rotundatum, margine integerrimum, sed insignitè undulatum, ut sinuatum videatur, nervo percursum lato, reliquâ fronde crassiore, maximè ad basin manifesto, apices versus obsolete: e foliis \*superficie oriuntur folia alia, nunc solitaria, nunc bina aut terna, primarii similia, quæ ipsa aliis, et hæc quoque aliis, iterum atque

\* Hæc folia, eorum in *F. rubente* suprâ memoratorum instar, nunquam ex ipso margine exsurgere videntur: discrepant autem ab iis ejus speciei, quod plerumque costæ insidentia reperiuntur, et sparsim hic illic per totum folium, non ibi modò quâ apici proximum, occurrant.



atque iterum eadem ratione prolifera, plantæ incrementum præbent.—Aliquando accidit in stirpe vetustâ foliorum primariorum nervum esse per aliquot pollicum longitudinem denudatum, elongatique caulis foliis sparsis pinnati speciem præ se ferre.

FRUCTIFICATIO \*tubercula sphaerica adbasin foliorum exiguum, subrotundorum, peltatorum, quæ frondis utrique paginæ copiosè insident, et sæpe totam cooperiunt, sita: hæc, si dissecentur, intus e fibris minutissimis, articulatis, parallelis, densè compactis, tota constare videntur.

COLOR lætè ruber, fugacissimus; soli expositæ aut in aquâ dulci servatæ sordidè lutescens, et demum albicans.

SUBSTANTIA cartilagineo-membranacea, tenuis, lenta, tenax.

Obs. Habitus variè crispatus, et, si nomini a Ginamio dato sit fidendum, spiralis:—exsiccata chartæ nequaquam adhæret:—frondi copiosè adhærent minores Fucorum, Confervarum, et Zoophytorum species.

Quam cæcus cæcæ viæ dux sit analogia in rebus tam paullum cognitæ quàm Algarum submersarum fructificatio satis, uti credo, inter omnes constabit qui hujus Fuci tubercula cum iis *F. rubentis* jam in tabulâ præcedente depicti conferant. Vix fieri potest ut mente effingamus duas Fucorum species, quas notis magis conspicuis a reliquis omnibus sejunxit et inter se connexit almâ natura; fructu tamen, notâ maximi momenti, longè discrepant. Est autem illud imprimis notatu dignum, fructificationem hîc sub *F. nervoso* delineatam omni ferè numero consentire cum illâ quàm sub *F. rubente* descripsit D<sup>na</sup> Griffiths; quâ de re mens est ad suspicandum proclivis ambas has stirpes fructu duplice, licet unum modò adhuc ego viderim, reapse gaudere. *F. nervosi* exemplaria quæ possideo Mertensii amicitia misit, adjectâ quoque observatione esse eandem Fuci speciem quàm *F. crispæ* nomine insignire sunt soliti Draparnaudius auctoresque plurimi Gallici, quos ut citem bibliotheca privata vix satis ampla negat. Optimè, de more suo, hunc Fucum descripsit Decandollius, ita ut, synonymon pro indubio habens, nomen ab ipso inditum sine hæsitacione asciverim, neque tamen vel § illi vel Mertensio adeo usque assentiri possum, ut illos secutus *F. caulescentem* Gmel. sub hac specie citem; cùm ejus plantæ descriptio et icon manca *F. vittati* exemplaria potius respicere mihi videantur; fieri tamen potest, neque hoc vero est absimile, Gmelinum utramque stirpem commiscuisse, et quædam ex iis quæ de *F. caulescente* tradidit a *F. nervoso* deprompsisse. Icones quoque Sebanæ, (III. t. 102. f. 11. et III. t. 103. f. 5.) quas pro optimis laudat, mihi olim sunt visæ, quum Sebanæ *Thesaurum* adeundi est data facultas, ad *F. vittatum* pertinere; nequaquam autem illis hîc nitor ad sententiam meam stabiliendam, quoniam neque librum ad manus habeo, neque, uti memini, bene intellexi quid vellet auctor, quum de posteriore memoraret, "*tenuia ejus folia de suâ superficie undequaque germina emittere flosculis similia*," nisi de Confervis seu Zoophytis parasiticis dictum crederem. Dignoscitur *F. nervosus*, ut jam sub *F. rubente* traditur, per proliferum crescendi modum ab omnibus aliis Fucorum speciebus, præcedente solâ exceptâ, a quâ statura major, margines crispæ undulatique, costa manifesta, foliorumque forma semper linearis distinguunt.

a. <i>F. nervosus</i> , magn. nat.	
b. frondis pars superior, sterilis.	
c. frondis pars superior, capsulis foliisque peltatis instructa, magn. auct.	6.
d. ejusdem portio	5.
e. folium peltatum et capsula	4.
f. capsula longitudinalitèr dissecta	3.
g. filamenta	2.
h. eadem	1.

\* Semina in his tuberculis nulla detegere potui, nec ullum discrimen inter strata illa duo e quibus effingi videntur. Confer notam sub *F. Griffithsii*, p. 81.

† Multæ sunt Fucorum species, præsertim ex iis fronde tereti instructis, quarum structura est adeo simplex et uniformis, ut nequaquam sit mirum si arcè inter se congruant, neque forsitan unquam constabit an pro distinctis speciebus an pro varietatibus haberi debeant; sed *F. rubentis* et *F. nervosi* substantia peculiaris, costa lata, crescendi modus prolifer, et foliola subrotunda peltata talem partium congruentiam concursum dignissimum qui notetur reddunt.

‡ Confer notam sub *F. rubente*, p. 20.

§ Decandollius in *Florâ Gallicâ* *F. nervosum* in duas varietates, quas sequente modo distinguit, dispertit, "*a. Marginibus undulatis.*—*b. Marginibus ciliato-tuberculatis*," et sub hac citat Gmelini *F. caulescentem*, t. 20. f. 2. ejus si exemplaria viderit, et cum primâ varietate reverâ connexa sciat, nihil aliud dicendum restat sed in errore versor et rem ita se habere miror:—sic, uti suspicor, similitudine quæ inter *F. caulescentem* et *F. nervosum* interest deceptus, varietatem § idè modò construxit ut Gmelini iconem proferret, in sententiâ meâ permaneo, illumque errare, et *F. nervosum* nunquam e margine esse proliferum credo.



*Fucus*, fronde sub-membranaceâ, planâ, enervi, palmato-laciniatâ, margine proliferâ; laciniis linearibus; tuberculis sphaericis, immersis.

*Fucus Sarniensis*. ROTH, *Cat. Bot.* III. p. 103. t. 1.

β. *tenuissimus*; ramis angustatis, summis subsetaceis.

HABITAT in Sinu Eblanensi. D. Scott.—In Oceano Hibernico Occidentali. *Herb. Banks.*—In Scotiæ oris.

D. Walker.—Ex Insulâ Sarniâ accepit D. Prof. Mertens.—β in littore Hibernico, prope Belfast, legit D. Templeton.

*Annua?*

RADIX callus exiguus, flavescent.

FRONDES ex eâdem basi plurimæ, dodrantes, vel pedales, planæ, nervi venarumque prorsus expertes, ortu angustissimæ, sed sese statim sensimque dilatantes, donec circiter unum a radice pollicem latitudine fiunt unguiculares: quâ radici proximæ indivisæ, at priusquam multarum linearum altitudinem attigerunt bifurcæ, et inde, vel per dichotomias vel palmatim, sæpe divisæ, intervallis plerumque brevibus, attamen incertis, et quandoque longis: segmenta ferè linearia, summa angustissima, omnia subfastigiata, apice nunc obtusa, et quasi truncata, nunc acuminata, margine integerrima, nisi quodd dente uno alteroque brevi spiniformi interdum sint instructa: aliquando etiam margines proliferi evadunt, laciniis sparsis, horizontalibus, iterum atque iterum divisus.

FRUCTIFICATIO, teste Rothio, tubercula frondi immersa, subrotunda, atra, absque ordine sparsa, magnitudine seminis papaveris.

COLOR purpurascens, subdiaphanus, fugacissimus; *exsiccata* intensior; *soli exposita* flavescent, et demùm albicans

SUBSTANTIA membranaceo-cartilaginea, tenax.

β varietas est notabilis; segmentis, ubi latissima, vix sesquilineam latis, summis acuminatis, et ita tenuibus, ut propemodum setacea videantur.

OBS. Ob colorem fugacissimum planta plerumque versicolor occurrit:—*exsiccata* chartæ laxiùs adhæret:—optimè dicit Rothius, in apicibus laciniarum læsis vel detrusis novas sæpiùs lacinias propullulare, ut ita proliferi evadant.

Multi jam anni sunt elapsi ex quo primùm scivimus D. Woodwardius et ipse debere hunc *Fucum* inter species Britannicas enumerari; specimina autem quæ tunc videramus adeò erant \*manca, ut neque cùm ille *Observationes de Fucis Britannicis*, neque cùm harum plantarum Synopsis ego scriberem, aliquid de illis proferre sustinuimus, veriti ne fieri possit ut sint tantummodò frustra alicujus speciei jampridem satis cognitæ et descriptæ. Extant quoque ejus exemplaria in Herbario Banksiano, sed vel hæc imperfecta; et, licet his nitens pro novâ specie agnoverit Solander, et *F. multifidi* nomen indiderit, diu tamen verisimilitèr Botanicorum notitiam indscriptus latuisset, nisi fortè ex Insulâ Sarniâ allatum acceperit Mertensius, qui, optimâ descriptione et icone adjectâ, tandem in Rothii *Catalectis* evulgavit. Hujus benevolentia exemplar hic depictum debeo, fructusque analysin ab ipso traditam repetendam curavi. Dolendum quidem est, quòd, quamvis fructificationem e tuberculis constare dixerit, nihil tamen protulerit de illorum naturâ aut de seminibus in illis inclusis. Hæc tubercula quoad magnitudinem longè recedunt a sparsis Ulvarum seminibus; nec magis congruit *F. Sarniensis* textura sub-cartilaginea cum eâ plantarum quæ illi generi ascribi solent. Plurimum habet in hoc affinitatis cum *F. palmato*, cum quo etiam convenit habitu crescendique modo perquam mutabili, quoniam segmenta lata atque angusta, longa atque brevia, dichotoma atque palmata non rarè in eâdem stirpe occurrunt. Frons quoque sæpe hic illic foraminibus exiguis oblongis pertusa, sed an hoc casu aliquo accidat, an ex ipsâ Fuci naturâ pendeat, nulla mihi dijudicandi datur potestas. Idem in pluribus exemplaribus vidi, eâque de re in posteriorem ire sententiam maximè propendeo. Planta, etiam in primo ætatis gradu, et lente accerrimâ observata, nunquam sese mihi reticulatam obtulit; et manifestè e duabus constat membranâ, quæ, injuriâ aliquâ acceptâ, disjunguntur.

a. *F. sarniensis*, magn. nat.

b. *frondis pars*, magn. auct. - - - - 1.

c. *frondis pars cum fructu*, e Rothii *Catalectis*.

\* Nequaquam hoc valet de omnibus exemplaribus quæ sunt in littoribus Britannicis detecta; pulcherrimum enim in Sinu Eblanensi legit D. Scott, aliudque formâ eximium nuper mihi benevolè misit D. Wright, quod Scotiæ ad oras invenit b. D. Walker, et *Chartaceæ dichotomæ* nomine insigire statuit; necdum autem talia videramus.



*Fucus Sarniensis*, frond sub-membranaceous, flat, without midrib, lacinated in a palmate manner, proliferous from its margin; segments linear; tubercles spherical, immersed.

*Fucus Sarniensis*. ROTH, *Cat. Bot.* III. p. 103. t. 1.

$\beta$ . *tenuissimus*; branches very narrow, the upper ones almost setaceous.

In the Ocean west of Ireland. *Herb. Banks.*—In Dublin Bay. *Dr. Scott.*—On the Scotch Coast. *Dr. Walker.*—Sent from Guernsey to *Professor Mertens.*— $\beta$  on the Irish Coast, near Belfast. *Mr. Templeton.*

*Annual?*

ROOT, a small, yellowish, callous disk.

FRONDS, numerous from the same base, nine inches or a foot long, flat, wholly destitute of midrib or veins, extremely narrow at their origin, but immediately widening, till at about an inch from the root they reach the width of six lines: in the part nearest to the base they are undivided, but become forked before they are many lines high, and afterwards repeatedly divided, either in a dichotomous or palmate manner, the intervals between each division being in general short, but of uncertain length, and sometimes long: the segments are almost linear, the upper ones the most narrow, all of them of nearly equal height; their apices obtuse and subtruncate in some specimens, in others acuminate, their margins quite entire, except that they are occasionally furnished with one or two short spiniform teeth; they are also now and then proliferous, with scattered, horizontal segments, repeatedly divided.

FRUCTIFICATION, according to Roth, roundish, black tubercles, immersed in the frond, dispersed without order, and of the size of poppy-seed.

COLOR, purplish, semitransparent, very fugitive; darker when the plant is dried; on exposure to the sun turning to yellowish, and at length to white.

SUBSTANCE, between membranaceous and cartilaginous, tough.

$\beta$  is a remarkable variety, its broadest segments scarcely equalling a line and a half in breadth; the upper ones acuminate, and so thin as to appear almost setaceous.

OBS. The frond on account of its fugitive tint appears in general party-colored:—in a dried state it adheres, but not strongly, to paper:—*Dr. Roth* observes very justly, that when the apices of the segments are injured they throw out a number of new shoots, and become proliferous.

This *Fucus* has been for many years known both to *Mr. Woodward* and myself as a native of the British coast, but known only by such \*mutilated specimens, that neither of us, when writing on the subject of these plants, could venture upon noticing it, apprehending it might be some one already described in a singularly injured state. There are also some pieces of it in the *Banksian Herbarium*, but even these are almost equally imperfect, so that, though *Dr. Solander* had considered them as belonging to a distinct species, and called them *F. multifidus*, the plant would probably long have continued to escape the notice of Botanists, had not *Professor Mertens* received it from the Island of Guernsey, and published it with an excellent description and figure in the third volume of *Dr. Roth's Catalecta*. I am indebted to him for the specimen here figured, and have borrowed his account and representation of the fruit which I never saw myself. One thing indeed I lament, that, though he describes the fructification as immersed tubercles, he has said nothing of their nature or contents, and has consequently left us in ignorance upon those important points. In their size they seem to differ essentially from the scattered seeds of the *Ulva*, and the sub-cartilaginous texture of *F. Sarniensis* is also materially different from that of the submersed *Algæ* generally referred to that genus. In this respect it approaches more nearly to *F. palmatus*, with which it also agrees in general habit, and in being very variable as to its mode of growth, the same plant not unfrequently producing both broad and narrow, long and short, dichotomous and palmate segments. The frond is occasionally found perforated in places with small oblong holes; but whether this is caused by the fruit falling out, or is the effect of any casual injury, I have no means of determining. I am inclined, however, to ascribe it to some cause peculiar to this species, as I have observed it in several specimens. The plant, even in its youngest state, seems to be destitute of any reticulated structure, and is evidently composed of two distinct membranes, which separate from each other in case of injury.

a. *F. Sarniensis*, natural size.

b. portion of the frond, magnified - - - 1.

c. ditto with fructification, borrowed from *Roth's Catalecta*.

\* This is by no means the case with all the specimens gathered on the British shores, for that found by *Dr. Scott*, in Dublin Bay, is singularly beautiful, and one very recently communicated to me by *Dr. Wright*, which was gathered on the Scotch coast by the late *Dr. Walker*, and by him called *Characta dichotoma*, is both large and perfect, but we had not then seen either of these.

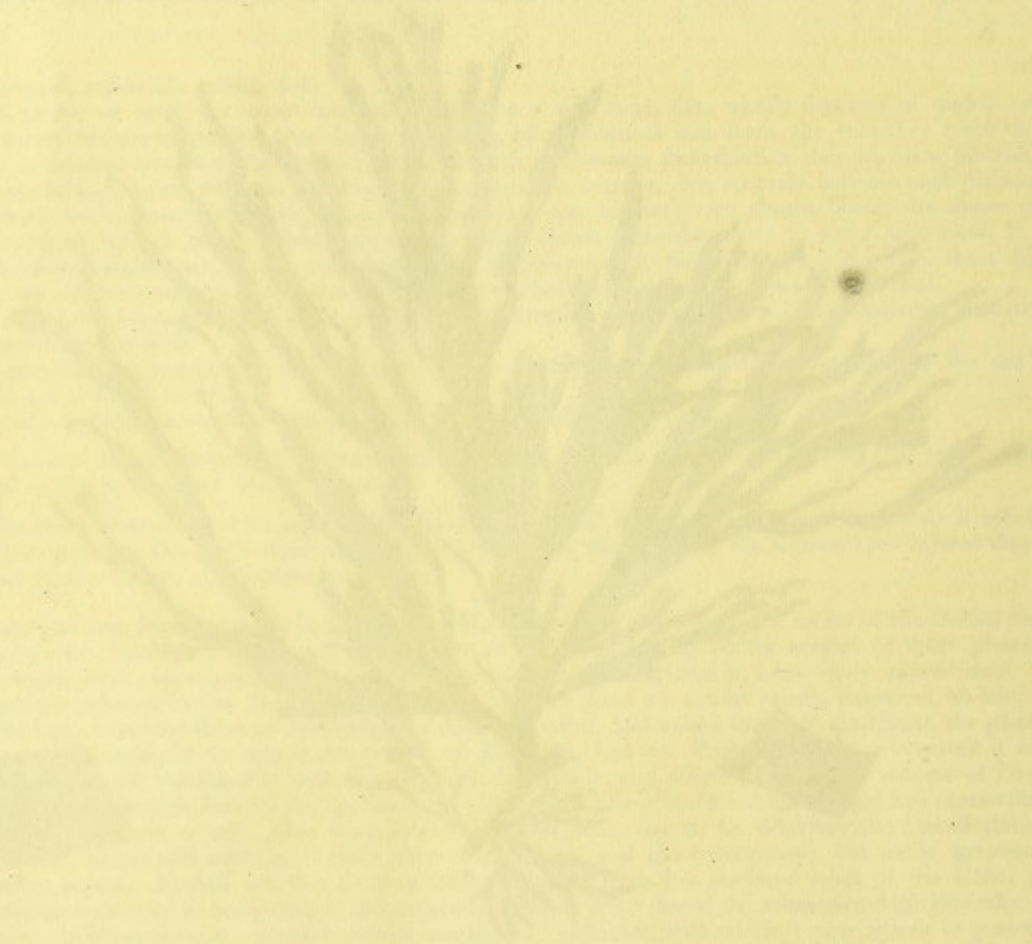




*Fucus Sarniensis.*



THE HISTORY OF THE  
PLANT KINGDOM  
IN TWO VOLUMES  
BY  
JOHN RAY, D.D.  
OF THE UNIVERSITY OF OXFORD  
IN TWO VOLUMES  
THE SECOND VOLUME  
CONTAINING  
THE HISTORY OF THE  
MINERAL KINGDOM  
AND THE HISTORY OF THE  
METALS  
LONDON  
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*Fucus*, fronde membranaceâ, planâ, enervi, palmato-laciniatâ, margine proliferâ; laciniis sursùm dilatatis, summis apice multifido-incisis, dentibus brevibus sub-setaceis.

*Fucus soboliferus*. Fl. Dan. t. 1066.

HABITAT in fundo maris Finmarkiæ. Vahl.—In Orcadum oris. D. C. Fothergill.

Annua?

RADIX callus exiguus.

FRONDES ex eâdem basi plurimæ, longitudine circiter palmares, quâ radici proximæ angustissimæ, teretiusculæ, et setâ porcinâ vix crassiores, inde ferè statim compressæ, et mox planæ, ab ortu usque ad apices sensim dilatatæ, ut segmenta summa sint propemodùm unguem lata: frons priusquam multarum linearum altitudinem attingit fit ramosa, ordine nunc bifurco, nunc palmato, utroque ut plurimum in eâdem stirpe occurrente, atque hinc sæpe dividitur simili ratione, intervallis brevibus, attamen incertis: segmenta omnia sursùm dilatata, et sub-cuneiformia, extrema apice incisa, dentibus plurimis, brevibus, sub-setaceis: frondis margines integerrimi, sed plerumque proliferi, segmentis basi attenuatis, sub-cuneiformibus, sæpiùs iterum divisus, apice multifido-incisis.

FRUCTIFICATIO hucusque ignota.

COLOR roseus, diaphanus; *marcescentis* sordidè flavescens, et demùm albicans.

SUBSTANTIA membranacea, tenuissima, et tenerrima, sub lente exquisitè reticulata, maculis subrotundis.

Obs. Exsiccata chartæ arctè adhæret.

Primus hanc stirpem, non minùs formâ quàm colore spectabilem, in *Florâ Danicâ* descripsit b. Vahlus, qui se unum modò exemplar unquam detexisse memorat; nec plus quam unum legit D. Fothergill, qui ad specierum Britannicarum numerum nuper ascripsit, et benevolè mecum communicavit. Perraram igitur esse plantam autumo, præsertim cùm neque in Linnæano, nec in Banksiano, nec in ullo alio, quod mihi invisendi contigit facultas, phyto-phylacio asservatam unquam viderim. Quoad substantiam et texturam Ulvas non minus quam Fucos referre videtur, nec mirarer, si, quando fructificatio latere desinit, illis potiùs censeretur; statui tamen in præsens insistere vestigiis Vahlis his annuerantis, donec aut patefiant semina, aut saltèm characteres qui utrumque secernunt genus rectiùs disgnoscantur, firmiùsque stabiliantur. Affinitatem arctissimam inter *F. Sarniensem* atque *F. soboliferum* intercedere neutiquam inficias eam: in multis certè conveniunt, et notas specificas ægrè erui expertus scio, credo verò satis inter se differe, cùm ob substantiam, quæ in hoc tenuissima et reticulata, in illo crassiuscula et ubique uniformis evadit, tum ob segmenta in hoc sursum dilatata, in illo linearia: neque tamen is ego sum qui aliquid de plantis quarum perpauca modò exemplaria adhuc vidi ex tripode affirmare ausim. Hæ duæ stirpes longè a reliquis omnibus crescendi modo discrepant, nec quod dicit Vahlus, scilicet *F. soboliferum* *F. bifido* affinem videri, opus est ut hic pluribus verbis redarguam.

a. *F. soboliferus*, magn. nat.

b. *frondis pars superior*, magn. auct. - - 6.

c. *ejusdem pars, ut structura reticulata appareat*. 1.



*Fucus soboliferus*, frond membranaceous, flat, without midrib, lacinated in a palmate manner, proliferous from the margin; segments dilated upwards, the extreme ones gashed at their apices with numerous short sub-setaceous teeth.

*Fucus soboliferus*. *Fl. Dan.* t. 1066.

At the bottom of the sea by Finmark. *Vahl*.—Upon the shores of the Orkney Islands. *Mr. Charles Fothergill*.  
*Annual?*

ROOT, a small callous disk.

FRONDS, numerous from the same base, about three or four inches long, at the part adjoining the root almost cylindrical, and scarcely thicker than a hog's bristles, but becoming almost immediately compressed, and soon flat, gradually widening from the base to the extremities, so that the upper segments are nearly half an inch in width: the frond becomes branched before it attains to the height of many lines, sometimes in a forked, and sometimes in a palmate manner, instances of both generally occurring on the same individual, and after this it is frequently again divided in a similar manner, at short but uncertain intervals: all the segments are dilated upwards, and sub-cuneiform, the extreme ones have their apices gashed, with several short nearly setaceous teeth: the margins of the frond are quite entire, but generally proliferous with segments attenuated at the base, sub-cuneiform, generally again divided, their apices gashed with numerous small teeth.

FRUCTIFICATION, hitherto unknown.

COLOR, pink, transparent; turning in decay to a dirty yellowish, and at length nearly to white.

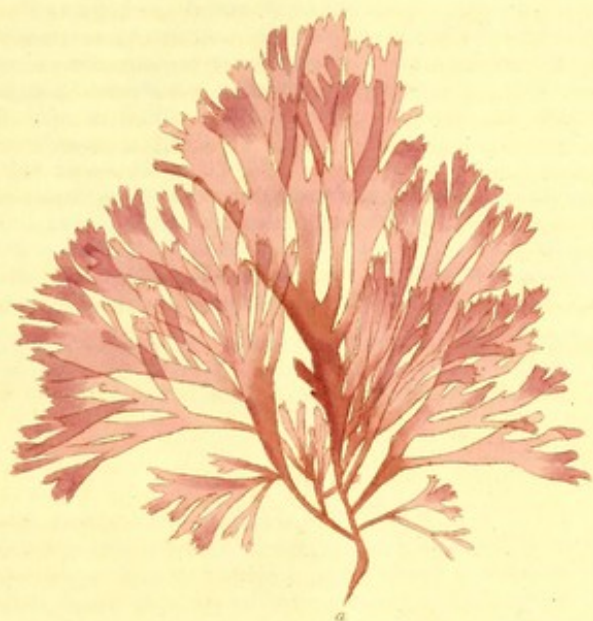
SUBSTANCE, extremely thin and tender; under the microscope beautifully reticulated with roundish meshes.

OBS. When dried it adheres closely to paper.

The only account which I find of the present *Fucus*, a plant no less conspicuous for its delicate texture and elegant form than for its beautiful color, is that given in the *Flora Danica*, by the late Professor Vahl, who there observes, that he never met with more than a single individual, and it is a little extraordinary that only one plant of it should also have been gathered by Mr. Fothergill, who lately added it to the Flora of the British Islands, and obligingly communicated it to me. I am therefore led to suppose that it is a species of very rare occurrence, and what tends to confirm this conjecture is, that I have not observed any specimens of it, either in the Linnæan or Banksian Herbaria, or in any other which I have had an opportunity of examining. With regard to its substance and texture, it is no less closely allied to the *Ulvæ* than the *Fuci*, nor should I be surprized, if, when the fructification is discovered, it should be placed permanently in the former of these genera; though, at the same time, as Vahl has arranged it in the latter, I thought it best to follow his example, till either the seeds should be detected, or at least till the boundaries between the two families should be better understood and more definitively fixed. I am well aware that there exists a very strong resemblance between the present and the preceding *Fucus*, that they agree together in most points of importance, and that it is extremely difficult to discover satisfactory specific characters between them. It is nevertheless my opinion that they are really distinct, and I found this opinion no less upon the difference of their substance, which in *F. soboliferus* is almost as thin as gold-beater's skin, and curiously reticulated, while in *F. Sarniensis* it is rather thick and every where uniform, than upon the segments, which are linear in the one, and dilated upwards in the other; notwithstanding this, however, I would not be understood as speaking by any means decisively with respect to plants of which I have had so few opportunities of judging. In their mode of growth these two *Fuci* differ widely from all the rest, nor can there be any need to make use of arguments to do away the suspicion entertained by Vahl, that *F. soboliferus* is nearly allied to *F. bifidus* of Hudson.

- |   |    |
|---|----|
| a. <i>F. soboliferus</i> , natural size.                  |    |
| b. upper part of the frond, magnified                     | 6. |
| c. portion of the same, to shew the reticulated structure | 1. |





*Fucus soboliferus.*



# THE HISTORY OF THE UNITED STATES

The history of the United States is a story of growth and change. It begins with the first settlers, who came to the Americas in search of a new life. They found a land of opportunity, but also a land of challenge. The early years were marked by struggle and hardship, but the spirit of the pioneers was unyielding. They built a nation from scratch, one that was based on the principles of freedom and democracy. Over time, the United States grew in size and power, becoming a global superpower. It has faced many challenges, from war to economic crisis, but it has always emerged stronger and more united. The history of the United States is a testament to the power of the human spirit and the ability of a nation to overcome adversity.



*Fucus*, caule compresso, filiformi, pinnato: ramis alternis, simplicibus: foliis lineari-lanceolatis, serratis: vesiculis sphaericis, petiolatis, petiolo plano: receptaculis cylindraceis, racemosis.

*Fucus natans*. LINN. *Sp. Pl.* II. p. 1628. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. *Fl. Zeyl.* p. 184. *Hort. Cliff.* p. 478. *Fl. Ang.* p. 572. *Linn. Trans.* III. p. 107. *With.* IV. p. 86. *Syn. Fuc.* I. p. 48. *Fl. Atl.* II. p. 421. *Fl. Lus.* II. p. 434. *Fl. Fr. Ed. 2da.* II. p. 26. *Fl. Ped.* II. p. 330. *Fl. Monsp.* p. 458.

*F. Sargasso.* var. 1. GMELIN, *Hist. Fuc.* p. 93.

*F. acinarius.* var. ESPER,  *Ic. Fuc.* I. p. 130. t. 66.

*F. subrepandus.* FORSKÅL, *Fl. Egypt.* p. 192? *Syst. Nat. Ed. Gmel.* II. p. 1381?

*F. folliculaceus serrato folio.* BARRELIER, *Icones.* t. 1122.

\* *Fuco Acinara con foglie di mezzana grandezza.* GINANNI, *Op. Post.* I. p. 18. t. 16. n. 31.

*Fuco Acinara di foglie lunghe, e nella sommità de rami florida.* GINANNI, *Op. Post.* I. p. 19. t. 17.

β. *crispus*; foliis confertis, ellipticis, denticulatis, undulatis, crispisque.

*F. lendigerus.* ESPER,  *Ic. Fuc.* I. p. 37. t. 15.

*F. crispus.* FORSKÅL, *Fl. Egypt.* p. 191?

*F. undulatus*; *Syst. Nat. Ed. Gmel.* II. p. 1381?

γ. *acanthicarpus*; foliis lineari-ellipticis, dentatis; receptaculis spinosis.

δ. *parvifolius*; foliis oblongis, serrato-dentatis; vesiculis apice attenuatis.

*Fuco Acinara di foglie corte e strette.* GINANNI, *Op. Post.* I. p. 19. t. 18.

ε. *integrifolius*; foliis inferioribus lanceolatis, sub-integerrimis; superioribus linearibus, dentatis.

ζ. *angustifolius*; foliis linearibus, angustissimis, sparsis, hinc illic dentatis.

HABITAT in Oceano Atlantico, Pacifico, et Indico, et ad omnium ferè terrarum oras inter alia rejectamenta occurrit.—β in Indiâ Occidentali. D. Wright.—γ in Mari Rubro. *Viccomes de Valentia*.—δ in Mari Mediterraneo. Ginanni.—ε Bermudis Insulis accepi.—ζ in Novæ Hollandiæ oris. D. Velley.—ξ in Mari Rubro. *Viccomes de Valentia*.

*Perennis.*

RADIX discus lignosus, conicus, diametro ferè pollicaris.

FRONDES ex eadem basi plurimæ, caule instructæ compresso, et propemodum ancipiti, pedali, vel bipedali, pennæ columbinæ crassitie, flexuoso, plerumque simplice, rariùs bifurco, obsito per totam longitudinem ramis compressis, distichis, e caulis angulis exeuntibus, simplicibus, bi- tri-pollicaribus, alternis, spatio brevi, attamen incerto, sejunctis, folia vesiculæque sustentantibus: folia lineari-lanceolata, vel linearia, interdum et lineari-oblonga, latitudine ab unguiculari ad bilinearem variant, disticha, alterna, nunc remotiuscula, nunc conferta, sessilia, aut basi in petiolum perbreve decurrentia, costâ tenui nigricante, nervos nullos laterales emittente percursa, poris mucifluis pertusa, margine argutè et absque ordine serrato-dentata: vesiculæ ramis quoque impositæ, et foliis immixtæ, haud ita frequentes, sphaericæ, *Juniperi communis* baccis aliquantum minores, petiolis planis, angustissimis, sursum dilatatis, lineam unam alteramve longis fultæ.

FRUCTIFICATIO receptacula bilinearia, cylindracea, in ramis sita, quandoque hinc illic spinulosa, simplicia, vel bifurca, conferta, et in racemum disposita, extrinsecus ubique inæqualia, ob tubercula innata sphaerica poro minutissimo pertusa; semen in singulis tuberculis unicum, fuscum, subrotundum, limbo pellucido cinctum.

COLOR plantæ recentis olivaceus; exsiccata atro-fuscescens; rursus madefactæ rufo-fuscus; sin frequentius sit elota, et tempestatis mutationibus objecta fit aquosè spadiceus.

SUBSTANTIA foliorum et vesicularum cartilaginea, tenuis; caulis sub-coriacea; ubique, etiam in exsiccata, mollis et flexilis.

β varietas est primo aspectu notabilis ob folia insignitè crispa et undulata:—folia conferta, elliptica, sesquiunguem longa, et tres quatuorve lineas lata; margo minutissimè dentatus; vesiculæ infrequentes, aliquando prorsus desunt.

γ ad tri- quadri-pedalem longitudinem excurrit; crescendi modus diffusus; rami semipedales, et ultra; folia laxè disposita, longitudine subpollicaria, latitudine quatuor linearum; margo profundè absque ordine incisus, dentibus majoribus quàm in reliquis varietatibus; vesiculæ sparsæ, frequentes; receptacula copiosa, insignitè spinosa; color pallidior quàm in α et β, magisque rufescens.

δ elegantissima est varietas, præcedentibus tenuior et magis delicata; rami breves; folia approximata, longitudine vix unguem, latitudine vix duas lineas æquant; receptacula perquam exigua; vesiculæ satis copiosæ, apice attenuatæ, et plerumque mucrone brevissimo aristatæ:—nana videtur planta.

ε stirps sesquipedalis illud habet notatu dignissimum folia basin versus e caule orta esse lanceolata, duos vel tres pollices longa, quatuor lineas lata, et margine sub-integerrima, dum ramea sunt triplò breviora et angustiora, et manifestè dentata; substantia pertenuis; color fuscus; vesiculæ nequaquam frequentes, sphaericæ.

ξ *F. natantem*

\* Hoc synonymon ad *Fucum Acinarium* retulit Gmelinus, sed, me iudice, injuriâ: quamvis enim folia icon integerrima sistat, *Fucum* Baulini *folliculaceum serrato folio*, et *Lenticulam* Lobelii *marinam serratis foliis* sub eo citavit nobilissimus auctor, iconesque in opere omnes sunt rudes, et quibus haud nimis fidendum. Has omnes, scilicet, t. 16, 17, 18, et 19, ad *F. Acinarium* pertinere credit Wulfenius.

† Caulis ut plurimum contortus evadit, unde sæpe accidit ramorum dispositionem alternam non statim patere.



ζ *F. natantem* cum *F. Acinaria* connectit:—longitudo bipedalis; folia remota, sesquipollicem longa, unam modò lineam lata, dentibus sparsis majusculis; vesiculæ oblongo-sphæricæ in petiolum decurrunt: crescendi modus diffusus: fructum non vidi.

Obs. Exsiccata chartæ ne minimum adhæret.

Si, dum *Fucorum* species ordinarem, meis tantummodò votis obtemperandum putavissem, certè voluisssem descriptionem iconemque illius hic depictæ potiùs ad hujus operis distulisse finem quàm in ipso limine sistitis; quoniam de plantâ, quæ in omnibus ferè maribus abundè provenit, licet sperare, ut, novis exemplarium copiis sæpe acceptis, notitia nostra quotannis augeatur, et ut terminos meliùs definitos inter illas stirpes, quæ, quantumvis distinctæ, jam sub uno *F. natantis* nomine commiscuntur, tandem statuere valeamus. Magnum dari harum stirpium numerum, et in plures varietates speciesque distribui debere jamdudum mihi persuasum habui, nec quivis, uti credo, in re tantillùm versatus facilè huic sententiæ inficias ibit; quamvis haud sit dissimulandum, similitudinem inter hasce omnes intercedere talem, qualis maximo sit ad intelligendum impedimento. Hæc de re, ut nodum pro virili solverem, et simul, Botanicorum aliorum animos huc alliciendo, omni quo potis est auxilio fruar, visum est, \*morâ nullâ interpositâ, exhibere iconas eorum *Fucorum F. natanti* affinium quorum jam extant descriptiones; quo facto, apertior patebit pro iis campus, qui, licet hactenùs sint ab auctoribus prætermis, specierum distinctarum prærogativam jure non minus æquo sibi asserunt. De notis quæ varietates suprâ memoratas distinguunt tam fusè dum unamquamque describerem tractavi, ut plura nunc proferre supervacaneum videatur. Quidquid hujus *Fuci* synonymiam variaque a congeneribus discrimina spectat, ad illas stirpes, et præsertim ad *F. bacciferum* retuli; ea modò hujus loci adjecturus quæ de universali, ut ita dicam, *F. natante* traduntur; quorum plurima jam olim enumeravit Gmelinus, qui omnia, quæcunque veteres meminerunt, summâ diligentia collecta exhibuit. Monendus tamen est lector, me stirpem hic depictam eâ primùm de causâ selegisse cui *F. natantis* nomen multis debitum imponerem, quòd reliquis omnibus vulgatiorem crederem, insequente modo demptâ, quæ non nisi sterilis hucusque est reperta; et quòd has tantùm duas in herbario suo hoc titulo insignitas servaverit Linnæus, qui *F. Sargasso* nomen, per quod diu inter Lusitanos innotuerat, *natanti* mutavit, credens semper liberè in oceano natare, nec ullis unquam affixam inhaerere scopulis. A tali sententiâ Botanici reliqui citò et meritò dissentierunt, nec opus est ut aliquid ad efficacius refellendam nunc adjiciatur; quoniam plurimas e varietatibus cum radicibus, et quasdam etiam loco suo natali innascentes tempus insequens melioribus auspiciis detexit. Brownius, Sloanius, Morisonius, atque itidem auctores cæteri, qui *F. natantem* congeneresque memoraverunt, descriptionibus sunt usi tam brevibus, ut, rem ultra spem positam existimans, nihil ad eorum synonymia extricanda sim conatus; cum non fieri possit ut conjecturâ assequamur quemnam inter omnes hoc vel illo nomine perstringere velint. Neque adeo magis necesse est ut multis hic verbis exponatur quidquid fuit olim de harum plantarum fructu somnium. Ipsum etiam Gmelinum haud fugit vesiculas sphæricas, quas pro fructificatione habuerunt †Linnæus Vahlusque, non posse ad talem a Naturâ finem constitui; et *verarum* illarum capsularum deprehensio, ob quam sibi tantum gratulatur ‡Ruizius, adeo repugnat rationi ut semet satis ipsa refellat. §Immensam *F. natantis* copiam, quæ in Oceano Atlantico provenit, multi non sine admiratione memoraverunt navigatores, inter quos ||Columbus et Lærius, qui per tales ejus acervos transierunt, ut mare pratum referret, et vel navium cursos tardaretur. Simile quiddam tradiderunt Osbeckius Rumphiusque, quorum ille addit, aceto conditum sapore vix cedere *Crithmo maritimo*, quo nos utimur; et hic in *Herbario Amboinensi* inquit, fieri ex hoc *Fuco* aliisque *Algis* acetaria cruda, quæ limonum succo, pipere, atque zingibere condiuntur. Præter hos Ruizius, ipse expertus, esculentum laudat, et præsertim juniorem atque caulium extremitates commendat: in Regno quoque Chilensi ferculum ex ipso effici tradit. Medicinæ loco ab aliis adhibetur; unde Bomarius, in suo *Naturalis Historiæ Lexico*, narrat esse aperientem, diureticum, et antiscorbuticum; necnon Kalmius in itineralio refert, in Americâ uti incolas *Sargasso* ad febres profligandas, et parturientes pulverem comedere exsiccatum ut partus promoveatur. Sed licet hæc planta sese hisce humano generi utilem præstet, talem finem non nisi secundarium respexisse videtur Summus Omnium Creator, cum eam effligeret; dum enim per oceanum copiâ penè incredibili fluitat, ministrat victum atque refugium piscibus Molluscisque innumeris; qui ex hoc vegetabili nutriti, ex eodem defensi, ENTIS ENTIVM, per quem creantur et creati protegentur, curam nulli animalculo, denegatam testantur.

- a. *F. natans*, magn. nat.
- b. *folium*, et *receptaculorum racemus*, magn. auct. - - 6.
- c. *receptaculum horizontalitè dissectum* - - - 3.
- d. *semina* - - - - - 1.
- e. *varietatis γ portio* - - - - - 6.

\* Illud etiam me ad has plantas hæc delineandas movit, ut starem promissis jam olim in *Fucorum Britannicorum Synopsi* datis, me illarum investigationi quàm citissime memet accincturum, quod tamen ne maturius facerem plurima impediverunt.

† Linnæus quidem aliquam veræ fructificationis notitiam habuisse videtur, quoniam dicit in *Systemate Naturæ*, "in quibusdam individuis ex *alis foliorum racemi brevissimi siliculis minutis verrucosis*:" cui verò sententiæ Vahlus se assentiri negat, inquit; "racemos brevissimos siliculis minutis verrucosis in *alis foliorum* non nisi rudimenta ramorum esse eo certius affirmare queo, cum specimina plura ad manus sunt, ubi alii ramuli racemorum foliiferi, alii vesiculiferi s. nt."

‡ Repertum suum talis momenti credidit hic Botanicus, ut Commentarium, de vera *F. natantis* fructificatione inscriptum, ad id illustrandum ederet, cujus ad finem tria *F. bacciferi* exemplaria sistit, quorum uni innascitur *Sertularia rotabilis*, quam masculos flores dicit, alteri *S. pumila*, quam feminæos, tertio *S. Plana*, quam pro hermaphroditis habet. Multa tamen notatu digna, quorum sub specie insequente fit mentio, libellus includit.

§ De hæc stirpe, in *Speciebus Plantarum*, dicit Linnæus, "vegetabile, ni fallor, inter omnia in orbe, numerosissimum."

|| Cum ipse libros, e quibus hæc observationes depromuntur, nunquam viderim, quod Gmelinus de re scripserit hic exscribere cogor: "quum CHR. COLUMBUS, (celare enim nefas esset quod tantam *Sargasso* famam conciliavit) Ao. 1492, investigaret mundum, et ab Insulis Canariensibus ad occidentalem trajiceret plagam, mare mox tot refertum deprehendebat herbis, ut pratum referret, dicitque herbam esse flavescenscentem, iustarum feni semisicci, folia gerentem rutæ vulgaris, cui adpendantur copiosæ baccae nigerrimæ, quæ siccate juniperinas referebant.—LÆRIUS in itineralio suo refert, quod per viginti quinque dies per illam herbam, nisi securibus viam aperissent, naves remorari debuissent, inponebatque aqua marium, per illas herbas turbida, esse se in paludibus cœnosis depulso."—Gmelin, *Hist. Fuc.* p. 93.





*Fucus natans.*







*Fucus natans*, stem compressed, filiform, pinnated: branches alternate, simple: leaves lineari-lanceolate, serrated: vesicles spherical, on flat petioli: receptacles cylindrical, racemose.

*Fucus natans*. LINN. *Sp. Pl.* II. p. 1628. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. *Fl. Zeyl.* p. 184. *Hort. Cliff.* p. 478. *Fl. Ang.* p. 572. *Linn. Trans.* III. p. 107. *With.* IV. p. 86. *Syn. Fuc.* I. p. 48. *Fl. Atl.* II. p. 421. *Fl. Lus.* II. p. 434. *Fl. Fr. Ed. 2da.* II. p. 26. *Fl. Ped.* II. p. 330. *Fl. Monsp.* p. 458.

*F. Sargasso.* var. 1. GMELIN, *Hist. Fuc.* p. 93.

*F. acinarius.* var. ESPER,  *Ic. Fuc.* I. p. 130. t. 66.

*F. subrepandus.* FORSKÅL, *Fl. Egypt.* p. 192? *Syst. Nat. Ed. Gmel.* II. p. 1381?

*F. folliculaceus serrato folio.* BARRELIER, *Icones.* t. 1122.

\* *Fuco Acinara con foglie di mezzana grandezza.* GINANNI, *Op. Post.* I. p. 18. t. 16. n. 31.

*Fuco Acinara di foglie lunghe, e nella sommità de' rami florida.* GINANNI, *Op. Post.* I. t. 19. f. 17.

β *crispus*; leaves clustered, elliptical, slightly toothed, waved and curled.

*F. lendigerus.* ESPER,  *Ic. Fuc.* I. p. 37. t. 15.

*F. crispus.* FORSKÅL, *Fl. Egypt.* p. 191?

*F. undulatus.* *Syst. Nat. Ed. Gmel.* II. p. 1381?

γ *acanthicarpus*; leaves between linear and elliptical, toothed; receptacles thorny.

δ *parvifolius*; leaves oblong, serrato-dentate; vesicles attenuated at their apices.

*Fuco Acinara di foglie corte e strette.* GINANNI, *Op. Post.* I. p. 19. t. 18.

ε *integrifolius*; lower leaves lanceolate, nearly entire; upper ones linear and toothed.

ζ *angustifolius*; leaves linear, very narrow, scattered, here and there toothed.

In the Atlantic, Pacific, and Indian Oceans, whence it is carried among other rejectamenta of the sea to the shores of almost every country.—β in the West Indies. *Dr. Wright.*—γ in the Red Sea. *Lord Valentia.*—δ in the Mediterranean. *Ginanni.*—I have received it from the Bermuda Islands.—ε on the shores of New Holland. *Col. Velley.*—ζ in the Red Sea. *Lord Valentia.*

*Perennial.*

ROOT, a woody, conical disk, almost an inch in diameter.

FRONDS, several from the same base, furnished with a flattened and nearly two-edged stem, one or two feet long, about as thick as a pigeon's quill, flexuose, generally simple, but occasionally forked, beset throughout its whole length with compressed, †alternate, distichous branches, arising from the edges of the stem, separated by a short, but uncertain, distance, and supporting both leaves and vesicles: leaves lineari-lanceolate or linear, or sometimes between linear and oblong, varying in breadth from two lines to half an inch, distichous, alternate, in some cases rather remote, in others clustered, sessile, or attenuated at their base into a very short petiolus, provided with a thin blackish midrib which sends out no lateral veins or nerves, their surface dotted with mucifluous pores, their margin serrato-dentate, with sharp teeth disposed in no certain order: vesicles also placed upon the branches, and mixed with the leaves, not very numerous, spherical, somewhat smaller than Juniper-berries, supported upon very narrow flat petioli, which are dilated upwards, and one or two lines long.

FRUCTIFICATION, cylindrical receptacles, placed on the branches, two lines long, occasionally beset with a few small spines, either simple or forked, clustered, and disposed in a racemus, externally every where uneven from the innate globular tubercles, perforated with a very minute pore, each containing a single roundish, brown seed, surrounded by a pellucid limbus.

COLOR, of the plant when recent, olive; dark-brown, when dry; after it is again moistened, reddish-brown; but if frequently washed and exposed to the action of the air turning to a light brown.

SUBSTANCE, in the leaves and vesicles thin and cartilaginous, in the stem inclining to coriaceous; but every where, even when dry, soft and flexible.

β is a variety remarkable at first sight, on account of the singularly curled and undulated leaves:—leaves clustered, elliptical, three quarters of an inch long, and three or four lines wide; their margin most minutely toothed; vesicles scarce, sometimes altogether wanting.

γ extends to three or four feet in length: its mode of growth is diffuse; its branches half a foot and more long; its leaves loosely arranged, about an inch long, and four lines wide; their margin deeply and irregularly notched, with teeth larger than in the other varieties: vesicles scattered, numerous: receptacles abundant, remarkably thorny: color paler than in α and β, and more reddish.

δ is a most elegant variety, more thin and delicate than the preceding ones:—branches short;—leaves placed close to each other, scarcely half an inch long, or two lines wide; receptacles very small; vesicles tolerably plentiful, attenuated at their apices, and most frequently tipped with a short awn:—it seems a dwarfish plant.

ε is

\* Gmelin has referred this synonym to *F. Acinaria*, but, in my opinion, without cause; for, though the leaves are represented in the figure as entire, yet the author has quoted under it Bauhin's *F. folliculaceus serrato folio*, and Lobel's *Lenticula marina serratis foliis*, and it needs scarcely be remarked that all the figures in the work are so rude, that great dependence is not to be placed on them in nice points. Wulfen considers both '6, 17, 18, and 19 as belonging to *F. Acinaria*.

† The stem is most frequently twisted, on which account the alternate disposition of the branches is seldom visible at first sight.



is about a foot and half long, and remarkable for having towards its base lanceolate leaves, two or three inches in length, and four lines in width, and almost entire, while those on the branches are shorter and narrower by two thirds, and have their margins visibly toothed: substance very thin: color rusty brown: vesicles by no means numerous, spherical.

ζ connects *F. natans* with *F. Acinaria*:—length two feet; leaves remote, an inch and half long, but not above a line wide, the margin furnished with largish scattered teeth: vesicles between oblong and spherical, decurrent into a petiolus: mode of growth diffuse:—I have seen no fruit on it.

Obs. When dried it does not adhere in the least to paper.

Had I considered it right to be guided altogether by my own inclination in the arrangement of the different species of Fuci for publication, I should certainly have been tempted rather to have reserved the present for the conclusion of this work, than to have given it a place at the very commencement; since, from the circumstance of its being found in such immense quantities in almost every sea, there might be reason to hope that fresh supplies of specimens may be frequently received, and opportunities consequently afforded for better defining the limits between the different varieties and species hitherto comprehended under the one general name of *F. natans*. That such varieties and species do really exist, and exist in considerable quantity, is a thing of which I have long been persuaded, and which will, I believe, very readily be admitted by every Botanist who has been in the habit of directing his attention to the subject. It must not, indeed, be denied, that the numerous points of similarity between these, oppose great obstacles to our understanding them properly; but at the same time to effect in this matter as much as possible by drawing the notice of Naturalists more particularly to them, it seemed advisable to figure\* without delay such of the affinities of the present plant as have been described by preceding authors, and thus to clear the way for gradually introducing the others, which, though hitherto neglected, ought, in my opinion, to be regarded as no less certainly distinct. Upon the peculiar appearances which distinguish the varieties above noticed, so much has already been said under each of them, that it cannot be necessary here to dwell farther upon the subject; and for most of the observations touching the synonymy of *F. natans*, and its difference from its congeners, I must refer my readers to those plants, and especially to *F. bacciferus*, merely confining myself in the present instance to general remarks, which have been very much exhausted by Gmelin, who with great assiduity collected whatever he found written respecting it. I feel it, however, necessary to observe, that my reasons for selecting the *Fucus* here represented as the true *F. natans*, in preference to others which may perhaps be regarded as equally deserving of the appellation, have been, that I believed it more common than any of the rest, except, perhaps, the following, to which I preferred it on account of its fructification; and that these two are alone preserved under this title in the Herbarium of Linnæus, who changed the name of *F. Sargasso*, by which it was known among the Portuguese, to that which it now bears, under the idea that it floated about in the ocean, without being attached to any particular spot; an idea which was soon generally and deservedly exploded, and which in later times has been quite controverted by most of the varieties having been actually found with roots, and some even gathered in their loci natales. I have abstained above from any endeavor to unravel the confused synonyms of Brown, Morison, and the older writers respecting *F. natans* and its congeners, their descriptions being in general so short as not to furnish the means of guessing to what they allude; nor is it necessary to dwell at length upon the mistaken notions that have prevailed as to the fruit of these plants: even Gmelin was aware that the spherical vesicles which † Linnæus and Vahl regarded as the fructification, could not have been designed by nature for this purpose, and the discovery, upon which ‡ Ruiz prided himself, is so absurd, that the very mentioning of it is in itself a sufficient refutation. § Numerous are the accounts given by navigators of the immense quantity in which *F. natans* is found in the Atlantic. Among these || Columbus and Lerus met with it in such prodigious masses that it made the ocean appear like a meadow, and impeded the progress of their ships. Observations nearly similar are made by Osbeck and Rumphius, the former of whom remarks that, if prepared with vinegar, it furnishes a pickle not inferior to Samphire, and the latter informs us in his *Herbarium Amboinense*, that of it and other Algæ are made salads, which are eaten seasoned with the juice of lemons, pepper, capsicum, and ginger. Ruiz also, from his own experience, praises its esculent nature, especially that of the younger shoots, and says that it is eaten in the kingdom of Chili. It is likewise in some places employed medicinally, and is particularly mentioned

\* I was also the more induced to do this by the promise given in the *Synopsis of the British Fuci*, (I. p. 51.) that I would as early as possible direct my attention to this tribe of plants; a promise which I have from different circumstances been prevented from fulfilling sooner.

† Linnæus indeed seems to have been in a measure acquainted with the true fruit, for he says in the *Systema Naturæ*, “in quibusdam individuis ex alis foliorum racemi brevissimi siliculis minutis verrucosis;” Vahl, however rejects this, and observes, “racemos brevissimos siliculis minutis verrucosis in alis foliorum non nisi rudimenta ramorum esse eo certius affirmare quæo, cum specimina plura ad manus sunt ubi alii ramuli racemorum foliiferi, alii vesiculiferi sint.”

‡ This Botanist considered his discovery of so much consequence that he published a pamphlet to illustrate it, entitled, “de vera Fuci natantis fructificatione Commentarius,” at the end of which he figures three specimens of *F. bacciferus*, the one infested with *Sertularia volubilis*, which he calls the male flowers, the second with *Sertularia pumila*, which he considers the female flowers, and the third with *Sertularia Plumæ*, which he regards hermaphrodite flowers. Independently, however, of this strange error, his work contains many useful observations, and much information, of which I have availed myself under the following species.

§ Linnæus says of this plant in the *Species Plantarum*, “Vegetabile, ni fallor, inter omnia in orbe, numerosissimum.”

|| Never having myself seen the works from which these observations are taken, I am under the necessity of transcribing what Gmelin has written upon the subject:—“Quam CHR. COLUMBUS (celare enim nefas esset quod tantam Sargasso famam conciliavit) Ao. 1492, investigaret mundum, et ab insulis Canariensibus ad occidentalem trajiceret plagam, mare mox tot refertum deprehendebat herbis, ut pratum referret, dicitque herbam esse flavescens, instar fœni semisicci, folia gerentem rutæ vulgaris, cui adpendantur copiosa: bacce nigerrime, quæ siccate juniperinas referebant.—LAERIUS in itinerario suo refert, quod per viginti quinque dies per illam herbam, nisi securibus viam aperuissent, naves remorari debuissent, imponebatque aqua marina, per illas herbas turbida, ut crederent, esse ac in paludibus cœnosis depulsos.”—Gmelin, *Hist. Fuc.* p. 94.



mentioned by Bomare, in his *Dictionary of Natural History*, as being both aperient, diuretic, and antiscorbutic, and by Kalm, in his travels, as being used among the natives of America to cure fevers, and as being eaten in a dry and powdered state by the women in childbirth, to facilitate parturition. Its serviceable qualities to mankind seem, however, to be but very secondary among the beneficent purposes which the Great Creator of all has designed it to answer in the economy of nature; for while it thus floats about in such almost inconceivable quantity, it affords both food and shelter to myriads of fishes and molluscæ, who, at once deriving from it their sustenance, and finding in it a refuge, bear testimony to the wisdom and goodness of that Being by whom they are created, protected, and preserved.

- a. *F. natans*, natural size.  
 b. leaf, and cluster of receptacles, magnified - 6.  
 c. receptacle cut through horizontally - 3.  
 d. seeds - - - - - 1.  
 e. piece of var.  $\gamma$  - - - - - 6.

## 47.—FUCUS BACCIFERUS.

*Fucus*, caule tereti, filiformi, bipinnato: ramis alternis, simpliciusculis: foliis linearibus, serratis: vesiculis sphaericis, petiolatis; petiolis teretibus.

*Fucus bacciferus*. Syn. *Fuc.* I. p. 55.

\* *F. natans*. ESPER, *Icon. Fuc.* I. p. 49. t. 23. WULFEN, *Crypt. Aquat.* n. 2. VAHL, *Skrift. af Naturhistorie Selskabet*. V. pars 2da. p. 36. RUIZ, *Commentarius de F. natante, cum icon.*

*F. denticulatus*. FORSKÅL, *Fl. Egypt.* p. 191. *Syst. Nat. Ed. Gmel.* II. p. 1381.

*F. Sargasso*. GMELIN, *Hist. Fuc.* p. 92.

*Lenticula marina vulgaris*. PARKINSON, *Thes.* p. 1281.

*β. oblongifolius*; foliis oblongis, obtusis, serrato-dentatis.

HABITAT utraque varietas in Oceano Atlantico, Pacifico, et Indico, unde ad omnium ferè terrarum oras inter alia rejectamenta vi fluctuum fertur.—Copiosè in Oceano Septentrionali a 22 ad 38 gradus. Ruiz.

† *Perennis*.

‡ RADIX nondum cognita.

FRONS pedalis et ultra, sed longitudo incertissima, cum nihil quod basi proximum videtur hactenus sit visum, caule instructa tereti, filiformi, pennæ passerinæ crassitie, flexuoso, plerumque bis terve diviso, segmentis elongatis, fastigatis, obsitis per totam longitudinem ramis teretibus, patentibus, alternis, laxiusculè dispositis, ut plurimum simplicibus, quandoque autem divisis, longitudinis incertæ, sed sæpius quatuor vel quinque pollicum, folia vesiculasque sustentantibus: folia plana, linearia, sed apices versus acutiuscula, § pollicem unum alterumve longa, et vix lineam lata, sessilia, remotiuscula, alterna, costâ tenui nigricante nervos nullos laterales emittente percurta, poris mucifluis rariùs, si unquam, pertusa, margine serrato-dentata, dentibus majusculis, sparsis: vesiculæ sphaericæ in ramis frequentes, grani piperis nigri magnitudine, nunc solitariae, nunc binæ ternæve, || intus omnino cavæ et lævigatæ, petiolo tereti lineari seu bilineari fultæ, apice ut plurimum, nequaquam vero semper, mucrone brevi setaceo aristatæ.

FRUCTIFICATIO nondum detecta.

COLOR plantæ recentis ferrugineo-pallidus, supernè luteo-virescens; exsiccata nigricans; rursus madefacta intensè fuscus.

\* SUBSTANTIA

\* Rectiùs forte fecissem, si synonyma omnia jam sub *F. natante* citata, hic quoque repetivissem, quoniam dubitationi non datur locus, quin Linnaeus et plurimi auctores, qui *F. natantem* memoraverunt, utrumque paritèr respexerint. Malui verò ea modò proferre quæ pro certis habui, ut nos tandem e synonymorum ambagibus, quantum id fieri potest, exolvere conemur.

† Annuam modò credit Ruizius, qui dicit, "non ideo ansim affirmare, *Fucum natantem* in aliis anni tempestatibus supra aquas in pelago non inveniri; fortasse in aliis maris tractibus, polis aut æquatori magis approximatis, hæc planta in diversis mensibus, sed nequiquam toto anno viget."—Addit quoque, "Quinimo non desunt quæ suadeant, singulis annis perire in maris littoribus a fluctibus ventisque in ingentes veluti acervos sub hyemis adventum convolutas, atque rejectas, ut scilicet semina emittant, et denuo in rupibus et maris fundo germinent, quousque per æstatem inde ventis divulsæ in pelagum propellantur, ubi perfectionem suam assequantur, fructificentque, et in littora iteratis vicibus protrusæ destruantur."—*Comment. de F. natante*, p. 20 & 21.

‡ Scabritiem hic illic in fronde notabilem esse solam plantæ radicem credit Ruizius, cujus sic stat de hæc re sententia, "In his Algis nullæ radices observantur, sed earum loco quasdam scabrities inferius habent, quibus certissimè saxi, et maris fundo, dum juniores essent, adhæserunt, quousque vegetiores, et vesiculis cavis numerosis, quas a natura acceperunt, præditæ, iteratis impulsibus, quos jam adultæ sursum subeunt, a rupibus et profundioribus locis evelluntur, et super aquas emergunt, ut aere atmosferico, luce, et calore gaudentes perfectionem acquirant, et fructus ferant, prout accidit in aliis pallidum, stagnorum, et fluviorum stirpibus, quarum flores saltem ex aquis ad hunc finem exsurgunt, emanantque."—*Comment. de Fucis natante*, p. 17.

§ Ipse saltem longiora nunquam vidi, sed palmaria dicit Ruizius.

|| De his vesiculis dicit Ruizius se ipsas accuratissimè introspectis, atque e millenis, quas primis diebus observavit, nullam invenisse, quæ pilos includeret, de quibus rogat Linnaeus an sint masculi flores, e contrario cunctæ cavæ et vacuæ esse ostendunt, et quasi interius politæ.—*Comment. de Fucis natante*, p. 6.



\* *SUBSTANTIA caulis* coriacea, *foliorum* et *vesicularum* cartilaginea; *exsiccata* ubique rigida, fragilis, et flecti nescia.

β in eo tantummodò discrepat ab α, quòd folia habet oblonga, duas lineas lata.

Obs. Præter varietatem illam jam memoratam ludere solet hic *Fucus* foliis vix semilineam latis, et quandoque ramis vesicularum tantâ copîâ onustis ut toti ferè cooperiantur:—chartæ ne minimùm adhaeret:—habitus in exsiccata implexus et tortilis, nec ullâ arte in rectum revocandus:—copiosè ei innasci solent *Sertularia Pluma*, *quadridentata*, *volubilis*, aliæque e minoribus Zoophytorum speciebus; aliquando etiam *Serpula* quædam.

Hunc *Fucum*, semper antehac cum stirpe in tabulâ præcedente depictâ commistum, primo ab illâ sejunct *Fucorum Britannicorum Synopsis*, unde quidquid est a veteribus traditum, sive de immensâ, quâ *F. natans* provenit, copîâ, sive de ejus proprietatibus cibo medicinæve inservientibus, non minùs unam harum quàm alteram respicit, et fortasse possit referri ad plurimas ex illis, quas, mox in hoc opere discernendas, capax illud *F. natantis* nomen hucusque includit. Hæc *Fucorum* familia, si mihi liceat pro distinctâ familiâ habere, complectitur multas stirpes, arctissimè inter se formâ connexas, et reliquarum valdè absimiles, imo characteribus tam insignibus notatas, ut proprium ferè constituere genus, idque naturæ maximè conveniens, primo aspectu videantur. Attentiùs verò inspicienti patebit, necesse esse has conjungi cum iis, quas *Fucos proprios* appellaverunt Weberus Mohriusque; fructificationem enim utrisque esse eandem, darique catenam, cujus sunt annuli *F. turbinatus* et quædam aliæ species nondùm hic delineatæ, per quam cunctæ devinciuntur. Neque tamen idcirco est negandum, inesse *F. natanti* congeneribusque notam vix in aliis reperiendam, scilicet folia nunquam in ramos mutari, sed formam sui propriam semper servare, quamvis, ut jam est sub *F. turbinato* observatum, et ut liquidissimè ea *F. ilicifolii* iconè, t. 51, constat, receptacula jam efficta in nova folia vesiculasque abeunt. Multa ex iis quæ sunt suprà de *F. baccifero* tradita e Ruizio excerpti, cujus descriptio et figura hanc plantam bene exprimunt, et cujus tractatus, quamvis nomine parùm idoneo *Commentarius de sverâ F. natantis fructificatione* inscribatur, multa tamen includit dignissima quæ memorentur, qualiacunque ipse de recente notavit, cùm sit illi data facultas, quæ, ut jure prædicat, paucis aliis contigit, per duos menses viventem observandi. Vesiculæ aeræ in *F. natante* et congeneribus prorsus vacuæ fibrilloso illo contextu interno penitus carent, quo sunt instructæ eæ *F. vesiculosi*, plurimorumque *Fucorum propriorum* qui nostrum mare incolunt. In exemplaribus a Ruizio visis harum numerus adeò erat ingens, ut e navi conspectæ uvularum immaturarum racemos referrent: has omnes a quibusdam individuis abscidit, quò certius stabiliretur sententia, esse a naturâ datas ut natantibus auxiliarentur. Rectè in hoc judicasse probavit exitus, cum stirpes omnes sic mancæ rursùs immersæ maris fundum illicò peterent. De nominibus hujus *Fuci* et præcedentis est \*\*animadversum, nec, ut verum fatear, injuriâ, utraque commutata plantis aptius

\* "Dum hæc Vegetabilia recentia persistunt, membranacea apparent, tenera, et gelatinosa: sed arefacta ichthyocollæ consistentiam acquirunt, et ejusdem substantiæ instar fragilia evadunt. In utroque statu saporem præ se ferunt viscidum, minimè ingratum, nec nauseabundum, et gari odorem."—*Comment. de Fuce natante*, p. 27.

† Forsan ex his excipi debet D. Lardizabal, qui de *F. baccifero* tantum agere videtur, et rem tam fusè tractavit, ut me lectoribus morigeraturum credo, si quidquid Ruizius ex illo exscripsit hujus loci repetam. "D. Vincentius Lardizabal, Regiæ Cantabrigiæ Societatis Medicus, *Dissertationem Physico-Medicam de ejusdem viribus et proprietatibus* hispanicè evulgavit, Matriti, anno 1772, sub titulo *Consuelo de Navegantes*. Hic eandem descriptionem et iconem ab Acosta mutuam exhibet, nihil in hac parte de suo adjiciens: plures scriptores memorat, qui de hac planta marina egerunt, et nonnulla loca ejusdem natalia, quin assignet anni tempestatem, qua supra aquas sese ostendit: qualitates, et usus addit, ab Acosta observatos: quæcumque ille de ejus virtute antiscorbutica tradit mordicus amplectitur, usus medicos et economicos commendat, et iteratis argumentis suadere conatur: rationem *F. natantis* gari odore, et nonnullis impuritatibus spoliandi, methodumque ex eo Acetaria præparandi et condiendi docet. Addit eum ad aves et pecora in navigatione alenda inservire posse, et non sine utilitate ad carnes et pisces salitos marisque aquam brevi edulcorandam adhiberi. Haud meminit incrustationum calcæarum, neque cochlearum, quibus maximam partem in littoribus et pelago hujusmodi plantæ conteguntur. . . . Hortatur autem, ad præparandum acetarium coctum, primum *Fuci* herbam lavare, deinde in frusta conscindere, mox in olla coquere cum sufficienti aquæ dulcis quantitate, et post unam aut alteram ebullitionem priori aqua effusa aliam denuo addere cum paucillo salis, et allii, in qua coquatur ad molliem, et denique illi in disco collocatæ olei incocti aut cum allii frixi, et aceti quantum sufficiat admiscere. Suadet quoque, aquæ dulcis defectu, adhibere maris aquam, in qua herba cocta insipida ferè evadit, et nonnihil gari odoris tantummodo retinet, quod minime accidit cum aqua dulci."—*Comment. de Fuce natante*, p. 28.

‡ Suprà p. 50.

§ Confer notam sub præcedente specie, p. 100. Id quod Ruizius sigillatim de hoc errore dicit est tam singulare ut hic verbatim transcribere deor:—"quoniam igitur satis mihi exploratum jam erat post tot dierum iteratas investigationes, venas illas, et inflorescentias non esse quidquam a *Fuce* ipso alienum, sed ipsius plantæ partes; ad eas describendas, qua res postulabat, diligentia me accinxi, et pro *Floribus masculis* calyculos solitarios (*Sertulariam volubilem*) "statui; pro *Femineis* spiculas absque calyculis" (*Sertulariam pumilam*) "et pro *Hermaphroditis* spiculas cum calyculis" (*Sertulariam Plumam*) "floribus solitariis similibus. Rationes autem, quæ me impulerunt ad hujusmodi florum distributionem, hæc fuere: eorum dispositio, figura, et affinitas cum aliis diversorum sexuum plantis. Vocavi igitur *Flores masculas* Vascula illa solitaria, quippe numerosiores erant, quam flosculi spicati aliorum duorum sexuum, prout fit in plantis monoicis, dioicis, et polygamis; accedebat etiam, in illis includi quandam substantiam luteo-sulphuream, antherarum pollini aliarum plantarum quodammodo similem. *Flores Femineas* ideo constitui spiculas corporibus conicis conflatas, quia hæc forma pistillorum absque stylo quidam, sed cum germine, et stigmate, aliorum vegetabilium germinibus, et stigmatibus plus minusve similibus, referebant. Denique pro *Floribus hermaphroditis* spicatos flosculos, vasculis masculorum similibus stipatos habui, proptereaquod spicati essent, et minus copiosam continerent substantiam luteo-sulphuream, quam flosculi masculi, qui semper solitarii conspiciuntur, et hujusmodi substantia abundabant. Nudis oculis, quos satis perspicaces a natura sortitus sum, ne quidem vitro adjutus, nullam aliam differentiam in his fructificationibus detegere potui."—*Comment. de Fuce natante*, p. 12.

¶ "Vesicularum vero rotundarum et cavarum, penitusque inanum, quibus replentur singulæ plantæ, adeo ingens erat numerus, ut e navi prospicientibus uvularum immaturarum racemulorum speciem exhiberent. Hæc vesiculæ, utpote materia omni manifesta, quæ pondus eis conciliet, vacuæ, plantarum e rupibus, quibus innascuntur, evulsionem juvant, et ex aquæ superficie emersionem superatationemque, donec transactis vitæ terminis a natura præscriptis marcescere in mari incipiant, penitusque in littoribus destructionem subeunt. Si hujusmodi vesiculis omni substantia ponderoso destitutis non instructæ essent plantæ, neque emergere, neque enatare possent, ni caules et folia poris scaterent aere plenis, qui eas aqua leviores efficerent. Ut hoc experimento comprobarem, pluribus plantis vesiculas abstuli, aliisque dirupi, omnesque illico maris fundum petierunt, neque ad superficiem ascenderunt, impeditæ scilicet caulium, et foliorum solidissimarum, et poris manifestis expertum gravitate."—*Comment. de Fuce natante*, p. 22.

\*\* Hæc animadversio occurrit in recensione *Wulfenii Cryptogamorum Aquaticorum*, in opere, cui titulus, *Allgemeine Literatur-Zeitung*, III. 1805. p. 456. Dicit Censor,—"Da dieser letztere (*F. bacciferus*) aber wirklich fast immer schwimmend, und ohne Befestigungspunkt, ersterer (*F. natans*)



aptius conventura; quoniam *F. bacciferus* hactenus non nisi liberè natans est detectus, et sic vagans, non modò vivere, sed etiam crescere videtur; plurimum ad eorum opinionem ita faciens qui negant Fucorum radices nutrimentum aliquid afferre. Doleo quidem quòd talem non acceperim notationem, donec causæ jam sub specie præcedente memoratæ impulerant ut aliter facerem; et nimis scio quantum e multiplicatis confusisque synonymis detrimenti in rem botanicam fluxit, ut ullum unquam nomen jam cognitum atque receptum sine causâ gravissimâ permutem. Fieri potest ut sint qui suspicentur *F. bacciferum* haud satis distinctum esse speciem, quia nulla vel radix vel fructificatio, ad quam edendam affines haud segnes, hucusque est reperta: tali autem sententiæ assentiri nequeo: licet enim, donec hæ deteguntur, res quodammodò in medio maneat, nullus dubito quin sit a reliquis diversa, cum ob habitum crescendique modum, tum præsertim ob texturam et caulem petiolosque cylindraceos.

a. *F. bacciferus*, magn. nat.

b. *rami pars*, magn. auct. - - - 4.

(*F. natans*) aber häufig mit einer scheibenförmigen Basis versehen, angetroffen wird: so hätten, durch eine Umwechslung, beide Namen an Bedeutung gewonnen. Dass über die wahren Fruchttheile an diesen Arten keine Zweifel mehr sind, braucht kaum erwähnt zu werden: Die nicht bis zur Fruchtbringung ausgebildeten, oder dieselbe vollendet habenden *tubercula* gehen in *Vesica* über, die zur Aufrechthaltung des Strauchs im Wasser dienen. Obgleich dem Rec. ganze Säcke voll dieses letzten aus dem atlantischen Meere eingeliefert worden sind, so fand er ihn immer als *ἀμφύς*; und *ἀκάρπης*."

## 47.—FUCUS BACCIFERUS.

*Fucus bacciferus*, stem cylindrical, filiform, bipinnate: branches alternate, mostly simple: leaves linear, serrated: vesicles spherical, on cylindrical petioles.

*Fucus bacciferus*. Syn. *Fuc.* I. t. 55.

\* *F. natans*. ESPER, *Icon. Fuc.* I. p. 49. t. 23. WULFEN, *Crypt. Aquat.* n. 3. VAHL, *Skrift. af Naturhistorie Selskabet.* V. pars 2da. p. 36. RUIZ, *Comment. de F. natante, cum icon.*

*F. Sargasso*. GMELIN, *Hist. Fuc.* p. 92.

*F. denticulatus*. FORSKÅL, *Fl. Egypt.* p. 191. *Syst. Nat. Ed. Gmel.* II. p. 1381.

*Lenticula marina vulgaris*. PARKINSON, *Thes.* p. 1281.

β. *oblongifolius*; leaves oblong, obtuse, between serrated and dentate.

Both varieties are found in the Atlantic, Pacific, and Indian Oceans, and are thence washed, among other rejectamenta, upon the shores of almost every country.—Plentiful in the Northern Ocean, from 22 to 38 degrees. Ruiz.

† Perennial.

‡ ROOT, not at present known.

FROND, a foot and more long, (but to what length it may extend it is impossible to say with any certainty, as nothing has at present been seen that indicated a positive proximity to a base) furnished with a cylindrical, filiform, flexuose stem, about the thickness of a sparrow's quill, in general twice or thrice divided, with long segments nearly of equal height, and beset throughout their whole length with cylindrical, patent, alternate branches, at small distances from each other, for the most part simple, but sometimes divided, and supporting leaves and vesicles: leaves flat, and linear, but sharpish towards the apices, an § inch or two long, and scarcely a line wide, sessile, rather remote, alternate, provided with a thin blackish midrib, which is destitute of lateral nerves, but seldom, if ever, perforated with

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mucifluous

\* It would probably have been best to have repeated here all the synonyms already quoted under *F. natans*, as there cannot be the least doubt but Linnæus and most of the authors who have mentioned this latter intended their descriptions to be equally applicable to both. Upon consideration, however, I preferred referring to those only which I regarded as certain, hoping that this might be the means of enabling us in time to extricate ourselves from the present perplexity of synonyms.

† Ruiz is of opinion that this plant is only annual, and says, "non ideo ausim affirmare, *Fucum natantem* in aliis anni tempestatibus supra aquas in pelago non inveniri; fortasse in aliis maribus tractibus, polis aut æquatori magis approximatis, hæc planta in diversis mensibus, sed nequiquam toto anno viget."—and again he says, "Quinimo non desunt quæ suadeant, singulis annis perire in maris littoribus a fluctibus ventisque in ingentes veluti æceros sub hyemis adventum convolutas, atque rejectas, ut scilicet semina emittant, et demum in rupibus et maris fundo germinant, quousque per æstatem inde ventis divulsæ in pelagum propellantur, ubi perfectionem suam assequantur, fructificentque, et in littora iteratis vicibus protrusæ destruantur."—*Comment. de F. natante*, p. 20 & 21.

‡ The roughness observable in different parts of the plant is considered as the only root by Ruiz, who remarks on this subject, "In his Algis nullæ radices observantur, sed earum loco quasdam scabrities inferius habent, quibus certissimè saxis, et maris fundo, dum juniores essent, adhæserunt, quousque vegetiores, et vesiculis cavis numerosis, quas a natura acceperunt, præditæ, iteratis impulsibus, quos jam adultæ sursum subeunt, a rupibus et profundioribus locis evelluntur, et super aquas emergunt, ut aere atmosferico, luce, et calore gaudentes perfectionem acquirant, et fructus ferant, prout accidit in aliis paludum, stagnorum, et fluviorum stirpibus, quarum flores saltem ex aquis ad hunc finem exsurgunt, enatantque."—*Comment. de Fuc. natante*, p. 17.

§ At least I have never seen them longer, but Ruiz calls them palmæ long.



mucifluous pores, their margin serrato-dentate, with largish scattered teeth: *vesicles* spherical, numerous, about the size of black pepper-corns, either solitary or growing two or three together, \*internally quite hollow and polished, supported upon a cylindrical petiolus, a line or two long, their apex most frequently, but by no means constantly, tipped with a short setaceous mucro.

FRUCTIFICATION, not yet discovered.

COLOR, when fresh, pale and ferruginous, of a yellowish green in the upper parts; when dried blackish; turning, if again moistened, to a very dark brown.

† SUBSTANCE, in the stem coriaceous, in the leaves and vesicles cartilaginous; in a dried state every where rigid and brittle.

β differs from α only in having its leaves oblong instead of linear, and two lines wide.

Obs. Besides the variety here mentioned, this *Fucus* is apt to vary in producing leaves scarcely half a line wide, and in having its branches sometimes furnished with such a profusion of vesicles as to be almost covered with them:—it does not adhere in the least to paper:—its habit in a dried state is remarkably twisted, and can by no means be brought to straight:—*Sertularia Pluma, quadridentata*, and *volubilis*, as well as others of the smaller Zoophytes, are found upon it in great abundance, and occasionally some of the *Serpula*.

The first mention made of this *Fucus*, as distinct from the preceding one, is in the *Synopsis of the British Fuci*, so that whatever the more early writers have said with respect to the immense quantity in which *F. natans* is found, as well as concerning its medicinal or esculent nature, must be considered as equally applicable to ‡ both species, and might perhaps be extended to the greater part of those, which, though heretofore confounded under one general name, it will be necessary in the course of this work to point out as really distinct. The tribe of *F. natans*, if I may be allowed to use such an expression, comprehends a considerable number of individuals, so closely allied to each other, and so considerably different from the rest of the *Fuci*, that they seem at first sight sufficiently marked to constitute a separate and very natural genus. It will, however, be found upon more attentive examination that they cannot be disjoined from those that Weber and Mohr have called the *Fuci proprii*, with which they agree in fructification, and to which they are united by a series of links formed of *F. turbinatus*, and several other species not at present figured. They have at the same time a strong character almost peculiar to themselves, which is that the leaves do not appear in any case to lengthen into branches, but constantly to preserve their original form, though the receptacles, as has § already been noticed under *F. turbinatus*, and as is most visible in *F. ilicifolius*, t. 51, are metamorphosed both into new leaves and vesicles. In the account above given of *F. bacciferus*, much has been borrowed from Ruiz, whose description and figure are most evidently designed for the present plant, and whose work, though most erroneously termed a *Treatise upon the true fructification of F. natans*, is valuable on account of the particulars that he observed while it was yet fresh; in which state he justly remarks that few botanists, have, like him, enjoyed the opportunity of examining it for two continued months. There seems also to be another circumstance in which *F. natans* and its congeners are naturally different from *F. vesiculosus* and most of the *Fuci proprii* of our seas; which is, that the vesicles are altogether empty, and destitute of the fibrous lining, which is so conspicuous in our

\* Upon the subject of these vesicles, Ruiz says, “se ipsas accuratissime introspexisse, atque e millenis, quas primis diebus observavit, nullam invenisse, quæ pilos includeret, de quibus rogat Linnæus an sint masculi flores, e contrario cunctæ cavæ et vacuæ sese ostenderunt, et quasi interior politæ.”—*Comment. de Fuce natante*, p. 6.

† “Dum hæc Vegetabilia recentia persistunt, membranacea apparent, tenera, et gelatinosa: sed arefacta ichthyocollæ consistentiam acquirunt, et ejusdem substantiæ instar fragilia evadunt. In utroque statu saporem præ se ferunt viscidum, minime ingratum, nec nauseabundum, et gari odorem.”—*Comment. de Fuce natante*, p. 27.

‡ There seems to be an exception to this observation in D. Lardizabal, who appears to refer only to *F. bacciferus*, and has dwelt so much at large upon the subject, that I think it may be gratifying to my readers if I extract what Ruiz has written concerning it:—“D. Vincentius Lardizabal, Regiæ Cantabrigiæ Societatis Medicus, Dissertationem Physico-Medicam de ejusdem viribus et proprietatibus hispanicæ divulgavit, Matriti, anno 1772, sub titulo *Consuelo de Navegantes*. Hic eandem descriptionem et iconem ab Acosta mutuam exhibet, nihil in hac parte de suo adjiciens: plures scriptores memorat, qui de hac planta marina egerunt, et nonnulla loca ejusdem natalia, quin assignet anni tempestatem, qua supra aquas sese ostendit: qualitates, et usus addit, ab Acosta observatos; quæcumque ille de ejus virtute antiscorbutica tradit mordicus amplectitur, usus medicos et æconomicos commendat, et iteratis argumentis suadere conatur: rationem *F. natantis* gari odore, et nonnullis impuritatibus spoliandi, methodum, ut ex eo Acetaria præparandi et condiendi docet. Addit eum ad aves et pecora in navigatione alenda inservire posse, et non sine utilitate ad carnes et pisces salitos marisque aquam brevi edulcorandam adhiberi. Haud meminit incrustationum calcæarum, neque cochlearum, quibus maximam partem in littoribus et pelago hujusmodi plantæ conteguntur. . . . Hortatur autem, ad præparandum acetarium coctum, primum *Fuci* herbam lavare, deinde in frusta concindere, mox in olla coquere cum sufficienti aquæ dulcis quantitate, et post unam aut alteram ebullitionem priori aqua effusa aliam denuo addere cum pauxillo salis, et alii, in qua coquatur ad molitum, et denique illi in disco collocatæ olei incocti aut cum allii frixi, et aceti quantum sufficiat admiscere. Suadet quoque, aquæ dulcis defectu, adhibere maris aquam, in qua herba cocta insipida ferè evadit, et nonnihil gari odoris tantummodo retinet, quod minime accidit cum aqua dulci.”—*Comment. de Fuce natante*, p. 23.

§ p. 50.

¶ See the note under the preceding species, p. 100. The observations made by Ruiz upon his three kinds of fructification are so detailed and curious, that I am tempted here to transcribe them at length:—“quoniam igitur satis mihi exploratum jam erat post tot dierum iteratas investigationes, venas illas, et inflorescentias non esse quidquam a *Fuce* ipso alienum, sed ipsius plantæ partes; ad eas describendas, qua res postulabat, diligentia me accinxit, et pro *Floribus masculis calyculis solitariis* (*Sertulariam volubilem*) “statui; pro *Femineis spiculis absque calyculis* (*Sertulariam pumilam*) “et pro *Hermaphroditis spiculis cum calyculis*,” (*Sertulariam Plumam*) “floribus solitariis similibus. Rationes autem, quæ me impulerunt ad hujusmodi florum distributionem, hæc fuere: eorum dispositio, figura, et affinitas cum aliis diversorum sexuum plantis. Vocavi igitur *Flores masculos* Vascula illa solitaria, quippe numerosiores erant, quam flosculi spicati aliorum duorum sexuum, prout fit in plantis monoicis, dioicis, et polygamis; accedebat etiam, in illis includi quandam substantiam luteo-sulphuream, antherarum pollini aliarum plantarum quodammodo similem. *Flores Femineos* ideo constitui spiculas corporibus conicis conflatas, quia hæc forma pistillorum absque stylo quidam, sed cum germine, et stigmate, aliorum vegetabilium germinibus, et stigmatibus plus minusve similibus, referebant. Denique pro *Floribus hermaphroditis* spicatos flosculos, vasculis masculorum similibus stipatos habui, proptereaquod spicati essent, et minus copiosam continerent substantiam luteo-sulphuream, quam flosculi masculi, qui semper solitarii conspiciuntur, et hujusmodi substantia abundabant. Nudis oculis, quos satis perspicaces a natura sortitus sum, ne quidem vitro adjunctis, nullam aliam differentiam in his fructificationibus detegere potui.”—*Comment. de Fuce natante*, p. 12.





*Fucus bacciferus.*







our European species. In the specimens noticed by Ruiz, they are so \*numerous, that, he says, they appeared, as he looked at the Fucus from the ship, like bunches of unripe grapes; and, to satisfy himself that they were designed by nature to assist the plant in swimming, he cut them off from some individuals, which, upon being again thrown into the sea, immediately sunk to the bottom. † It has been observed, and, I must own, not without an appearance of justice, that, instead of giving the name of *F. natans* to the preceding species, it would have been better to have applied it to the one here figured, which has never yet been found except swimming about, in which state it appears certain that it continues to live and increase, thus affording the strongest argument in favour of the opinion of those who maintain that the roots of Fuci are not organs of nourishment. This observation unfortunately did not reach me till, for reasons already mentioned under the preceding species, I had done otherwise; and I know too well how much botany has suffered from the multiplication and constant confusion of its synonymy, ever to change without the most decisive cause a name already known and established. It is certainly extraordinary that *F. bacciferus* should never have been seen with either root or fructification, especially as its congeners seem by no means unwilling to produce their fruit. The species may possibly be regarded as in some degree unsettled till this is discovered, but I at the same time feel no doubt in giving it as my opinion, that it is essentially distinct from all others, differing in its mode of growth and general habit, and still more in its texture, and cylindrical stem and petioli.

a. *F. bacciferus*, natural size.

b. part of a branch, magnified - - 4.

\* "Vesicularum vero rotundarum et cavarum, penitusque inanium, quibus replentur singulae plantae, adeo ingens erat numerus, ut e navi prospicientibus uvularum immaturarum racemulorum speciem exhiberent. Hae vesiculae, utpote materia omni manifesta, quae pondus eis conciliet, vacuae, plantarum e rupibus, quibus innascuntur, evulsionem juvant, et ex aquae superficie emersionem supernationemque, donec transactis vitae terminis a natura praescriptis marcescere in mari incipiunt, penitusque in littoribus destructionem subeunt. Si huiusmodi vesiculis omni substantia ponderosa destitutis non instructae essent plantae, neque emergere, neque enatare possent, ni caules et folia poris scatere aere plenius, qui eas aqua leviores efficerent. Ut hoc experimento comprobarem, pluribus plantis vesiculas abstuli, aliisque dirupi, omnesque illico maris fundum petierunt, neque ad superficiem adscenderunt, impedite scilicet caulium, et foliorum solidissimorum, et poris manifestis expertum gravitate."—*Comment. de Fucus natans*, p. 22.

† This observation is made in the Review of *Wulfen's Cryptogama Aquatica*, in the *Allgemeine Literatur-Zeitung*, III. 1805. p. 450. The Critic says,—“Da dieser letztere (*F. bacciferus*) aber wirklich fast immer schwimmend, und ohne Befestigungspunkt, ersterer (*F. natans*) aber häufig mit einer scheibenförmigen Basis versehen, angetroffen wird: so hätten, durch eine Umwechslung, beide Namen an Bedeutung gewonnen. Dass über die wahren Fruchtheile an diesen Arten keine Zweifel mehr sind, braucht kaum erwähnt zu werden: Die nicht bis zur Fruchtbildung ausgebildeten, oder dieselbe vollendet habenden *tubercula* gehen in *Vesica* über, die zur Aufrechthaltung des Stranck im Wasser dienen. Obgleich dem Rec. ganze Säcke voll dieses letzten aus dem atlantischen Meere eingeliefert worden sind, so fand er ihn immer als *ἀπὸ τοῦ* und *ἀναπνεύς*.”

## 48.—FUCUS LENDIGERUS.

*Fucus*, caule tereti, filiformi, simplicissimo, foliis obsito oblongis, sparsim serrato-dentatis: vesiculis nullis: receptaculis cylindraceis, racemosis; racemis compositis.

*Fucus lendigerus*. LINN. *Sp. Pl.* II. p. 1628. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. GMELIN, *Hist. Fuc.* p. 101.

HABITAT ad Insulam Adscensionis. Osbeck.

Perennis.

RADIX callus expansus.

FRONDES ex eadem basi plurimae, caule instructae terete, filiformi, recto, pennâ passerinâ tenuiore, vel simplice, vel ramum unum alterumque brevem, vagum, apices versus emittente, infernè per dimidiam ferè longitudinem nudo, aut foliis aliquot alternis praedito, supernè semper folioso, foliis crebris, confertis, oblongis, brevissimè petiolatis, poris, mucifluis hic illic pertusis, nervo tenui obscuro percursis, apice rotundatis, margine serrato-dentatis, dentibus exiguis sparsis—*vesiculae*, ut videtur, nullae.

FRUCTIFICATIO caulis juxta apices, et saepius foliorum ad alas sita, e receptaculis constat cylindraceis, bilinearibus, simplicibus, vel bifurcis, pluribus in racemum iterùm atque iterùm aliquando divisum congestis, extrinsecus ubique inaequalibus ob tubercula innata sphaerica, poro minutissimo pertusa, sub quo latet semen unicum, oblongum, limbo pellucido cinctum:—racemus haud rarò foliolosus evadit.

COLOR recentis olivaceus, exsiccata nigricans.

SUBSTANTIA in caule coriacea, in foliis cartilaginea, tenax.

OBS. Exsiccata chartae ne minimum adhæret.

An debeat hic *Fucus* pro specie distinctâ haberi, res est, quæ, ut verum fatear, nequaquam mihi extra dubitationem posita videtur. Exemplaria nulla observandi hactenus est data facultas, præter ea in Herbario Linnaeano inclusa, in quo ditissimo phytophylacio quatuor hujus Algæ servantur specimina, ad quæ satis liquet Linnaeum elaborasse descriptionem in *Speciebus Plantarum* traditam. Horum maximum hæc nostra sistit icon: cuncta conveniunt in stature parvitate, racemis compositis, vesicularumque absentia; neque est negandum quin hæc notæ, si modò stabiles permaneant,



permaneant, ad speciem discriminandam satis superque suppedient: anne autem sint stabiles non est e quatuor individuis dijudicandum, et, si non sint, vereor ut hanc stirpem a *F. natante* distinguamus; quoniam summa inter utramque certè similitudo interest, et, notis jam memoratis deficientibus, nullum, nisi caulis in unâ teretiusculus in alterâ compressus, supererit discrimen. *F. lendigerus* videtur esse planta, non modò infrequentè visa, sed paucis cognita. Gmelinus, qui tantum Linnæi fide recensuit, ejusque verba, ut ipse palàm prædicat, excrispsit, se eam planè ignoravisse fatetur; stirpsque, quam sub eodem nomine depinxit Esperus, I. t. 15, est ad *F. natantem* referenda, et jam in hoc opere ad ejus var.  $\beta$  citatur. Species ab utrâque, ut mihi videtur, diversa pro *F. lendigero* in Herbario Banksiano servatur.

- a. *F. lendigerus*, magn. nat.  
 b. *receptaculorum racemus, et folium*, magn. auct. - 6.  
 c. *receptaculum horizontalitè dissectum.* - - 3.

## 48.—FUCUS LENDIGERUS.

*Fucus lendigerus*, stem cylindrical, filiform, quite simple, beset with oblong leaves, here and there serrato-dentate: vesicles none: receptacles cylindrical, collected into compound racemi.

*Fucus lendigerus*. LINN. *Sp. Pl.* II. p. 1628. *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. GMELIN, *Hist. Fuc.* p. 101.

On the shore at Ascension Island. Osbeck.

Perennial.

ROOT, an expanded callous disk.

FRONDS, numerous from the same base, furnished with a cylindrical, filiform, straight stem, more thin than a sparrow's quill, either simple, or sending out near its apex one or two short scattered branches, and either naked in its lower part for nearly half its length, or only producing a few alternate leaves, but in its upper part always leafy; leaves numerous, clustered, oblong, supported upon extremely short petioli, here and there perforated with mucifluous pores, provided with a thin dark midrib, rounded at their apices, at their margins serrato-dentate, with small scattered teeth:—vesicles, apparently, none.

FRUCTIFICATION, situated near the end of the stem, and generally in the axillæ of the leaves, consisting of cylindrical receptacles two lines long, some simple, some forked, many of them collected into a racemus, which is frequently again and again divided, externally unequal all over on account of the innate spherical tubercles, each of which is perforated with an extremely minute pore, under which lies a single, oblong seed, surrounded with a pellucid limbus.

COLOR, in the fresh plant, olive-green; blackish when dry.

SUBSTANCE, coriaceous in the stem, in the leaves cartilaginous and tough.

OBS. When dried it does not in the least adhere to paper.

How far this *Fucus* ought really to be considered as a distinct species is, I must confess, a matter of some doubt to me. I have hitherto had the opportunity of examining no specimens, except those in the Linnæan Herbarium, where there are preserved four, from which it is evident that the description in the *Species Plantarum* was composed, and of which the present figure represents the largest. The whole of these specimens agree in their dwarfish size, compound racemi, and total want of vesicles, circumstances so striking, that, if constant, they would of course be sufficient to keep it separate from its affinities. Among these *F. natans* is the plant to which it is most closely allied, and of which, provided the marks just mentioned do not prove permanent, I apprehend it must be considered a variety, as there will remain only the cylindrical or compressed stem to separate them. *F. lendigerus* appears to be a *Fucus*, not only of rare occurrence, but very little known: Gmelin has inserted it in his work avowedly upon the authority of Linnæus alone, merely copying his description, and what Professor Esper has figured under this name, I. t. 15, is nothing more than *F. natans*, to the variety  $\beta$  of which it is quoted above. In the Banksian Herbarium, too, is preserved another still different species.

- a. *F. lendigerus*, natural size.  
 b. *cluster of receptacles, and leaf*, magnified - - 6.  
 c. *receptacle, cut through horizontally* - - 3.





*Fucus lendigerus.*







*Fucus*, caule teretiusculo, filiformi, bipinnato: ramis sub-alternis, simplicibus: foliis linearibus integerrimis: vesiculis oblongo-pyriformibus, petiolatis; petiolis planis: receptaculis cylindraceis, sub-solitariis.

*Fucus acinarius*. LINN. *Sp. Pl.* II. p. 1628. (excl. syn. omnibus.) *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. *Mant.* p. 508.

$\beta$ . *pyncocistus*; foliis oblongis.

*F. pyncocistus*. MERTENS, MSS.

$\gamma$ . *megalocarpus*; receptaculis oblongis, undulatis, spinulosis.

HABITAT  $\alpha$  in Oceano Australiori. Linnaeus.—In Mari Rubro, una cum var.  $\gamma$ . *Vicecomes de Valentia*.—Ex Indiâ Orientali accepit D. Smith.— $\beta$  in Mari Coreano. D. Horner.—Ex Ægypti oris accepit D. J. Banks, Baronet.

*Perennis*.

RADIX callus expansus, satis magnus, quandòque hic illic torosus, et sub-repens.

FRONDES vel solitariae, vel binae, ternariae, bi- tri-pedales, instructae caule nunc simplice, nunc semel iterumve diviso, e tereti compresso, filiformi, Merulae pennae crassitie, flexuosè erecto, basin versus nudo, inde per totam longitudinem pinnato ramis patentibus, sub-distichis, ut plurimum alternis, inferioribus sub-dodrantalibus, semper longissimis, atque iterum simili modo pinnatis, reliquis quò magis ad apicem adpropinquant eò brevioribus, unde totius plantae peripheria pyramidata, omnibus simplicibus, vel rarissimè bifurcis, spatio brevi sejunctis, foliis vesiculisque copiosè obsitis: folia linearia sessilia, pollicem longa, atque haud lineam lata, poris mucifluis pertusa, nervo tenui nigricante percursa, margine semper integerrima: vesiculæ creberrimæ, oblongæ, basi decurrentes, *Cannabis sativa* seminibus aliquantùm minores, intus omnino vacuæ, petiolo brevi plano fultæ, qui mox elongatus in folium mutatur, unde vesiculæ foliorum ad apices sitæ non rarè occurrunt.

FRUCTIFICATIO in ramis foliorum ad alas sita, e receptaculis constat cylindraceis, vix lineam longis, vel solitariis, vel duobus tribusve in racemum congestis, subsessilibus, extrinsecus ubique torulosus, ob tubercula innata, sphaerica, poro minutissimo pertusa, singula semen unicum, oblongum, limbo pellucido cinctum includentia.

COLOR, qui recentis verisimillimè intensè fusco-viridis, exsiccata nigricans.

SUBSTANTIA in caule coriacea, basin versus lignosa, in foliis cartilaginea, crassiuscula, tenax.

$\beta$  in eo præsertim ab  $\alpha$  discrepat quòd folia habeat duplò latiora, breviora, oblonga, et coloris dilutionis:—exemplar hujus varietatis a Mertensio missum ramos habuit vesiculis fructuque ferè totos coopertos, sed ea ex Ægypto accepta his maximà ex parte caruerunt, et foliis sunt instructa solito longioribus, aliquando bifurcis.

$\gamma$ , cujus unum modò exemplar vidi, folia eorum in  $\alpha$  similia gerit, sed sparsa: magna contra receptaculorum copia, quæ oblonga, duas lineas longa, et propemodùm unam lata, planiuscula, lenitè crispa, atque undulata, margine spinulosa.

Obs. Exsiccata chartæ non adhæret:—receptacula efficta in folia transire indubium videtur, et hoc vel in  $\gamma$  valere, cujus fructus tum spinas exuit:—tota planta insignitè lavis.

De hoc Fuco, sicut olim de *F. fastigiato* et *F. rubente*, Linnæi Herbario potiùs quam scriptis iterùm sum confusus, iterùmque dubito, an, sic faciendo, rectè necne fecerim. Planta hic delineata, cujus nulla, quod scio, hactenùs extat icon, ut habitu longè alieno gaudet, ita specie certè satis discrepat ab illâ, cui *F. Acinaria* nomen indere solent Botanici, et quam liquet ipsum Linnæum primitus respicere voluisse. Ea stirps maris Mediterranei incolæ, sese caule muricato vesiculisque magnis sphaericis conspiciendam præstat. Folia utrique paritèr integerrima erroris ansam fortasse præbuerunt. Conveniunt in hoc cum nullâ aliâ inter *F. natantis* familiam hucusque detectâ, dempto *F. heterophyllo*, Herb. Banks., cui etiam foliorum minorum et receptaculorum forma eadem, sed, quod ejus speciei proprium, folia quoque habet latè oblonga, reliquis, quibus immista nascuntur, multoties majora, et vesiculæ sunt sphaericæ, atque aristâ terminatæ. Petiolorum, quibus vesiculæ insident, in folia metamorphosis nullibi magis liquidò quàm in *F. Acinaria* conspicitur, an verò idem per omnes huic congeneres valeat nequaquàm constat. Varietas  $\beta$  in Herbario Linnæano eidem cui  $\alpha$  agglutinata chartæ servatur: specie forsan differt, sed, licet habitu discrepet, characteres nullos específicos in præsens perspicio.

- |   |   |   |   |    |
|---|---|---|---|----|
| a. <i>F. Acinariae ramus</i> , magn. nat.             |   |   |   |    |
| b. <i>ejusdem pars</i> , magn. auct.                  | - | - | - | 6. |
| c. <i>receptacula, cum vesiculis, et folio</i>        | - | - | - | 4. |
| d. <i>receptaculum horizontalitè dissectum</i>        | - | - | - | 2. |
| e. <i>var. <math>\beta</math> portio</i> , magn. nat. |   |   |   |    |

\* Iconas Fuci quondam *F. Acinaria* nuncupati, bonas tradiderunt Donatius atque Esperus, descriptionemque optimam Wulfenius, unde stirps satis cognita. Vellem tamen hic delineatam sistere, faceremque, ni vetarent exemplaria vix nimis manca; quæ de re est expectandum donec pax rediens literarum commercij portas cum botanicis exteris rursus aperiat. Hunc Fucum *F. tinariæ folio* nominavit Bauhinus, quamobrem *F. tinariifolius* mihi audit.



*Fucus Acinaria*, stem sub-cylindrical, filiform, bipinnate: branches mostly alternate, simple: leaves linear, quite entire: vesicles between oblong and pyriform, on flat petioli: receptacles cylindrical, generally solitary.

*Fucus acinaris*. LINN. *Sp. Pl.* II. p. 1628. (excl. syn. omnibus.) *Syst. Nat.* II. p. 715. *Syst. Nat. Ed. Gmel.* II. p. 1380. *Mant.* p. 508.

β. *pyncocistus*; leaves oblong.

*F. pyncocistus*. Mertens, MSS.

γ. *megalocarpus*; receptacles oblong, undulated, spinous.

In the Southern Ocean. Linnæus.—In the Red Sea, together with var. γ. Viscount Valentia.—Sent from the East Indies to Dr. Smith.—β in the Straits of Corea. Dr. Horner.—Shores of Egypt. Sir Joseph Banks.

Perennial.

ROOT, a largish, expanded, callous disk, sometimes swelling out here and there into knobs, and inclining to creeping.

FRONDS, either solitary, or growing two or three together, from two to three feet long, furnished with a stem in general simple, but occasionally once or twice divided, between cylindrical and compressed, filiform, about the thickness of a blackbird's quill, rather flexuose, naked towards the base, but afterwards pinnated throughout its whole length with patent, sub-distichous branches, for the most alternate, the lowest about nine inches long, always longer than the rest, and again pinnated in the same manner as the stem, the rest gradually shortening as they approach the apices, so that the outline of the whole plant is pyramidal, all of them simple, or very rarely forked, separated from each other by short spaces, and plentifully beset with leaves and vesicles: leaves linear, sessile, an inch long, and not a line wide, perforated with mucifluous pores, and furnished with a narrow blackish midrib, their margins quite entire: vesicles very numerous, oblong, decurrent at the base, somewhat smaller than Hemp-seed, altogether empty within, supported upon a short, flat petiolus, which in time lengthens, and changes into a leaf, so that the vesicles are not unfrequently found placed upon the ends of the leaves.

FRUCTIFICATION, situated upon the branches at the axillæ of the leaves, consisting of cylindrical receptacles, scarcely a line long, either solitary, or collected two or three together into racemi, nearly sessile, externally uneven on account of the innate spherical tubercles, which are perforated with a minute pore, and contain each a single, oblong seed, surrounded with a pellucid limbus.

COLOR, in the fresh plant most probably a deep brownish green, when dried, blackish.

SUBSTANCE, of the stem coriaceous, inclining to ligneous near the root, of the leaves cartilaginous, thickish, and tough.

β differs from α principally in having leaves much shorter, and of double the width, of an oblong form, and paler color:—the specimen of this plant sent me by Professor Mertens had its branches nearly covered with fructification and vesicles, both which were almost wholly wanting in those from Egypt, which latter had longer, sometimes forked leaves.

Of γ, I have seen only a single specimen, the leaves of which were like those of α, but thinly scattered; on the other hand there was a great quantity of receptacles, of an oblong shape, two lines long, and nearly one wide, flattish, slightly curled and waved, and beset with small spines at their margins.

Obs. When dried it does not adhere in the least to paper:—there appears no doubt of the receptacles turning into leaves after they have discharged their seeds, or of the same being the case in the var. γ, the fructification of which then loses its spines:—the whole plant is remarkably smooth.

In the case of this *Fucus*, as before in those of *F. fastigiatus* and *F. rubens*, I have relied upon the authority of the Herbarium, in preference to that of the writings of Linnæus, but I must again express my doubts how far it was right to do so. The plant here figured, of which no representation has ever yet been given, and which appears to be known to no author upon the subject, has a habit widely different from that of the \*species which commonly passes among botanists under the title of *F. Acinaria*, and to which there can be no question but that Linnæus himself originally intended to apply that name, as in the *Species Plantarum* he particularly refers to the older writers, who apparently knew no other. The latter plant is a native of the Mediterranean, and is remarkable for its rough exterior, muricated stem, and spherical vesicles, while on the other hand, the smooth, almost polished, surface, and oblong, or sub-pyriform, air-bladders are no less characteristic of the *Fucus* before us. Both of them have leaves equally entire, which in all probability gave rise to the confusion between them, as in this circumstance they differ from every other individual of the family of *F. natans* at present known, excepting only *F. heterophyllus* of the Banksian Herbarium, which has also its smaller leaves and receptacles of the same shape, but bears, in addition to these, leaves of a widely oblong form, many times larger than the others, among which they grow mixed, and produces spherical vesicles terminated by an arista. The changing of the footstalks of the air-bladders into leaves is in no species more conspicuous than in *F. Acinaria*: it may, however, at the same time, admit of doubt whether the same takes place in all the

\* Good figures of this plant have been given by Donati and Esper, and an excellent description by Wulfen, so that it is a *Fucus* sufficiently known. At the same time, I should have been very glad to have figured it at once, and I would have done so, had not my specimens been unluckily too imperfect, on which account it is necessary to wait till the return of peace restores our intercourse with foreign Botanists. Bauhin, and the older naturalists, called this species *Fucus Linaria folio*, which name, changed only to *F. linariifolius*, I purpose to continue.





*Fucus Acinaria.*







the congeners of this plant. The variety  $\beta$  is preserved in the Linnæan Herbarium, attached to the same sheet of paper with the more common appearance of the *Fucus*: it is probably a distinct species, but I at present see no characters upon which I could depend in making it so.

- a. Branch of *F. Acinaria*, natural size.
- b. part of the same, magnified - - - 6.
- c. receptacles, with a leaf, and vesicles - - - 4.
- d. receptacle cut through horizontally - - - 2.
- e. Piece of var.  $\beta$ , natural size.

## 50.—FUCUS AQUIFOLIUS.

*Fucus*, caule filiformi, compresso, pinnato; ramis alternis, simplicibus; foliis oblongo-spatulatis, repando-dentatis; vesiculis petiolatis, sphaericis, mucronulatis; petiolis compressis; receptaculis cylindraceis, racemosis.

HABITAT in Mari Indico, in Freto Insularum Sunda. D. Watts.

Perennis?

RADIX nondum a me visa.

FRONS longitudinis hactenus incognitæ, (cùm ea quæ adhuc accepi exemplaria, quamvis tripedalia et ultra, tantummodò stirpis majoris essent partes, basi apiceque paritèr carentes) caule instructa plano-compresso, ubique lineari, diametro sesquilineæ, semper, quantum vidi, indiviso, sed ramis alternis, distichis, intervallo inter singulos circiter bipollicari, per totam longitudinem instructo, cætera nudo; rami longitudine vix tripollicares, compressi, caule tenuiores, lineares, simplices, vel basin versus ramulo uno alteroque brevissimo instructi, foliosi, et vesiculiferi; folia nunc solitaria, nunc, ut sæpius accidit, bina, majore cum duplò minore associato, alterna, ex oblongo spatulata, sessilia, pollicem longa, nervo nigricante tenui mediotenus percursa, margine repando-dentata; vesiculæ sphaericæ, *Pisi sativi* seminis magnitudine, foliorum ad alas sitæ, sparsæ, nequaquam frequentes, intus omninò cavæ et lævigatæ, petiolo brevi compresso fultæ, apice mucronatæ mucrone exiguo.

FRUCTIFICATIO in ramis disposita, axillaris, e receptaculis constat exiguis, teretiusculis, filiformibus, simplicibus bifurcisque, plurimis in racemum congestis, extrinsecus inæqualibus, pertusisque undique poris exiguis, sub quibus latent receptacula globosa, innata, singula semina duo vel tria fusca pyriformia includentia.

COLOR, qui recentis forsàn olivaceus, est in exsiccata, æquè atque iterùm madefacta, intensè spadiceo-fuscus: caulis niger.

SUBSTANTIA ubique coriacea, lenta, tenax.

OBS. In hoc quoque *Fuco*, sicut est olim sub *F. natante* observatum, ramorum foliorumque dispositio alterna, ob totius plantæ habitum sub-spiralitèr tortum, non semper liquet;—exsiccata chartæ neutiquàm adhæret.

Exemplaria hujus *Fuci*, commista aliquot aliis *F. natanti* affinibus speciebus, benevolè mihi septem abhinc annis misit D. G. Watts, qui ex Indiâ Orientali redux legit. Stirpem visu raram esse suspicor, cùm in Herbario observârim nullo, neque aliunde unquam acceperim, sitque planta quæ, vel sicca vel madida, adeò primo aspectu est notabilis, ut etiam minus cautorum oculos ad se trahat; quâ de re, quamvis, uti suprâ memoratur, specimina nostra sint ad utramque extremitatem manca, persuasum mihi habeo esse revera a reliquis distinctissimam, nec dubitavi pro novâ specie hic agnitam exhibere. Quantum e crescendi modo, substantiâ, partiumque singularum magnitudine conjicere licet, verisimile videtur ad magnam accrescere molem, vixque ullum extare in hâc familiâ *Fucum* qui vel majore vel etiam pari gaudeat. Foliorum forma, totius plantæ color, et textura coriacea, necnon vesicularum infrequentèr sparsarum magnitudo notas, per quas a congeneribus dignoscitur, certissimas suppeditant. Dentes, qui foliorum margines cingunt, sunt variabiles; plerumque magni, acuti, et numerosi occurrunt, sed aliquando prope-modum sunt obsoleti. Nomen deprompsi a similitudine, quæ interest summa, inter folia hujus *Fuci* madida atque ea *Ilicis aquifolii*, quam *Aquifolium* modò Tournefortius et veteres dixerant.

- a. *F. aquifolii* pars, magn. nat.
- b. folium, et receptaculorum racemus, magn. auct. 6.
- c. receptaculum horizontalitèr dissectum. - - 2.



*Fucus aquifolius*, stem filiform, compressed, pinnated; branches alternate, simple; leaves between oblong and spatulate, repando-dentate; vesicles petiolate, spherical, tipped with a small point; petioli, compressed; receptacles cylindrical, racemose.

In the Straits of Sunda. Mr. Watts.

Perennial?

ROOT, I have never yet seen.

FROND, of unknown length, (as the specimens which I have received, although three feet and more long, were only parts of larger plants, and equally imperfect at both ends,) furnished with a stem between flat and compressed, about a line and half in diameter, and every where linear, never, as far as I have observed, divided, but beset throughout its whole length with alternate distichous branches, separated from each other by intervals of nearly two inches, in other respects naked; branches scarcely three inches long, compressed, linear, more narrow than the stem, either simple, or towards the base provided with one or two extremely short ramuli, bearing both leaves and vesicles; leaves, in some instances, solitary, but more frequently growing in pairs, in which a larger is joined with one not half its size, alternate, sessile, of a form between oblong and spatulate, an inch in length, furnished with a thin blackish nerve that does not in general extend above half way through them, their margins repando-dentate; vesicles spherical, about the size of the seeds of *Pisum sativum*, situated at the axils of the leaves, scattered, unfrequent, altogether hollow and smooth within, supported upon a short and compressed petiolus, and tipped at their apices with a small point.

FRUCTIFICATION, placed upon the branches, axillary, consisting of small, cylindrical, filiform receptacles, either simple or forked, many of them collected into a racemus, externally uneven, and every where perforated with minute pores, under which lie globular, innate receptacles, each of them containing two or three brown pyriform seeds.

COLOR, though probably an olive green when fresh, turns in drying to a deep rich chocolate brown, and continues so after it is again moistened; in the stem black.

SUBSTANCE, throughout the whole plant coriaceous, flexible, and tough.

Obs. In this *Fucus*, as well as in *F. natans*, as has been already remarked under that species, the alternate arrangement of the branches and leaves is by no means always perceptible at first sight, because the whole plant is twisted in a spiral manner:—when dry, it does not adhere in the least to paper.

It is now seven years since I received my specimens of the present plant, which were very obligingly communicated to me by Mr. George Watts, who gathered it in small quantities, mixed with some others of the affinities of *F. natans*, upon his passage through the Straits of Sunda, when returning from India to England. Having received it from no other quarter, nor observed it in any Herbarium, I am led to apprehend it is a *Fucus* of unfrequent occurrence; and this opinion derives some confirmation from the circumstance of its being sufficiently unlike the rest, whether in a dry or moist state, to attract the notice of even a superficial observer; on which account I feel the strongest persuasion of its being a distinct species, and have consequently not hesitated here to publish it as such, although my specimens, as above mentioned, are unfortunately imperfect at each extremity. From its mode of growth, its substance, and the size of its several parts, a probable conjecture may be formed that it attains to a considerable magnitude, and yields in this respect to few, if any, of the same family. Its most striking characteristic marks consist in the color and coriaceous texture of the whole, the form of the leaves, and the unusual size of the scattered vesicles. No dependence is to be placed upon the teeth that fringe the edges of the leaves, as, though they are in general both large, sharp, and numerous, they are sometimes the very reverse of these, and are occasionally almost obsolete. The name is derived from the strong resemblance in shape and appearance, between the leaves, when wet, and those of the Holly, which, although referred by Linnaeus to the genus, *Ilex*, had with Tournefort, and the more ancient botanists, passed under the single name of the *Aquifolium*.

a. part of *F. aquifolius*, natural size.

b. leaf, and cluster of receptacles, magnified - - 6.

c. receptacle cut through horizontally - - 2.





*Fucus aquifolius.*







*Fucus*, caule filiformi, terete, pinnato; ramis alternis, simplicibus; foliis elliptico-subrotundis, repando-dentatis; vesiculis petiolatis, sphaericis, petiolis planis; receptaculis compressis, linearibus, serratis.

HABITAT in Mari Indico, in Freto Insularum Sunda. *D. Watts.*

*Perennis?*

RADIX nondum mihi visa.

FRONS tri-quadri-pedalis, et ultra, *caule* instructa terete, vel levitè compresso, filiformi, *Merula* pennæ crassitie, nunquam, quantum vidi, diviso, sed ramis alternis, sub-distichis, horizontalibus, remotiusculis, per totam longitudinem obsito, cætera, nisi ad apicem, nudo; *rami* basi proximi palmam et ultra longi, hinc sensim breviores, superiores simplices, inferiores aliis brevissimis, alternis, laxè dispositis pinnati, omnes folia vesiculasque sustentantes; *folia* numerosa, alterna, sessilia, unguem circiter longa, figuræ latè ellipticæ, vel ex ellipticâ subrotundæ, poris frequentibus pertusa, nervo tenui, nigricante, juxta medium evanescente instructa, margine crispatula, et repando-dentata, dentibus exiguis crebris; *vesiculæ* foliis immixtæ, copiosæ, sphæricæ, *Vicia sativa* seminibus aliquantùm minores, nunc solitaria, nunc binæ ternæ, petiolo perbrevis, plano, sursum dilatato insidentes, membranâ angustâ foliaceâ sæpius cinctæ, intus omninò cavæ.

FRUCTIFICATIO foliorum ad alas in ramis sita, e receptaculis constat compressis, linearibus, lineam unam alteramve longis, profundè serrato-dentatis, in racemum congestis, sessilibus, simplicibusque, extrinsecus inæqualibus, et poris exiguis pertusis, sub quibus latent receptacula sphaerica, innata, singula semina aliquot subrotunda, fusca, limbo pellucido cincta includentia.

et diaphanus.

**SUBSTANTIA** in caule coriacea, succosa, in foliis, et vesiculis, membranacea, tenuis, et, si in aquâ dulci retineatur, flaccida.

Obs. Habitus totius plantæ crispatus:—exsiccata chartæ nequaquàm adhæret.

Omnes licet Fuci *F. natanti* congeneres formæ habitusque insigniantur elegantia, vix una inter hos hactenus innotuit species cui palmam in hisce cedit *F. ilicifolius*, neque, si ejus indolem crescendique modum spectes, unam reperies, quæ luculentius demonstrat œconomiam Naturæ in his plantis fingendis, quâ receptacula, seminibus jam sparsis, in nova folia vesiculasque mutantur. Obtinet profectò idem in plurimis aliis individuis, et præsertim in iis, quæ ad eandem, cui hæc, familiam annumerantur; id quod satis cuivis erit manifestum qui vel tantillum temporis in his stirpibus investigandis insumperit, et hinc quoque liquidò patet, unde pori in foliorum plurimorum superficie notabiles originem trahunt, cùm hi sint nihil aliud quàm foraminum istorum exiguorum reliquæ, per quæ olim sunt elapsa semina. Quantumvis autem latè hoc diffundatur principium, est nihilominus, sicut\* jam olim in hoc opere animadverti, nequaquàm universale, neque ullus datur error, a quo cautius est cavendum, quàm ille eorum, qui, quia Fucorum quorundam receptacula effœta in folia vesiculasque transire videntur, ducunt idcirco pro indubio folia vesiculasque omnes tale exordium habere; quum contrà sæpe reperiuntur exemplaria his onusta quæ nihil unquam tulerunt fructus, horumque ortus, nisi valde fallor, illum fructificationis nunquam non antecedit. Per receptaculorum in folia metamorphosin faciem *F. ilicifolius* perquam singularem induit, et stirps inde quasi foliis heteromorphis, his latis, subrotundis, ambitu denticulatis, illis exiguis, angustis, linearibus, et profundè serratis instructa apparet. Verisimile videtur plurima ex his minoribus, dummodò ad majorum unquam staturam excrescant, decidere solere, quod ni fiat planta tantâ foliorum copiâ gravata evaderet, quantæ nullum reperimus inter Fucos exemplum. Arctissimam habet *F. ilicifolius* affinitatem cum *F. natantis* var.  $\beta$ , a quâ distinguunt folia subrotunda, color, substantia tenuis, et receptacula spinosa, quæ, simul considerata, speciei characteres maximè essentialia ministrant. Nomen non tam ducitur a similitudine cum aliquâ ex ilcibus Linnæanis, quam ab illâ, quæ interest maxima, cum *Quercu Ilice*, et *Quercu cocciferâ*, quarum utraque *Ilex* inter antiquos audiit.

- |  |   |   |   |   |    |
|--|---|---|---|---|----|
| a. <i>F. ilicifolius</i> , magn. nat.  |   |   |   |   |    |
| b. <i>ramus, cum receptaculis</i> , magn. auct.  | - | - | - | - | 6. |
| c. <i>receptacula</i> - - - - -  | - | - | - | - | 4. |
| d. <i>receptalum horizontalitér dissectum</i>  | - | - | - | - | 2. |
| e. <i>semina</i> - - - - -   | - | - | - | - | 1. |
| f. <i>ramus cum receptaculis jam in folia vesiculasque ab-</i><br><i>utibus</i> , magn. nat. |   |   |   |   |    |
| g. <i>ejusdem pars</i> , magn. auct.   | - | - | - | - | 5. |
| h. <i>folium</i> - - - - -   | - | - | - | - | 3. |
| i. <i>vesicula dissecta</i> - - - - -  | - | - | - | - | 2. |

\* Confer Notam sub *F. turbinato*, p. 50.



*Fucus ilicifolius*, stem filiform, cylindrical, pinnated; branches alternate, simple; leaves between elliptical and roundish, repando-dentate; vesicles petiolate, spherical, petioli flat; receptacles compressed, linear, serrated.

In the Straits of Sunda. Mr. G. Watts.

Perennial?

ROOT, I have not yet seen.

FROND, three or four feet, or even more, in length, provided with a filiform stem, either cylindrical, or slightly compressed, of the thickness of a blackbird's quill, never, as far as I have seen, divided, but beset throughout its whole length with alternate, sub-distichous, horizontal, rather remote branches, in other respects naked, except towards the apices; *branches*, nearest the base, a palm and more long, thence gradually shortening, the upper ones simple, the lower ones loosely pinnated with others, which are alternate, and extremely short, all of them bear leaves and vesicles; *leaves*, numerous, alternate, sessile, about half an inch long, in form widely elliptical, or inclining to roundish, perforated with many pores, and furnished with a thin dark midrib, which disappears about the centre, their margins curled, and repando-dentate, with frequent small teeth; *vesicles* mixed with the leaves, plentiful, spherical, somewhat smaller than the seeds of *Vicia sativa*, in some cases solitary, in others growing two or three together, supported upon a very short, flat petiolus, widened upwards, generally surrounded with a narrow foliaceous membrane, internally quite hollow.

FRUCTIFICATION, situated upon the branches at the axillæ of the leaves, consisting of compressed, linear receptacles, one or two lines long, deeply serrato-dentate, sessile, simple, collected into racemi, externally uneven, and perforated with minute pores, under which lie innate spherical receptacles, each containing a few roundish, brown seeds, surrounded with a pellucid limbus.

COLOR, in the recent plant, probably a pale olive-green; when dry, as well as if again moistened, a pleasant, pale, greenish brown, and semitransparent.

SUBSTANCE, of the stem, coriaceous, of the leaves and vesicles, membranaceous and thin, if kept in fresh water, soon becoming flaccid.

Obs. The habit of the whole plant inclines to curled:—when dry, it does not in the least adhere to paper.

The whole of the Fuci allied to *F. natans* are remarkable for the elegance of their form and general appearance, but, perhaps, scarcely any one among them is in these respects so conspicuous as the present, and certainly, if regarded as an interesting species, no one is more deserving of our attention; for it is impossible that any should afford a more decisive proof of the economy of nature in the growth of these plants, as far as relates to the changing of the pods, after they have discharged their fructification, both into vesicles and leaves. That such is the case in many other Fuci, and especially in those which are congeners to *F. ilicifolius*, is a point of which a little attention will be fully sufficient to persuade us, and we may hence satisfactorily account for the pores that are observable upon the surface of their leaves in general, which are in reality the remains of the apertures through which the seeds have escaped: but, however prevalent this principle may be, I have \* already in the course of this work had occasion to express my conviction, that it is not universal, and I would wish particularly to guard my readers against being hurried into the conclusion, that, because the receptacles of some Fuci turn, when empty, into leaves and air-bladders, it must therefore of necessity follow, that the latter are indebted for their origin to the former. No conclusion can be more erroneous, for both leaves and vesicles may be seen upon individuals, in which there neither is, nor ever has been, any fructification, and I feel no doubt that each of these parts naturally precedes the fruit in the growth of the plants. The metamorphosis of the receptacles gives *F. ilicifolius* a very singular appearance, making it look as if it were furnished with two different kinds of leaves, the one wide, roundish, and fringed with minute teeth, the other small, narrow, linear, and deeply serrated. It seems probable that, if these latter ever attain to the size of the former, some of them drop off, or the specimens must be crowded in a manner of which no other species affords an instance. The nearest affinity of *F. ilicifolius* is the var.  $\beta$  of *F. natans*, from which it differs in its roundish leaves, its color, its thin substance, and its spinous receptacles, which together afford the strong characters of the plant. Its name is derived, not so much from the resemblance of the leaves to any of the Linnæan *Ilices*, as to those of the *Quercus coccifera* and *Quercus Ilex*, each of which was originally called an *Ilex*.

- |  |   |   |   |    |
|--|---|---|---|----|
| a. <i>F. ilicifolius</i> , natural size.                                 |   |   |   |    |
| b. branch, with receptacles, magnified                                   | - | - | - | 6. |
| c. receptacles   | - | - | - | 4. |
| d. receptacle cut through horizontally                                   | - | - | - | 2. |
| e. seeds   | - | - | - | 1. |
| f. branch with receptacles turning to leaves and vesicles, natural size. |   |   |   |    |
| g. part of the same, magnified   | - | - | - | 5. |
| h. leaf  | - | - | - | 3. |
| i. vesicle cut through   | - | - | - | 3. |

\* See Note under *F. turbinatus*, p. 50.





*Fucus ilicifolius.*







*Fucus*, fronde coriaceâ, filiformi, terete, dichotomâ, apicibus obtusis; vesiculis sparsis, innatis, ellipticis, solitariis, fronde latioribus.

HABITAT inter rejectamenta maris apud Cunnamara in Hiberniâ. D. J. T. Mackay.

*Perennis*.

RADIX discus explanatus.

FRONS longitudine spithamæa, vel dodrantalis, vel etiam pedalis, basin versus levitè compressa, pennæque corvinæ crassitie, hinc ferè statim cylindrica, et sensim, sed lenissimè, attenuata, ut apices vix pennæ passerinæ magnitudinem superent, dichotomiis juxta basin incipientibus, novies, decies, vel pluries, intervallo brevi, attamen incerto, repetitis, divisa, furcis patentibus, summis patenti-divaricatis, segmentis fastigiatis, apicibus rotundatis obtusis: ramis, præsertim superioribus, innascuntur *Vesiculæ* solitariae, ellipticae, *Cannabis sativæ* seminis magnitudine, in ipsâ frondis substantiâ immersæ, et ejusdem cum illâ coloris, juxta furcas plerumque dispositæ, intus cavæ, nisi quoddam fibris aliquot albis reticulatis sint instructæ.

FRUCTIFICATIO nondum visa.

COLOR olivaceo-viridis, prope basin intensior et nigricans, apices versus dilutior, flavescenti tinctus, et subdiaphanus; *exsiccata* nigrescens.

SUBSTANTIA coriaceo-cartilaginea, lenta, tenax; *exsiccata* rigida et fragilis.

OBS. Habitus stirpis ob ramos numerosos insignitè spissus:—rami haud rarè curvi tortique:—*exsiccata* chartæ nequaquam adhæret:—aquam dulcem colore flavicante tingit, et in hac servata odorem acrem spirat.

Primus hunc *Fucum*, a nemine antehac, quod scio, observatum, Nereidi Britannicæ adjecit D. Jacobus Townshend Mackay, cui exemplar hic depictum debeo, et cujus nomine, cum nulla ejus hucusque descriptio extet, insigniri; memor quantum ille ad harum Insularum scientiam naturalem promovendam præstitit, et præsertim quot \*stirpes peregrinas in Hiberniâ detexit, dum regiones ejus australes, vix aut ne vix unquam antea a botanico lustratas pede, singulari studio et successu, auspiciis Dni Scott, plus unâ vice investigaret. Iter per has partes æstate MDCCCV faciens invenit stirpem quam hæc tabula sistit, in parvâ quâdam crepidine juxta terminum superiorem sinûs "Birtebui" dicti, prope collem Cahil in Cunnamarâ, sed nusquam alibi. Facit me per epistolas certior se haud unum exemplar quod rupibus innascebatur deprehendere potuisse, sed omnia liberè in littore jacere, et tantâ quidem copiâ ut totum ferè spatium quâ sunt a mari rejecta cooperirent. Adfuit etiam *F. nodosus*, qui, quantumvis esset saxorum finitimorum frequentissimus incola, non nisi pari modo, nihilo scilicet affixus, hujus loci occurrit, et uterque in pilas, vi fortè æstus, est volutatus, neque tamen propter illud desierant crescere, sed surculis creberrimis a radice, quæ globuli centrum occupavit, emicantibus, se habitu spisso jam supra memorato induerunt. Ex *F. Mackaii* texturâ necnon consuetudine illarum, quibus maximè est affinis, specierum, augurari licet fructum hyeme modò provenire, et hæc de causâ fructiferum in præsens cernere vix est quod speremus, cum nemo botanicus prope locum ejus natalem habitat, vel iter ibi facere eâ anni tempestate sibi facilè in animum inducat. Est autem stirps quæ notis nimis conspicuis insignitur ut sit locus ad timendum ne detur ulla in discriminandâ difficultas, nec dubitare possumus quin sit ad illam *Fucorum* releganda tribum, quam *Fucos proprios* appellant Weberus Mohriusque, feratque receptacula frondis ad apices sita, similia eorum in *F. canaliculato* et *F. disticho* observatorum. Sedes ei in *Fucorum* Britannicorum Catalogo inter *F. nodosum* et *F. canaliculatum* media debetur, talemque habet cum his, quorum unus et alter in eodem quo *F. Mackaii* loco abundè provenit, affinitatem, ut, si inter Algas submersas aliquid hybridè generari credamus, suspicari esset in promptu originem notham ab his duobus commistis trahere. Quoad habitum, formam, colorem, magnitudinem, ramorum divisionem, et crescendi modum, cum posteriore convenit, a quo frons teres, nunquam vel minimum canaliculata, primo aspectu distinguit; ut vesiculas taceam, quæ characterem maximè essentialia subministrant. Hæc, magnitudine modò demptâ, eas *F. nodosi* omnimodè referunt, et, sicut illæ, e totâ frondis substantiâ tumidâ conflantur. In quibusdam surculis penitus desunt: plantæ medium versus plerumque occurrunt, ramorumque partem superiorem non longè a dichotomiis sæpius occupant: semper, quantum vidi, solitariae reperiuntur, quamvis fieri potest ut dentur exemplaria in quibus duæ, ramis diversis innatæ, tantum sibi invicem adpropinquent ut propemodum in unam confluere videantur.

a. *F. Mackaii*, magn. nat.

b. *vesicula dissecta*, magn. auct. - - - 5.

c. *fibræ reticulatæ e vesiculâ excerptæ* - - - 1.

\* Ex his plurimæ sunt Musci Lichenesque, necdum evulgantur, sed satis ampla messis librum, cui titulus *English Botany*, jamjam ditavit ut nullus sit dubitationi locus quin laudes nostras hic optimè mereatur. Testes hujus, *Saxifraga Geum*, *Arctaria ciliata*, *Turritis alpina*, *Schæmus fucus*, necnon *Hymenophyllum alatum* capsulis instructum.



*Fucus Mackaili*, frond coriaceous, cylindrical, filiform, dichotomous, the apices blunt; vesicles scattered, innate, elliptical, solitary, wider than the frond.

Among the rejectamenta of the sea in a sheltered bay at Cunnamara, in the county of Galway. Mr. J. T. Mackay.

Perennial.

ROOT, an expanded callous disk.

FROND, generally from five to nine inches, but sometimes reaching to a foot in length, slightly compressed, and about the size of a crow's quill, near the base, but soon becoming cylindrical, and gradually narrowed, though too slightly to be perceptible, so that at the extremities the size is scarcely equal to a sparrow's quill: the frond is divided nine or ten times, or even more frequently, with dichotomies that begin near the base, and are afterwards repeated at short, but uncertain, distances; the forks are patent, and the upper ones between patent and divaricated, the segments all of equal height; the apices short, rounded, and blunt: the branches, especially towards the upper part of the frond, are here and there swelled into solitary elliptical *vesicles*, of the size of Hemp-seed, of the same color as the rest of the plant, generally disposed near the dichotomies, internally hollow, excepting a few white reticulated fibres.

FRUCTIFICATION, at present unknown.

COLOR, olive-green, darker and blackish near the base, towards the apices pale, tinged with yellow, and somewhat transparent; blackish, when dry.

SUBSTANCE, between coriaceous and cartilaginous, flexible and tough; in a dry state, rigid and brittle.

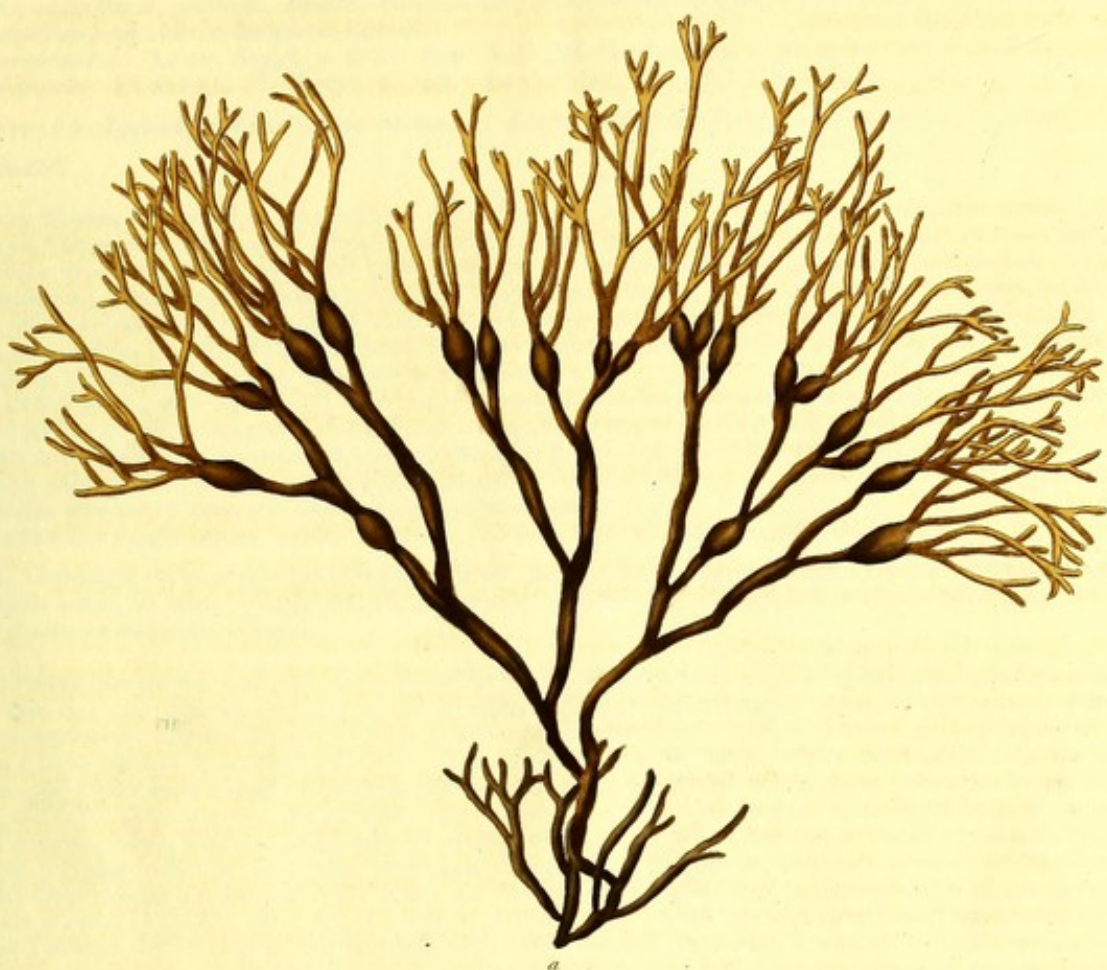
OBS. Habit very thick and bushy:—branches not unfrequently recurved and twisted:—when put into fresh water it gives out a great deal of color, and has a strong smell:—when dry it does not adhere in the least to paper.

For the present very interesting addition to the catalogue of British Fuci, we are indebted to Mr. James Townshend Mackay, to whom I am also obliged for the specimen here figured, and by whose name I have ventured to call it, as I find no description of it in any preceding author, in memory of the services that he has rendered to the botany of these Islands, particularly by his \*discoveries in Ireland, the south-west districts of which, a part hitherto least known to Naturalists, he has more than once, under the auspices of Dr. Scott, explored with extraordinary zeal and success. It was in one of these excursions, in the summer of 1805, that he met with the plant here figured, in a small creek at the upper end of Birtebui Bay, near the hill of Cahil, Cunnamara, but no where else. He informs me, that he could not find a single specimen attached to the rocks, but it was all lying in loose balls upon the shore, and in such quantity as entirely to cover that part of the strand upon which it was thrown. With it was *F. nodosus*, which, though produced in great abundance upon rocks in the neighbourhood, seemed to exist at that place only in a similar manner, without being fixed to any thing; both of them being rolled up, as if by the action of the waves, and in that state apparently continuing to grow, and throwing out from the root, which was in the centre, a prodigious number of shoots in all directions, so as to give the thick and bushy appearance above described. From the texture and affinities of *F. Mackaili* there seems little doubt of winter being the time in which it bears its fruit, and we can therefore entertain no hope of soon seeing it with fructification, as no botanist lives in the neighbourhood, or would easily be persuaded to travel there in such a season. It is a plant, however, too strongly marked for there to be any difficulty in distinguishing it, nor would any naturalist feel a hesitation in referring it to the *Fuci proprii* of Weber and Mohr, or in concluding that the receptacles are situated at the extremity of the frond, and are similar to those of *F. canaliculatus* or *F. distichus*. Among the British Fuci its natural place would be between *F. nodosus* and *F. canaliculatus*, to both of which it is so much allied, that, if hybrid productions may be allowed to exist among the submersed Algæ, I should be tempted to suppose it was indebted for its origin to an union of these two species, both which abound in the neighbourhood. In habit, form, color, size, ramification, and mode of growth, it agrees with the latter, from which its sub-cylindrical frond, never in the least inclining to channelled, would always be sufficient at first sight to distinguish it, even in the absence of the vesicles, to which it is indebted for its strongest character, and which, except in size, altogether resemble those of *F. nodosus*, being, as in that species, actual swellings of the whole substance of the frond. These in some shoots are altogether wanting: in general they are found about the middle of the plant, and almost always towards the upper end of the branch, where it becomes forked: they are also regularly solitary, as far as I have seen, although occasionally two may be placed so near to each other on different branches as to be in some measure confluent.

- a. *F. Mackaili*, natural size.
- b. *vesicle cut open*, magnified - - - - - 5.
- c. *reticulated fibres from the interior of the vesicle* - 1.

\* Of these a considerable portion is confined to the Mosses and Lichens, and not at present published, but a sufficient number has been given to the public in *English Botany*, fully to justify my assertion. Among them are *Saxifraga Geum*, *Arenaria ciliata*, *Turritis alpina*, *Scleranthus fuscus*, and *Hymenophyllum alatum* with fruit.





*Fucus Mackaii.*







*Fucus*, caule terete, prostrato, repente, ramosissimo; ramis erectis, simpliciusculis, pinnatis; pinnis approximatis, patentibus, oppositis, cylindraceis, obtusis.

*Fucus pinnatus*. LINN. *Suppl.* p. 452. *Syst. Nat. Ed. Gmel.* II. p. 1390.

*F. plumaris*. FORSKÅL, *Fl. Ægypt.* p. 190. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1388.

HABITAT in Zeylonâ, in Freto Chilas sub mare. Koenig.—In Mari Rubro. Vicecomès de Valentia.

*Perennis?*

RADIX fibrosa, ortu simplex, mox in fibras aliquot semiungiculares, teretes, lutescentes, ramosas divisa.

FRONS \* teres, filiformis, pennæ Merulæ crassitie, instructa caule prostrato, repente, pedali, et ultra, simplice, vel semel atque iterum dichotomo, intervallis haud certis per totam longitudinem e parte inferiore radices, e superiore ramos emittente, cætera nudo; rami vagi, erecti, longitudine palmares, seu dodrantes, plerumque simplices, aut tantum bifidi, interdum enormiter divisi, omnes a basi usque ad apices vestiti pinnis distichis, patentibus, leniter falcatis, simplicibus, bi- tri-linearibus, ejusdem ferè cum ramis crassitie, cylindraceis, sed basi aliquantum attenuatis, integerrimis, obtusis, approximatis, ut plurimum oppositis.

FRUCTIFICATIO, teste LINNÆO, "est racemus ex verticillis cum fructificationibus pedicellatis, peltatis, planis;"—quidnam sit hoc nescio, ipse certè nihil simile vidi: in quibusdam exemplaribus, sub lente observatis, maculæ aliquot, tubercula innata referentes, apparuerunt, sed semina nulla, et e plantæ indole hæc non esse fructum crederem.

COLOR pulcherrimè gramineo-viridis, sub-diaphanus, in caule dilutior et stramineus; in aquâ dulci asservatæ, vel soli expositæ albescens; exsiccata nitens, quasi vernice obductus.

SUBSTANTIA membranacea, tenuis, tenerima; in caule, æquè ac in totâ plantâ exsiccata, fragilis.

Obs. Cavendum est ne stirpes juniores tyroni fucum faciant: hæ pinnarum penitus expertes reperiuntur, et ramis filiformibus nudis, ut etiam colore, texturâ, substantiâque, *Chara flexilis* exemplaria manca mirè simulant:—stirps siccata chartæ ne minimum adhæret.

Cum omnes illæ stirpes, quotquot sunt a Botanicis Fucorum generi annumeratæ, hujus operis materiem ministrent, postuletque ejus ratio cunctas, quantumvis inter se texturâ vel fructu discrepantes, hinc delineatas sistere, quo nostra Algarum marinarum cognitio firmiori demum fundamento nitatur, habes, lector botanice, in hac tabulâ depictam primam e tribu quâdam, quæ formâ et indole adeo a reliquis abhorret, ut sit nemo, vel tantillum in hac scientiâ versatus, qui dubitet quin novum propriumque genus summo jure constituat. Plantæ, e quibus hæc constat tribus, omnes, nisi fallor, intra tropicos, qui dicuntur, circulos reperiuntur, neque rupibus saxisque submarinis, reliquorum instar Fucorum, infixæ adhærent, sed littora arenosa colunt, atque ea præsertim loca ubi non nisi summo maris æstu alluuntur, per quæ, radicibus in terram sabulosam intrusis, latè perrepunt. Singularis harum indoles Fucos cum † vegetabilibus terrenis quodammodò connectit; sed arctior adhuc inter has amplamque ‡ Zoophytorum familiam similitudo interest, et quidem tam arcta ut in quibusdam individuis limites ægrè definiantur. Distinguuntur ab omnibus iis Fucorum familiis quæ nobiscum magis frequentè occurrunt per caules prostratos repentes, et per radicem naturam; quamvis enim non desint inter hasce posteriores aliquæ stirpes, quæ saxa plantasque vicinas rependo obtegunt, est tamen earum radix nihil unquam aliud nisi frons ipsa continuata, quæ, simul atque laxatur, in novos surculos elongata assurgit, id quod satis cuivis patebit Botanico *F. lumbricalem* vel *F. ciliatum* inspicienti; dum e contrario *F. pinnati* affiniumque radices a reliquâ frondis substantiâ toto cælo discrepant, et ad eum tantummodò finem a naturâ comparatæ videntur, ut plantas in loco sustentent natales, vel fortassè aliquid nutrimenti afferant. Totius quoque frondis textura, utpote quæ nihil habet in se gelatosi aut tenacis, ei Fucorum cæterorum est absimilis, extatque causæ cur hæ species semel exsiccata faciem pristinam nunquam recuperent. Inest etiam aliud discrimen, nempe color pulcherrimè gramineo-viridis, qui, si luci obijciatur, citissimè in album diaphanum cornei similem mutatur. Tribum haud numerosam crederem, quoniam § quinque modò species sunt ab auctoribus recensitæ, nec multæ aliæ jam describendæ hactenùs sunt detectæ. De fructificatione nihil omninò, uti mihi apparet, hucusque innotuit, cum neque illud, quicquid id est, quod sub plantâ hinc depictâ LINNÆUS, neque id quod sub *F. Chemniziæ* suo Esperus pro fructu habuit, receptacula mihi videantur vera, vetetque horum vegetabilium indoles peculiaris, ne aliquid ex analogiâ depromptum proferre auderemus. Illud tantummodò hariolari licet, non minùs capsulis quàm structurâ universali a reliquis algis submersis discrepare. De notis quæ *F. pinnatum* ab *F. taxifolio* distinguunt sub illâ

\* Ita mihi quidem videtur, sed anne sese res ita reverà habeat nequeo pro certo dicere, cum nihil sit de recente traditum, et stirps iterum madefacta haud bene reviviscat.

† Accuratius forsitan si locutus si "cum *Charis*" dixeram, in quo genere duæ saltem sunt species, *C. nidifica* et *C. flexilis*, quas *F. pinnatus* insignitè refert; quinam autem sit ille Fucorum naturalis ordo cui hæ plantæ paritèr sunt affines nequaquam facile foret dictu. Ab omnibus mirè abluunt; neque ita, quàm solent, auspicatò observasse mihi videntur Weberus Mohriusque, cum de his plantis in opere, *Neue Beiträge* dicto, p. 318, memorarent, "ihre gesammte Vegetation scheint sich der *Fuci corallini* Gmelins, oder der Draparnaudischen *Zonarien*, auffallend zu nähern. Die Frondes ode die Blättchen sind eben so fein längsgetrichelt, Farbe und Substanz scheint merklich überein zu kommen." Utriusque familiæ color et substantia, quibus nituntur, mihi semper quam diversissimi sunt visi, et licet *F. Ophioglossum* lineis parallelis, *U. flabelliformis* instar, distinguatur, ne una tamen alia species simili modo striata hucusque innotuit, desuntque vel in hac circuli illi concentrici unde nomen suum aptissimum *Zonariæ* deducunt.

‡ Præter similitudinem ex stirpium habitu universali, ut ita dicam, depromptam, quàm tantummodò hinc perstringere volui, optimè est a Webero Mohrioque observatum, "der stamm verräth, so zu sagen, äusserlich wenig vegetabilischen Organismus, ist strohgelb und spröde."

§ Hæ quinque species sunt *F. pinnatus* L., *F. taxifolius* et *F. cupressoides* Vahl, *F. Ophioglossum* Web. et Mohr, necnon *F. Chemniziæ* Esper, quibus fortasse est annuerandus *F. urarius* L., vegetabile, dummodò sit vegetabile, loci perquam dubii, atque etiam, iudice Lamourouxio, *F. sertularioides* Gmel., quæ eadem atque *F. taxifolius* mihi videtur. Erraverunt Weberus Mohriusque, qui *F. triangularem* eidem familiæ adjungendam censuerunt. Stirpes aliquot magnificas his affines e Novâ Hollandiâ secum attulit D. Brown.



illâ memoratur specie, neque ulla alia datur quâcum fieri potest ut commisceatur. *F. plumaris* Forskaliani nulla in Herbario suo reperiuntur exemplaria, neque tamen eo seciùs pro synonymo indubio citavi, quoniam \*descriptio cunctis numeris conveniens scrupulos, me iudice, satis omnes eximit.

- a. *F. pinnatus*, magn. nat.  
 b. *rami pars*, magn. auct. - - - - - 6.  
 c. *pinna seorsum*, *maculata* - - - - - 6.

\* Quo meliùs ii e lectoribus quibus *Floram Egyptiaco-Arabicam* adeundi non datur facultas de hac re judicare possint, descriptionem in illo opere datam hic exscripsi—

"*F. plumaris*; caule tereti, repente, sursum ramosa, ramis plumiformibus; foliis distinctis; vesicis nullis.  
 "Color totius gramineo-viridis. Caulis flavescens, repens, vel prostratus, fundo incumbens: ramis sparsis, confertis; bipoll. plumiformibus: i. e. foliolis filiformibus, distichis, patentibus, confertissimis; rami unguis spatio simplices, dein divisi in 2 vel 3 similes plumas lineari-lanceolatas, sesquipollicares. Singularis prorsus structura."

## 53.—FUCUS PINNATUS.

*Fucus pinnatus*, stem cylindrical, prostrate, creeping, much and irregularly branched; branches erect, mostly simple, pinnated; pinnae close to each other, patent, opposite, cylindrical, obtuse.

*Fucus pinnatus*. LINN. *Suppl.* p. 452. *Syst. Nat. Ed. Gmel.* II. p. 1390.

*F. plumaris*. FORSKÅL, *Fl. Egypt.* p. 190. LINN. *Syst. Nat. Ed. Gmel.* II. p. 1388.

In the Indian Ocean, by Ceylon, under the sea. Koenig.—In the Red Sea. Viscount Valentia.

*Perennial?*

ROOT, fibrous, simple at its origin, but afterwards divided in several cylindrical, straw-colored, branching fibres, about a quarter of an inch long.

FROND, \*cylindrical, filiform, of the thickness of a blackbird's quill, furnished with a procumbent creeping stem, a foot or more long, either simple, or once or twice dichotomous, sending forth at uncertain intervals, throughout its whole length, roots from its under, and branches from its upper side, in other respects naked; branches scattered, erect, from five to nine inches long, in general simple or only bifid, but sometimes irregularly divided, all of them beset from base to summit with distichous, patent pinnae, which are slightly curved, simple, two or three lines long, about the same thickness as the branches, cylindrical, except that they are somewhat attenuated at the base, quite entire, obtuse, placed near to each other, and for the most part opposite.

FRUCTIFICATION, according to Linnaeus, is a racemus, with peltate, flat pedicellate fruit:—what this may allude to, I own, I do not know: I certainly have seen nothing like it:—in some specimens, which I examined under the microscope, there appeared a few spots resembling innate tubercles, but I could discover no seeds, and from the nature of the plant I do not apprehend that these were the fruit.

COLOR, a very beautiful bright glass-green, pale and yellowish in the stem; turning white, if kept in fresh water, or exposed to the sun; when dry skining.

SUBSTANCE, membranaceous, thin, and very tender; brittle in the stem, and also in the whole plant after it is dried.

OBS. Caution is necessary to the unexperienced Botanist, lest he be misled by young specimens of this *Fucus*, which are entirely destitute of pinnae, and resemble in their naked filiform branches, as well as in their color, texture, and substance, battered plants of *Chara flexilis*:—when dry it does not adhere at all to paper.

In compliance with the original intention of this work, in which it was proposed to include whatever plants have been generally considered by botanists as belonging to the tribe of Fuci, however anomalous in their texture and fruit, that thus the foundation may be laid for the better understanding of the marine Algæ in future, I here present my readers with the first species of a family, so widely removed from all the rest, that it would be impossible for the most sceptical to doubt of the propriety of hereafter removing them into a separate genus. The plants which constitute this family are, I believe, all natives of tropical climates, where they grow, not upon rocks, but upon the sandy

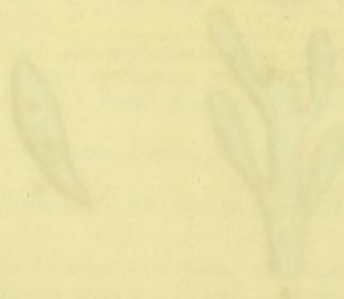
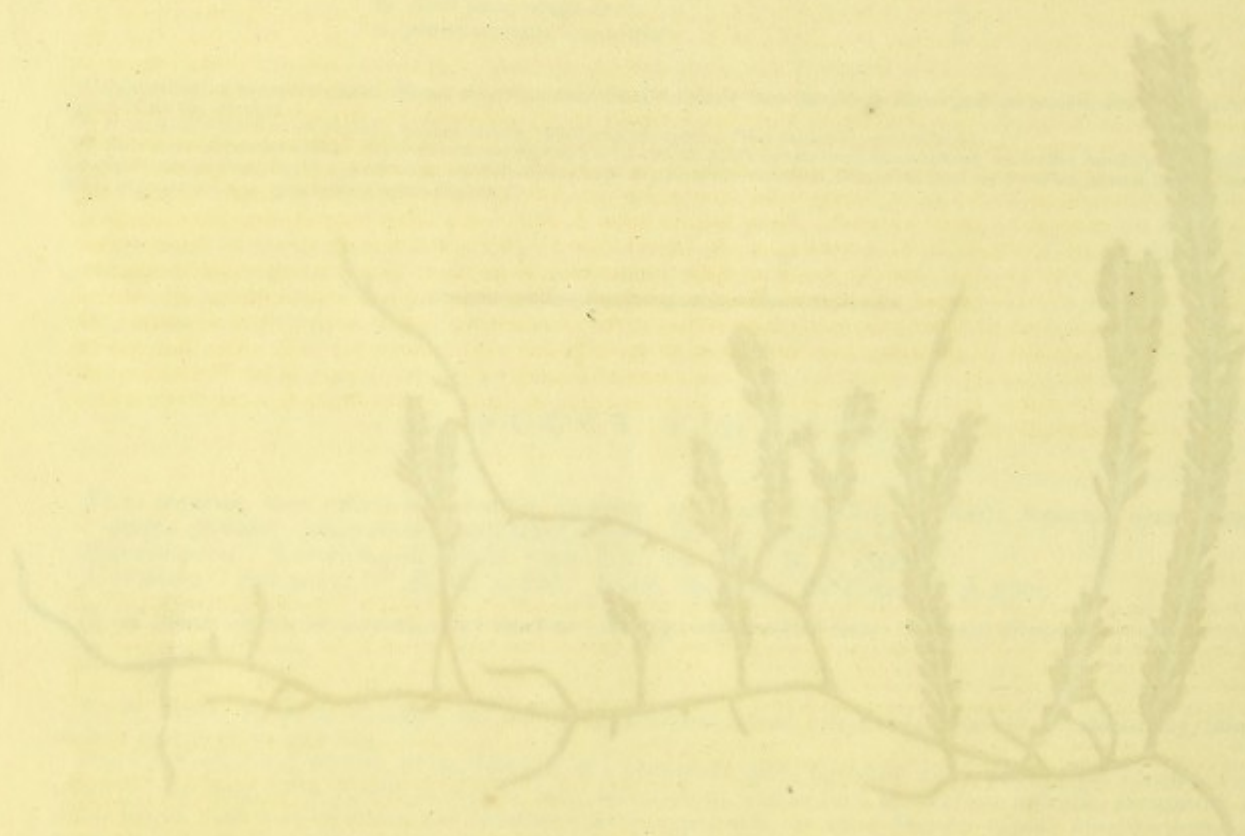
\* This is as it appeared to me, but I would wish to be understood as speaking by no means positively upon the subject, for I find nothing relative to it mentioned by those who have seen it fresh, and the plant, after it has been once dried, recovers very imperfectly in water, which must serve as my apology if the description be found to be more than usually inaccurate.





*Fucus pinnatus.*







sandy shores, and generally near high water mark, creeping in the loose soil, and by their peculiar nature connecting the Fuci in a measure with the \*vegetables of the earth, but still more so with the numerous tribes of †Zoophytes, to which some of them are so closely allied that the boundary between them is drawn with difficulty. It will immediately be seen that they differ from the more common families of Fuci in their prostrate creeping stems, and in their roots; for, though there are not wanting among these latter some individuals which also creep along the rocks and neighbouring plants, yet their roots are never any thing more than mere continuations of the frond, which, upon being detached from their hold, immediately lengthen, and expand into new shoots, as may be seen by any botanist who troubles himself to examine *F. lumbricalis* or *F. ciliatus*; whereas in *F. pinnatus* and its congeners, the roots are of a substance wholly unlike the rest of the plant, and are obviously designed to answer no other purposes, besides those of fixing them in their stations, and, probably, of providing sustenance. The texture, too, of the whole frond is dissimilar to that of other Fuci, being altogether destitute of any gelatinous or viscid property, so that they never recover their original appearance after they have been once dried; and, in addition to these peculiarities, the color of the whole is a beautiful grass-green, particularly liable from exposure to the air to turn to a transparent horny-white. I am inclined to think that the family is not a numerous one, only †five species being described by preceding authors, and not many more known to exist. Their fructification I cannot help considering as altogether unknown; for what Linnæus has attributed to the present plant, or Esper to his *F. Chemnizia*, appears to me to be most probably unconnected with the fruit, and the nature of these vegetables is so peculiar, that it is impossible to hazard a conjecture as to the sort of capsules that they are likely to produce. This alone we may venture to say, that they in all probability recede from the other submersed Algæ no less in this circumstance than in their general structure. Of the characters that separate *F. pinnatus* from the subject of the following plate, mention is made under that species. There is no other that it in any wise resembles. No specimens of Forskål's *F. plumaris* exist in his Herbarium, but I have nevertheless ventured upon quoting it above as a § certain synonym, his description being so accurate as to leave no doubt in my mind upon the subject.

- a. *F. pinnatus*, natural size.  
 b. part of a branch, magnified - - - 6.  
 c. pinna separate, marked with spots - - - 6.

\* It would perhaps have been more correct to have said, "with the *Charæ*," to some of which, especially *C. flexilis* and *C. nidifica*, the present species is considerably allied. To point out to what other natural division of the Fuci this tribe bear equal resemblance might be difficult, they are so much removed from all; and the remark made by Weber and Mohr, in their *Neue Beiträge*, p. 318, that "in their general properties they approach strikingly to the *Fuci corallini* of Gmelin, or the *Zonariæ* of Draparnaud," is not, in my opinion, delivered with the usual accuracy of these acute Botanists. The color and substance of the two families, upon which they rely, have always appeared to me widely different, and, though *F. Ophioglossum* is marked with parallel lines like *U. flabelliformis*, I am acquainted with no other species that is so, nor even in this are there any traces of the concentric circles, whence the *Zonariæ* take their name.

† Besides the resemblance in general habit, to which I intended to allude, it has been justly observed by Weber and Mohr, that the stiff straw-colored stem betrays externally few traces of vegetable organization.

‡ These five are, the plant here described, *F. taxifolius*, and *F. cupressoides*, Vahl; *F. Ophioglossum*, Weber and Mohr; and *F. Chemnizia*, Esper; to which number is probably to be added, *F. weariis*, L., a plant of very doubtful place (if indeed it be a plant at all) and, in the opinion of Lamouroux, *F. sertularioides*, Gmel. which appears to me the same as *F. taxifolius*. The idea entertained by Weber and Mohr, that *F. triangularis* also belongs to the same family is certainly erroneous. Mr. Brown has brought two or three very splendid species of this tribe with him from New Holland.

§ To enable such of my readers as may not be in possession of the *Flora Ægyptiaco-Arabica* to judge, as well as myself, upon the subject, I here transcribe the description from that work, p. 190.

"*F. plumaris*; caule tereti, repente, sursum ramoso, ramis plumiformibus; foliis distinctis; vesicis nullis.  
 i. e. foliis filiformibus, distichis, patentibus, confertissimis; rami unguis spatii simplicis, dein divisi in 2 vel 3 similes plumas lineari-lanceolatas, sesquipollicares. Singularis prorsus structura."



*Fucus taxifolius*, stem cylindrical, prostrate, creeping, much and irregularly branched; branches erect, mostly simple, pinnated; pinnae close to each other, patent, falcate, opposite, cylindrical, acute.

*Fucus taxifolius*. VAHL, in *Skript. af Naturhistorie-Selskabet*. V. pars 2da. p. 36.

*F. sertularioides*. GMELIN, *Hist. Fuc.* p. 151. t. 15. f. 4? LINN. *Syst. Nat. Ed. Gmel.* II. p. 1385?

*F. abietinus*. KOENIG, MSS.

Near the City of Adampatnam. J. G. Koenig, M. D.—Shores of the Isle of St. Croix. West.—In the Red Sea. Viscount Valentia.—Coast of New Holland. Mr. Brown.

*Perennial?*

ROOT, yellowish-brown, half an inch and more long, simple at its origin, but afterwards divided into a few incurved, generally simple fibres.

FROND, cylindrical, filiform, scarcely so thick as a blackbird's quill, furnished with a prostrate, creeping stem, a foot or more long, cylindrical when wet, when dry contracted, and wrinkled, so as never afterwards to recover, in general simple, but occasionally here and there dichotomous, putting forth throughout its whole length at uncertain intervals, roots from its under and branches from its upper side, in other respects naked; branches scattered, erect, varying in length from three inches to a foot, compressed, filiform, more thin than a sparrow's quill, simple in some specimens, in others bifid, or trifid, or even irregularly divided, naked for the distance of a line or two from their base, afterwards pinnated; pinnae distichous, patent, falcate, simple, quite entire, about equal in thickness to the branches, compressed, linear, acute, close to each other, opposite, those towards each extremity of the branches shortest, the intermediate ones longest, and almost half an inch long.

\* FRUCTIFICATION, at present unknown.

COLOR, in the pinnae grass-green, tinged with brown, in the stem pale yellow, and in the branches, particularly towards the base, blackish: the whole plant turns white, if exposed to the sun, or kept in fresh water; when dry, it is destitute of any gloss.

SUBSTANCE, cartilaginous in the stem, in the pinnae membranaceous, but not very thin; stiff and brittle after it is dry.

Obs. Although this plant in drying does not adhere in the least to paper, the ends of the pinnae not unfrequently then stick together, so that it is difficult to separate without tearing them.

The resemblance between the present and the preceding *Fucus* is so strong, and the characters that distinguish them are of a nature so easily to be overlooked, that the description of either, unless written with the greatest caution, and with an actual comparison of specimens, will probably be so drawn up as to be, at the same time, applicable also to the other. After an acknowledgment of this nature, it may reasonably be asked, what are the grounds upon which I have ventured to separate them, and to such a question a more satisfactory answer may be given, by referring to the figures, than by any words which it might be in my power to employ. That the plants are in reality very different, I have no doubt myself, nor could any one doubt it who had ever seen them. The habit, texture, and substance of the two are dissimilar: *F. pinnatus*, when dry, is almost as thin as goldbeater's skin, and floats about with the slightest breath of air, whereas *F. taxifolius* is comparatively stiff and rigid; the color of the latter is darker and more brown than that of the former; the pinnae are more falcate, not half so thick, by no means attenuated at their bases, and acute, instead of obtuse, at their apices; besides which, they have, when dry, the peculiarity, above noticed, of folding in a measure over each other at the points and adhering together. Koenig, who gathered them both, had distinguished them, and the specimen in the Banksian Herbarium, which is here figured, was communicated by him, under the name of *F. abietinus*. I am, however, inclined to believe that they were confounded by Linnæus; who, though he has preserved in his *Hortus Siccus* only the subject of the preceding plate under the name of *F. pinnatus*, had nevertheless given to Acharius the *F. taxifolius* of Vahl for the same species, as was observed by †Weber and Mohr during their tour through Sweden. These Botanists consequently consider the two *Fuci* as synonymous, and I ought in justice to observe, that I have no means of disproving their opinion, having never myself seen any authentic specimen of Vahl's plant; in spite of which, however, I have ventured to differ from them, the name of *F. taxifolius*, which is most happily applied to the one, being by no means equally applicable to the other, and particular mention being made of the acuteness of the pinnae in the description, which is copious, and contains also other differences of an inferior nature. I have subjoined a mark of doubt to Gmelin's synonym above quoted, and have not even hazarded the adopting of the name used by him, though admirably expressive, because both his figure and description are made from individuals so imperfect, that it is impossible to speak with certainty upon the subject. I am, however, inclined

to

\* West, according to Vahl, was of opinion that he had detected fructification in this *Fucus*; but it is added by Vahl, that the vesicles which that Botanist mistook for the fruit, are unquestionably the eggs of some testaceous animal, being easily separable from the frond, instead of growing upon it, and being in substance and color quite different from it. They are rather coriaceous than membranous; and are filled with the same matter as is found in other dried eggs of testaceæ; similar ones are also sometimes met with upon other *Fuci*, that are furnished with true capsules. Their size is about equal to that of mustard seed, their color grey, their form oblong, in the middle they are covered with an orbicular lamina, and are perforated with a pore at one extremity: in drying they shrink.—Such are the observations of Vahl, which I have been induced to repeat, principally as they afford me the opportunity of remarking how frequently the eggs of marine insects, or the lesser Zoophytes adhere to *Fuci*, and give the appearance of fructification, and consequently how much care is necessary in our observations. The same very frequently happens in fresh-water *Confervæ*.

† *Naturhistorische Reise durch einen Theil Schwedens*, p. 78.





*Fucus taxifolius.*







to believe that his plant is the same as ours, there being in Lord Valentia's collection a specimen considerably resembling that which he has represented.

*F. taxifolius*, natural size.

b. upper part of a branch, magnified - - - 5.

c. pinna - - - - - 4.

## 54.—FUCUS TAXIFOLIUS.

*Fucus*, caule terete, prostrato, repente, ramosissimo; ramis erectis, simpliciusculis, pinnatis; pinnis approximatis patentibus, falcatis, oppositis, cylindraceis, acutis.

*Fucus taxifolius*. VAHL, in *Skript. af Naturhistorie Selskabet*. V. pars 2da. p. 36.

*F. sertularioides*. GMELIN, *Hist. Fuc.* p. 151. t. 15. f. 4?

*F. abietinus*. KOENIG, MSS.

HABITAT in Freto Chilas, prope Civitatem Adampatnam. J. G. Koenig. M. D.—In Insulâ Sanctæ Crucis. West.—In Mari Rubro. *Viccomes de Valentia*.—In Novæ Hollandiæ oris. D. Brown.

*Perennis?*

RADIX lutescenti-fusca, unguem et ultra longa, ortu simplex, mox in fibras aliquot simpliciusculas incurvas divisa.

FRONS teres, filiformis, pennâ Merulæ aliquantùm tenuior, instructa caule prostrato, repente, pedali, et ultra, madore terete, siccitate collabente et ruguloso, neque posthac reficiendo, plerumque simplice, sed quandoque hic illic dichotomo, intervallis haud certis per totam longitudinem e parte inferiore radices, e superiore ramos emittente, cætera nudo; rami vagi, erecti, longitudine a tripollicarem ad pedalem variabiles, compressi, filiformes, pennâ passerinâ tenuiores, nunc simplices, nunc bifidi, trifidive, vel etiam enormiter divisi, basi per unam alteramque lineam nudi, cætera pinnati; pinnæ distichæ, patentæ, falcatæ, simplices, integerrimæ, ejusdem ferè cum ramis crassitie, compressæ, lineares, acutæ, approximatae, oppositæ, eae rami apicem basinque versus minores, intermediæ longiores, et propemodùm unguiculares.

\* FRUCTIFICATIO hactenus latet.

COLOR, qui pinnarum gramineo-viridis fuscescenti-immixtus, est in caule stramineus, et in ramis, præsertim basin versus, nigricans; per totam stirpem in aquâ dulci asservatam vel soli objectam albescens; in exsiccata nitoris expers.

SUBSTANTIA caulis cartilaginea, pinnarum membranacea, neque tamen ita tenuis; exsiccatione rigida et fragilis.

OBS. Quamquam planta siccata chartæ nequaquam adhæret, pinnarum apices non rarò tunc agglutinati inter se coherent, nec nisi divellendo disjunguntur.

Tantam habet hic *Fucus* cum præcedente affinitatem, et notæ quæ unum ab altero secernunt tam agrè verbis capiuntur, ut in singulis describendis summâ curâ amborumque exemplaribus est opus, ne, characteribus per quos invicem distinguuntur prætermisiss, talis conficiatur descriptio, qualis utrique paritèr conveniat. Hoc prædicato, quæret fortè aliquis, quânam igitur sum adductus causâ ut disjungam; cui tamen ego nullâ promptius efficaciusve ratione respondendum existimo, quàm referendo ad iconas, ubi luculentius quàm quod verbis fieri potest exponuntur discrimina. Plantas has, quantumvis inter se plurimis congruentes, esse revera distinctas nullus dubito; nec dubitabit ille, quisquis utriusque exemplaria vidit. Habitu, texturâ, et substantiâ discrepant: exsiccatione enim *F. pinnatus* fit quâvis ferè membranâ tenuior, plumæque instar lenissimo agitur halitu, contra verò *F. taxifolius* rigidus crassiusculusque evadit. Hujus etiam color intensior, fuscescentie tinctus; pinnæ quoque magis falcatæ, iis *F. pinnati* duplò angustiores, basi nequaquam attenuatæ, atque apice non modò non obtusæ verùm acuminatæ; præter quod, harum extremitates, uti suprâ memoratur, in plantâ siccata quodammodò sunt imbricatæ, coherentque. Koenigius, qui ambos nascentes legit, pro diversis habuit, et exemplar hic depictum est ab ipso ad Herbarium Banksianum sub *F. abietini* nomine communicatum. Suspicio verò utrumque esse a Linnæo commistum, qui, licet illam modò stirpem in tabulâ præcedente adumbratam pro *F. pinnato* in phytophylacio suo servaret, miserat tamen olim ad Acharium *F. taxifolium* eodem titulo insignitum, quod, dum † Sueciam peragrarent, viderunt Weberus Mohriusque, qui inde duos hos *Fucos* aliumque et eundem crediderunt. Mihi quidem *F. taxifolii* Vahlmani exemplaria nulla, auctoritate, quod aiunt, rata, hucusque sunt visa, neque tamen eo secius pro hujus nostræ stirpis, potiùs quàm præcedentis, synonymo indubio habeo, cum quòd nomen uni convenientissimum alteri malè congruat, tum quòd in descrip-

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tione

\* Vahlus refert credidisse Westium se fructificationem in hoc fuce detexisse; vesiculæ verò, quas pro fructu habuit, "sunt," ut ipsius verbis utar, "certo certius ovula cujusdam animalis testacei: facile enim a fronde separantur nec ei connatæ, substantia et colore gaudent omnino diverso, coriaceæ potius sunt quam membranaceæ, materia simili repletæ ac illa quæ in aliis ovulis exsiccatis testaceorum reperitur, denique similes in aliis fucis reperio, veris vesiculis instructis. Sunt magnitudine seminis sinapi, griseæ, parum oblongæ, medio lamina orbiculata auctæ, altera extremitate poro perforatæ, siccitate collapsæ."—Hæc Vahlî observationes eâ præsertim de causâ hic repeti, ut monerem lectores quàm sæpe testaceorum ova, aut Zoophyta minora, fucis inherentes fructificationis speciem præbeant, quantæque igitur curæ in observandis est opus. Idem in *Conferis* aquas dulces habitantibus haud infrequenter occurrit.

† *Naturhistorische Reise durch einen Theil Schwedens*, p. 78.



tionē suā ubere pinnas acutas, et quædam alia minoris momenti, memoret Botanicus ille acutissimus, fato nimis, eheu! proprio præreptus. Gmelini synonymo suprà citato dubitationis signum subjeci, neque nomen ab eo impositum, quantumvis aptissimum, asciscere sum ausus, quia descriptio æquè ac icon ad exemplaria plus æquo manca confectæ nihil de hac re certi proferendum relinquunt. Ad hanc autem pertinere stirpem credo, cùm in Herbario nobilissimi Vicecomitis de Valentia specimen quod ei a Gmelino depicto satis respondeat asservatum extet.

- a. *F. taxifolius*, magn. nat.  
 b. *rami pars superior* magn. auct. - - - 5.  
 c. *pinna* - - - - - 4.

## 55.—FUCUS SELAGO.

*Fucus Selago*, stem cylindrical, prostrate, creeping, much and irregularly branched; branches erect, mostly simple, every where covered with ramuli between erect and patent, closely imbricated, cylindrical, and acute.

In the Red Sea. Viscount Valentia.

Perennial?

ROOT, pale straw-color, three or four lines long, at first simple, afterwards divided into a few incurved unbranched fibres.

FROND, cylindrical, filiform, of the thickness of a sparrow's quill, furnished with a prostrate creeping stem, more than four inches long, but how much more I am unable to say, smooth, dichotomous, shrinking and wrinkled when dry, throwing out at short, but uncertain intervals, branches from its upper, and roots from its under side, in other respects naked; branches scattered, erect, nearly half a foot high, either simple, or irregularly beset with one or two shorter ones, all consisting of a narrow compressed midrib, clothed on all sides, from base to summit, with closely imbricated \*ramuli between erect and patent, simple, quite entire, straight, three or four lines in length, about the same thickness as the midrib, compressed, linear, and acute.

FRUCTIFICATION, at present unknown.

COLOR, a beautiful grass-green in the ramuli, in the stem pale-yellow; destitute of gloss when dry; if exposed to the sun, or kept in fresh water, turning to white.

SUBSTANCE, of the stem, cartilaginous, of the leaves membranaceous; after drying rather stiff and brittle.

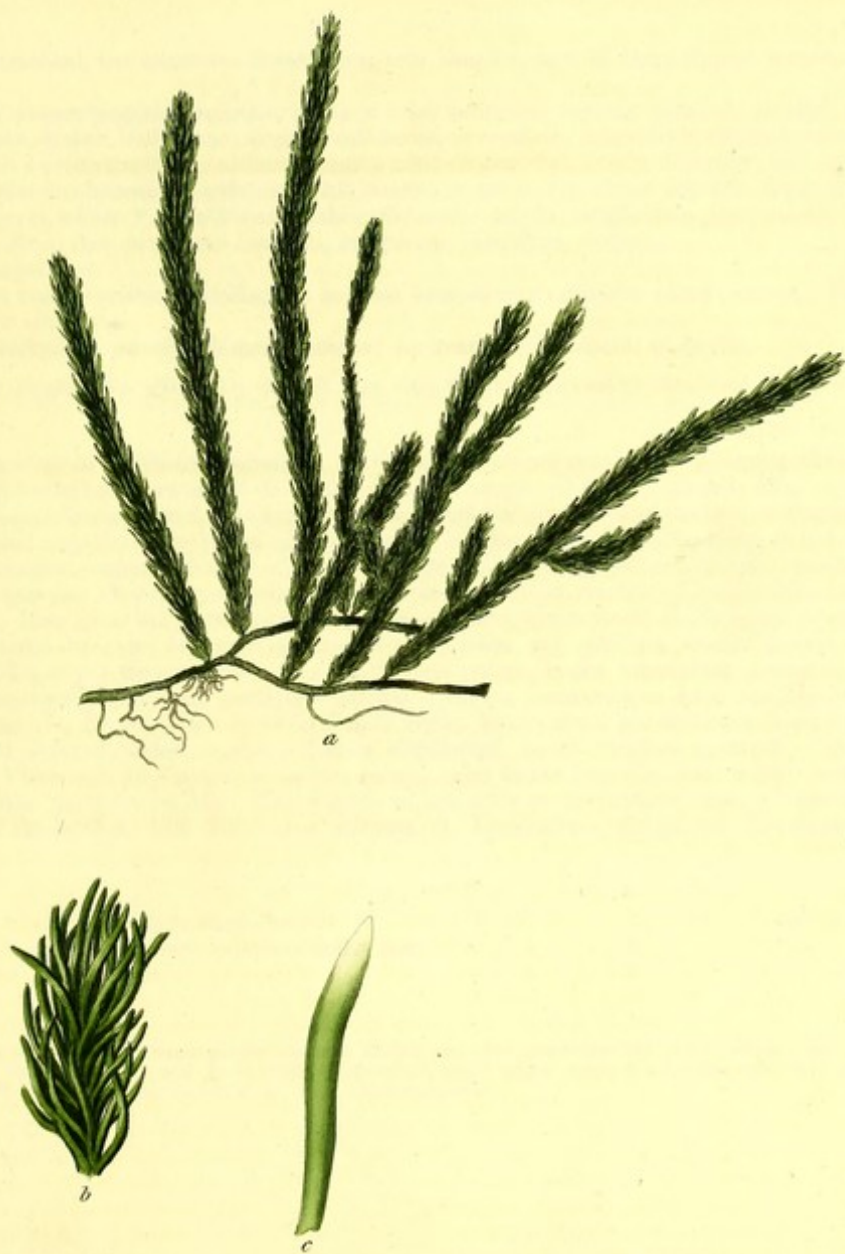
Obs. When dry it does not adhere in the least to paper:—the ramuli are so closely imbricated as altogether to cover and conceal the nerve of the branches.

If under the preceding *Fucus* it has been necessary to point out that it is really distinct from *F. pinnatus*, and carefully to particularise the characters by which these two plants are essentially distinguished, it is on the other hand scarcely less important to observe, under the present, that the marks which separate it from *F. taxifolius* seem to me to exist more strongly in appearance than in reality, and that, independently of the disposition of the ramuli, which are in the one completely distichous, and in the other closely imbricated on all sides, there is nothing that would lead to make them considered as distinct species, the slight dissimilarity of color, and the circumstance of the ramuli being straight or somewhat falcate, not being of themselves more than sufficient to constitute small varieties. It is upon this account principally that I have been induced to figure *F. Selago*, without having seen more specimens than the one here represented, in order that, by placing it next to *F. taxifolius*, botanists may have a better opportunity of forming their opinion how far these two *Fuci* are to be considered distinct; and I will only observe that, in my opinion, they are truly so, though, till an opportunity is afforded of examining a greater number of individuals, the point must be considered as in a measure undetermined. Mr. Brown, who has brought from New Holland some beautiful plants of a *Fucus*, which, though much larger than the present, seems scarcely to be specifically different, will, when he examines this part of his Herbarium, probably enable us to decide it. For the specimen now figured I am indebted to Lord Valentia, whose kindness I shall have repeated occasions to acknowledge in the course of this work, for the furtherance of which, he has most obligingly communicated the whole of the submersed Algæ, collected by himself in the Red Sea. Upon the name of *F. Selago*, it can scarcely be necessary to offer any remark, as it must be sufficiently obvious to every botanist that it is taken from the resemblance which the plant bears, when moist, to the *Lycopodium Selago* of Linnæus.

- a. *F. Selago*, natural size.  
 b. *upper part of the frond*, magnified - - - 5.  
 c. *ramulus* - - - - - 3.

\* The parts here called ramuli are precisely the same as those which under the two preceding species are termed pinnae, the change of name being occasioned only by their disposition, which is not distichous. In form and situation these almost exactly agree with the ramuli already described under *F. pinastroides* and *F. lycopodioides*, but their nature is quite different, nor are they ever, like them, divided, or lengthened into branches.





*Fucus Selago.*







*Fucus*, caule terete, prostrato, repente, ramosissimo; ramis erectis, simpliciusculis, undique obtectis ramulis erecto-patulis, densè imbricatis, cylindræis, acutiusculis.

HABITAT in Mari Rubro. Vicecomes de Valentia.

Perennis?

RADIX coloris dilutè straminei, tres quatuorve lineas longa, ortu simplex, mox in fibras aliquot incurvas simplices divisa.

FRONS teres, filiformis, pennæ passerinæ crassitie, instructa caule prostrato, repente, palmari, et ultrà, sed longitudinis hactenus mihi ignotæ, glabro, dichotomo, siccitate collabente, et ruguloso, intervallis brevibus, attamen incertis, e parte superiore ramos, ex inferiore radices emittente, cætera nudo; rami vagi, erecti, altitudine ferè semipedales, nunc simplices, nunc uno alterove breviorè sparsim instructi, omnes e nervo constantes angusto, compresso, undequaque, a basi usque ad apices, obsito \* ramulis densè imbricatis, erecto-patulis, simplicibus, integerrimis, rectis, tres quatuorve lineas longis, ejusdem ferè cum nervo crassitie, compressis, linearibus, acutis.

FRUCTIFICATIO hucusque latet.

COLOR, qui ramulorum amoenè gramineo-viridis, est in caule stramineus; exsiccata nitoris expers; soli objectæ, l in aquâ dulci asservatæ albescens.

SUBSTANTIA caulis cartilaginea, ramulorum membranacea; exsiccatione rigidiuscula et fragilis.

Obs. Exsiccata chartæ nequaquam adhæret:—ramuli tam densè sunt imbricati ut ramorum nervorum omninò cooperiant et celent.

Si *Fucum* præcedentem tractanti imprimis necessarium sit visum lectoris animus ad ea advertere discrimina per quæ sese a *F. pinnato* dignoscendum præstat, ut de duabus stirpibus, reapse distinctis, quamvis inter se simillimis, nulla in posterum errori suppeditaretur ansa, haud minùs est de plantâ hîc depictâ observandum, characteres, qui ab *F. taxifolio* secernunt, videri majoris, quàm reverà sint, momenti; si enim ramulorum dispositio in hoc disticha in illo undique imbricata excipiat, tantum abest ut ulla maneat nota, quæ sufficiat ad species duas constituendas, ut omninò eadem evadant; quoniam ob coloris exiguum discrimen et ramulos vel erectos vel lenitèr falcatos vix essent in varietates dispartendi. Hæc igitur me primùm impulit causa, ut, licet unum modò *F. Selaginis* exemplar hucusque viderim, hîc nihilominus depictum sisterem, quò, ambabus stirpibus unà exhibitis, melior daretur occasio de iis dijudicandi. Nihil ultrà ipse pro me prædicabo nisi quòd diversas putem, neque tamen huic sententiæ impensius instarem, donec plura observandi exemplaria contigerit facultas. Litem, quamprimùm hanc sui Herbarii perlustraverit partem, fortè dirimet D. Brown, qui e Novâ Hollandiâ redux secum attulit pulcherrimum quendam *Fucum*, hujus certè affinem, si non omninò eundem, quamvis habitu aliquantùm, staturâ multum discrepet. Specimen hîc adumbratum nobilissimo Vicecomiti de Valentia acceptum refero, cujus in me benevolentiam nequeo satis laudare, quâ Algas submersas omnes, quotquot in Mari Rubro legit, ad hoc opus promovendum misit. Nomen, uti satis cuivis patebit botanico, a similitudine, quæ inter hanc stirpem et *Lycopodium Selaginem* Linnæanum interest maxima, depromitur.

a. *F. Selago*, magn. nat.

b. *frondis pars superior*, magn. auct. - - - 5.

c. *ramulus* - - - - - 3.

\* Partes eæ hîc ramuli dictæ omninò sunt eædem atque illæ quæ sub duabus speciebus præcedentibus *pinnæ* audiunt; nomenque idcirco modò mutatur quia situs haud distichus. Utut verò formâ situque convenient, longè indole recedunt a ramulis jam sub *F. pinastroide* et *lycopodioides* descriptis, neque, illorum instar, unquam sunt divisi, vel in ramos elongantur.



*Fucus ericifolius*, stem prostrate, creeping, much and irregularly branched; branches erect, irregularly divided, every where covered with ramuli, closely imbricated, between erect and patent, elliptical, hollow, tipped with an extremely short mucro.

Found at the Bermuda Islands. *Herb. Banks.*

*Perennial?*

**ROOT**, pale yellowish, at first simple, afterwards divided into a few fibres.

**FROND**, cylindrical, filiform, nearly as thick as a crow's quill, furnished with a prostrate, creeping, smooth, and glossy stem, which is most probably cylindrical when recent, but in drying collapses, and becomes deeply longitudinally furrowed, so as never afterwards to recover, it throws out branches from its upper, and roots from its under side, in other respects it is naked; branches scattered, erect, three or four inches, or more, high, either forked, or beset with other smaller ones, cylindrical, naked for the space of a line or two from the base, afterwards covered every where, even to the apices, with ramuli closely imbricated on all sides, between erect and patent, about a line long, elliptical, inflated, tipped with an extremely minute mucro, externally smooth, but appearing under a microscope most delicately striated, internally quite hollow:—in drying they collapse, and are variously wrinkled.

**FRUCTIFICATION**, at present unknown.

**COLOR**, of the ramuli grass-green, destitute of gloss, of the stem whitish-yellow, and shining; the whole plant, if kept in fresh-water or exposed to the sun, turns white.

**SUBSTANCE**, in the stem cartilaginous, hard and tough, in the ramuli between membranaceous and cartilaginous; when dry firm, stiff, and brittle.

**Obs.** The plant contains nothing whatever viscid, and in drying does not adhere in the least to paper.

Of this species also, as well as of the last, I have at present seen only a single specimen, but it appears to be a plant so extremely different from all others, that it is impossible to mistake it; and I have therefore felt no hesitation in publishing it here, being anxious to bring together all that I at present know respecting the extraordinary family to which it belongs. Its texture is very unlike that of its congeners, being so hard and thick as to seem, when dry, almost ligneous, a circumstance, which added to the strong resemblance that it bears in general appearance to a bunch of *Erica vulgaris*, or *tetralix*, makes it an excellent connecting link between this tribe of Algæ and the phænogamous vegetables of the earth. The inflated ramuli, which look, when magnified, like the leaves of *Sedum acre* or *sexangulare*, bring this plant near to *F. uvari* of Linnæus, from which it is completely different in its habit, and in the form of its parts. The description above given is necessarily very incomplete, having been drawn up merely from a single individual, and from the fragment of another, both preserved in the Banksian Herbarium, where alone I have at present seen this *Fucus*, which does not appear to be known to any foreign author. Many deficiencies might, indeed, safely be supplied from analogy; judging from which, there can be no doubt, that the mode of growth is precisely similar to that of the three preceding species. It is unfortunate that the name of *F. ericoides* had been previously given to a different *Fucus* much less deserving of it; in consequence of which, it was necessary to apply to the present that of *F. ericifolius*, which is by no means equally applicable, the resemblance consisting more in habit and in general appearance than in the form of the leaves, though these also, especially in a dry state, are not unlike those of the *Ericæ*.

a. *F. ericifolius*, natural size.

b. upper part of the frond, magnified - - - 4.

c. portion of a ramulus cut through - - - 2.





*Fucus ericifolius.*







*Fucus*, caule prostrato, repente, ramosissimo; ramis erectis, vagè divisis, undique obtectis ramulis erecto-patulis, densè imbricatis, ellipticis, cavis, brevissimè mucronulatis.

HABITAT ad Insulas Bermudas. *Herb. Banks.*

*Perennis?*

RADIX lutescens, ortu simplex, mox in fibras aliquot divisa.

FRONS teres, filiformis, pennæ corvinæ ferè crassitie, instructa *caule* prostrato, repente, lævi, nitidoque, madore verisimillimè terete, siccitate collabente et profundè longitudinalitèr sulcato, neque posthàc reficiendo, e parte inferiore radices, e superiore ramos emittente, cætera nudo; *rami* vagi, erecti, tri-quadri-pollicares, et ultrà, vel bifurci, vel aliis minoribus obsiti, teretes, basin versus, per unius duarumve linearum longitudinem, nudi, inde ubique, usque ad apices, vestiti *ramulis* undique densè imbricatis, erecto-patulis, circiter lineam longis, ellipticis, inflatis, mucrone minutissimo apiculatis, extrinsecus glabris, sed sub lente tenuissimè striatis, intus omninò cavis:—siccitate collabuntur et variè rugulosi evadunt.

FRUCTIFICATIO hactenùs latet.

COLOR ramulorum gramineo-viridis, nitoris expers, caulis albo-stramineus, nitidus, *per totam stirpem in aquâ dulci asservatam vel soli objectam* albescens.

SUBSTANTIA caulis cartilaginea, dura, tenax, ramulorum membranaceo-cartilaginea; exsiccata firma, rigida, et fragilis.

Obs. Stirps ne minimum in se viscidis habens siccitate chartæ nequaquam adhæret.

Hujus quoque Fuci, sicut præcedentis, unicum modò exemplar adhuc vidi, neque tamen eâ de causâ hîc evulgare dubitavi, cum quòd videatur planta primo aspectu a reliquis dignoscenda, tùm quòd vellem omnes hujus familiæ stirpes, quotquot mihi hucusque innotuerunt, simul depictas sistere. Texturâ multùm a congeneribus recedit, constatque substantiâ adedè durâ et crassâ, ut exsiccata propemodùm lignosa appareat. Huic si adjicias similitudinem, quam præ se fert cum *Ericâ vulgari* et *tetralice*, statim agnosces unum ex annulis in Naturæ catenâ Algas submersas ad vegetabilia terrena phænogama alligantibus. Per ramulos inflatos, qui sub lente conspecti folia *Sedi acris* vel *sexangularis* quodammodò referunt, appropinquit *F. ericifolius* ad *F. uvarium* Linn. a quo partium figurâ et habitu toto celo discrepat. Descriptio suprà data, ad unum modò exemplar atque alterius frustulum, utrumque in Herbario Banksiano servatum, confecta, necessariè manca reperietur, neque plantam ab ullo auctore memoratam invenio, unde aliquid ejus indolem historiamve illustrans depromere possim. Facile quidem foret, et fortasse etiam tutum, plurima ex iis quæ hic desunt analogiâ supplere, neque hâc nisus dubitaret aliquis credere crescendi modum esse omninò ejus similem jam sub Fucis tribus præcedentibus descripti. Dolendum est *F. ericoidis* nomen esse olim a Botanicis ali inditum speciei, cui multò minùs aptè quadrat; unde nihil restavit aliud, nisi ut hanc nostram *F. ericifolium* nuncuparemus, quod tamen nequaquam paritèr idoneum, quoniam similitudo major in plantæ habitu et facie totâ externâ quam in foliorum formâ sit posita, quamvis et hæc quoque, præsertim siccata, ea *Ericarum* haud ita malè referant.

a. *F. ericifolius*, magn. nat.

b. *frondis pars superior*, magn. auct. - - - 4.

c. *ramuli dissecti pars* - - - - 2.



*Fucus clavifer*, stem cylindrical, filiform, prostrate, creeping, much and irregularly branched; branches erect, mostly simple; ramuli between erect and patent, imbricated on all sides, pyriform, hollow.

*Fucus racemosus*. FORSKÅL, *Fl. Egypt.* p. 191? *Syst. Nat. Ed. Gmel.* II. p. 1382?

In the Red Sea. Viscount Valentia.

ROOT, pale straw-colored, an inch and more long, in some cases simple, in others divided, and occasionally beset with small fibres.

FROND, cylindrical, filiform, about the thickness of a blackbird's quill, furnished with a prostrate, creeping stem, from nine inches to a foot in length, either simple, or here and there irregularly divided, cylindrical when moist, when dry collapsing and wrinkled, throwing out, at short, but uncertain distances, throughout its whole length branches from the upper, and roots from the under surface, in other respects naked; branches irregularly scattered, erect, one or two inches long, so constantly simple, that I have seen only a single instance in which they were forked towards the base, almost cylindrical, filiform, of nearly the same thickness as the rest of the frond, naked for the space of a line or two from the stem, but afterwards covered with ramuli, loosely placed on all sides, between erect and patent, of a pyriform shape, and about a line long, their apices either quite entire, or slightly emarginate.

FRUCTIFICATION, hitherto undiscovered.

COLOR, every where, except in the roots, grass-green, most commonly, but by no means always, tinged with yellow in the stem; when dry dark, dull, and destitute of gloss; turning, if exposed to the sun, or kept in fresh water, to pale-yellow, and finally to white.

SUBSTANCE, cartilaginous in the stem, in the ramuli thin, and membranaceous, flexible after the plant is dry.

OBS. No part of the frond adheres in a dry state to paper; the ramuli collapse then remarkably, and are generally pressed close to the stem, and look as if they were spherical.

With regard to substance, texture, and mode of growth, the *Fucus* here figured accords so exactly with those represented in the four preceding plates, that the resemblance between them can scarcely fail to strike even the most incautious observer, nor can the slightest doubt be entertained of their belonging to the same natural family. The form of the ramuli, however, is in *F. clavifer* so extremely unlike that of any of the others as immediately to distinguish it, not only from these, but from every other species of submersed Alga, at present known, excepting only *F. Chemnitzia* of Esper, to which I was at first inclined to refer it as a synonym, till a more attentive examination of a specimen communicated to me by the learned Professor himself, induced me to adopt a contrary opinion. The lower and youngest ramuli are, according to the figure in the *Icones Fucorum*, cylindrical and acute, but the \*rest are clavate at their apices, yet not like those of *F. clavifer*, for they appear to preserve their cylindrical form to their extremities, where they suddenly expand. They are also longer, and more thin; and, in addition to this, Dr. Esper has described and figured his plant as arising from a membranaceous base, a circumstance, which, if correct, tends to deprive us of the strongest character of this singular tribe of vegetables, with which *F. Chemnitzia* agrees so precisely in all other points, that I cannot help apprehending he is in this instance mistaken, though the specimen that he has sent me, being small, does not afford the means of confirming my suspicion. He particularly dwells upon its resemblance to *F. Gartnera* of Gmelin, which is generally supposed to be the same as *F. pedunculatus*; but, whether such a supposition be correct or not, there can be no necessity to enlarge upon the points of difference between them, as the principal character of *F. Gartnera* depends upon the tufts of Conferva-like filaments that terminate its branches, and of these it is almost needless to say that there is not the least trace in *F. clavifer* or *F. Chemnitzia*. With respect to the synonym of †Forskål above quoted, I should scarcely have considered it requisite to subjoin to it a mark of doubt, had not that accurate Botanist expressly noticed the racemose disposition of the vesicles as its essential character. The *F. racemosus* figured by Esper, I. t. 98, is, as that author himself observes, a widely different species, and seems to me to be probably only a ‡battered stem of *F. mucronatus* or *granulatus*, stripped of its leaves and branches. The name of *F. clavifer* has been taken from the appearance of the plant when recent, in which state the branches look as if merely a cluster of small clavate bodies: had it been allowed to have borrowed an appellation from the form it assumes after it is dried, it might have been aptly denominated *F. Trichomanes*. I am indebted to the kindness of Lord Valentia for the individual here figured, nor have I ever seen any specimens of this *Fucus* besides those brought by him from Egypt.

a. *F. clavifer*, natural size.

b. upper part of a branch, magnified - - 6.

\* Dr. Esper considers the inflated ramuli as the fructification, in which opinion, I am sorry to say, I do not see sufficient cause to coincide with him. I should be tempted here to transcribe a considerable part of his description, but that I hope for a more favourable opportunity of treating upon the subject, when *F. Chemnitzia* shall be figured in this work, and I will therefore now merely copy that part of the specific character which relates to what he considers the fruit:—"fructificationibus confertis ex corpusculis pedunculatis tubæformibus, limbo campanulato."

† Weber and Mohr in their enumeration of Forskål's Fuci (*Archiv für die syst. Naturgeschichte*, I. p. 134.) say nothing more of this plant than that it differs toto cælo from what Esper has figured under the same name. It is entirely upon the following description in the *Fl. Egypt.* that I found my opinion of its being the same as *F. clavifer*:

"FUCUS RACEMOSUS: caule tereti, repente-ramoso; vesicis obovatis, a confertè racemosis, foliis nullis.

"Totus viridis. Caulis repens in fundo. Racemi vesicularum tripollicares, undique vesiculis viridibus imbricati." *Fl. Egypt.* p. 191.

‡ It was something similar to this that was described in Dr. Withering's *Botanical Arrangements*, IV. p. 111, under the name of *F. nodicaulis*.





*Fucus clavifer.*







*Fucus* caule terete, filiformi, prostrato, repente, ramosissimo; ramis erectis, simpliciusculis; ramulis erecto-patulis, undique imbricatis, pyriformibus, cavis.

*Fucus racemosus*. FORSKÅL, *Fl. Ægypt.* p. 191.? *Syst. Nat. Ed. Gmel.* II. p. 1382?

HABITAT in Mari Rubro. *Viccomes de Valentia*.

*Perennis?*

RADIX coloris dilutè straminei, pollicem et ultra longa, nunc simplex, nunc divisa, vel interdum fibrillis obsita.

FRONS teres, filiformis, pennæ Merulæ crassitie, caule instructa prostrato, repente, dodrantali, aut pedali, simplice, vel hic illic vagè diviso, madore terete, siccitate collabente et ruguloso, intervallis brevibus, attamen incertis, per totam longitudinem e parte superiore ramos, ex inferiore radices emittente, cætera nudo; rami vagi, erecti, longitudine pollicares, et quandoque bipollicares, plerumque simplices, ita ut unum modò juxta basin bifurcum viderim, teretiusculi, filiformes, ejusdem ferè cum reliquâ fronde crassitie, basi per unam alteramve lineam nudi, inde obsiti ramulis undique laxè dispositis, erecto-patulis, lineam circiter longis, pyriformibus, apice nunc integerrimis, nunc lenitè emarginatis.

FRUCTIFICATIO nulla hactenùs detecta.

COLOR ubique, nisi in radicibus, gramineo-viridis, in caule sæpiùs, sed nequaquam semper, stramineo tinctus; exsiccata obscurus, et nitoris expers; soli objectæ vel in aquâ dulci servatæ lutescens, et demum albescens.

SUBSTANTIA in caule cartilagineâ, in ramulis membranacea et tenuis; in exsiccata flexilis.

Obs. Nulla stirpis exsiccata pars chartæ adhæret: ramuli tum insignitè collabuntur, caulique sæpiùs adpressi, et sphaerici apparent.

Si substantia, textura, crescendique modus respiciantur, maxima inter *Fucum* hic depictum atque illos in tabulis quatuor præcedentibus delineatos similitudo intercedere reperietur; unde quantum inter se conveniunt patebit cuivis vel obitèr inspicienti, nec dubitationi dabitur locus quin ad eandem familiam naturalem ascribi debeant. Quantumvis verò hæc similitudo valeat, ramulorum formâ aded singulari gaudet *F. clavifer*, ut statim per hanc dignoscatur, non modò a reliquis omnibus hujusce tribus individuis, sed a cunctis hucusque detectis Algarum submersarum speciebus, *Fuco* Esperii *Chemnitzii* modò excepto, quem tam insignitè refert, ut primò eundem crediderim, donec, specimenibus ab ipso Professore missis attentius lustratis, de hæc sententiâ discedere sum coactus. Tabula in *Iconibus Fucorum* ramulos inferiores et juniores teretes acutosque sistit; neque sunt \*reliqui, licet apices habeant clavatos, eorum *F. claviferi* omninò similes, cum formam cylindraceam ad extremitates usque servant, seque ibi derepentè dilatent. Sunt etiam longiores tenuioresque. Præter hæc plantam suam e basi membranaceâ oriri tradit Esperus, sed in hoc optimum auctorem aliquid humani esse passum nequeo non suspicari, quoniam *F. Chemnitzii* in omnibus aliis artissimè accedit *F. pinnato* et congeneribus, quibus caulis repens maximi momenti notam suppeditat. Fortasse exemplaria manca erroris extitere causa, et certè ex illo quod ad me misit vir cl. nihil est de hæc re dijudicandum. Multis Esperus verbis disserit quantum sit affinis *F. Gärtneræ* Gmel., quem pro *F. pedunculati* synonymo plurimi citant; sed non est opus ut eum in his sequeremur, quoniam horum *Fucorum* character essentialis in fibrillarum confervoidearum fasciculis ramos terminantibus conspicitur, et tales in *F. clavifero* vel *Chemnitzii* incassum quæres. † Forskalii synonymo suprâ citato dubitationis signum vix subjecissem, nisi ad speciem discriminandam Botanicus ille accuratissimus vesicularum dispositione racemosâ imprimis sit nixus. *Fucus*, quem sub *F. racemosi* nomine depinxit Esperus (I. t. 98,) est, uti ipse prædicat, a plantâ ejusdem nominis Forskalianâ distinctissimus, et est forsàn tantummodò *F. mucronati* vel *F. granulati*‡ caulis maris æstu ita denudatus ut sit foliis ramisque omninò orbatus. *F. claviferi* nomen a plantæ recentis facie, quum ramulis claviformibus rami undique obsiti conspiciuntur, deprompsi: *F. Trichomanem* aptius dixissem, si titulum ad exsiccata confectum imponere licuisset. Stirpem hic depictam nobilissimi Vicecomitis de Valentia benevolentia debeo, neque ulla hactenùs vidi hujus stirpis exemplaria præter ea ab ipso ex Ægypto reportata.

a. *F. clavifer*, magn. nat.

b. rami pars superior, magn. auct. - - - 6.

\* Ramulos hos clavatos pro fructu habet Esperus; neque piget quòd causam perspiciam nullam ob quam huic sententiæ assentirem. Voluissim hic magnâ de parte exscribere quiddam de his tradidit, nisi talia tractandi occasionem sperarem fore meliorem, cum *F. Chemnitzii* in hoc opere sisterem. Hæc igitur de causâ nihil hujus loci repetendum existimo, nisi id quod in descriptione specificâ de fructificatione dixit: "fructificationibus confertis ex corpusculis pedunculatis tubaformibus, limbo campanulato."

† In *Fucorum* Forskalianorum recensione (*Archiv. für die Syst. Naturgeschichte* I. p. 134.) nihil ultra de hæc stirpe dicunt Weberus Mohriusque, quàm quòd toto cælo discrepet ab illâ, cui idem nomen Esperus indidit; quamobrem descriptione hic subjecta omnis nitor quòd eundem cum *F. clavifero* credam:—

"*FUCUS RACEMOSUS*: caule tereti, repente-ramoso, vesicis obovatis, confertè racemosis, foliis nullis.

"Totus viridis. Caulis repens in fundo. Racemi vesicularum tripollicares, undique vesiculis viridibus imbricati."—*Fl. Ægypt.* p. 191.

‡ Simile quiddam est a b. Witheringio in opere suo, *Botanical Arrangements* dicto, IV. p. 111, sub *F. nodicaulis* nomine descriptum.



*Fucus Ophioglossum*, stem cylindrical, filiform, prostrate, creeping, much and irregularly branched; branches membranaceous, flat, nerveless, between linear and elliptical, quite entire, proliferous from their margin and surface.

*Fucus Ophioglossum*. *Beiträge zur Naturkunde*. I. p. 317. WEBER u. MOHR, *Archiv für die Syst. Naturgeschichte*. I. p. 136.

*F. prolifer*. FORSKÅL, *Fl. Egypt.* p. 193. *Syst. Nat. Ed. Gmel.* II. p. 1390.

Shores of the Mediterranean, by Alexandria. FORSKÅL.—Near Barcelona. Professor Mertens.

*Perennial?*

ROOT, pale-yellow, half an inch and more long, consisting of several fibres, either simple or branched.

FROND, furnished, apparently, with a prostrate, creeping stem, of what length I am unable to say, cylindrical, filiform, more thin than a sparrow's quill, striking root here and there, its apex expanded into a leaf wholly destitute of midrib or veins, between linear and elliptical, quite entire, three or four inches long, and scarcely the half of one wide, rounded at its extremity, proliferous from both its margin and surface, with other scattered leaves, similar to the primary ones, which in their turns produce in the same manner a third series, the last being smallest, and the youngest roundish:—In addition to this, new filiform stems are also produced from the leaves, and in some cases the leading stem, instead of being cylindrical, is flat, narrow, and linear.

FRUCTIFICATION, at present unknown; for, though some brownish specks are observable in places upon the leaves, yet nothing can be discovered in them that may be taken for seeds.

COLOR, grass-green, sometimes variegated with brown, and sometimes with whitish, to which latter it turns from exposure to the sun, or from being kept long in fresh water: when dry the frond shines, as if varnished.

SUBSTANCE, as thin as goldbeater's skin, and extremely tender; appearing, if examined under the microscope, beautifully reticulated.

Obs. In a dry state it adheres slightly to paper.

There can be no question of *F. Ophioglossum* being the plant to which Dr. Weber and Dr. Mohr intended particularly to allude, when, as has been already quoted under *F. pinnatus*, they remarked that there existed a close connection between this tribe of Algæ and the *Fuci corallini* of Gmelin, made by Draparnaud into a genus under the name of \**Zonaria*; nor is it to be denied that it bears in general appearance a considerable resemblance to some of the individuals of that family, or that the parallel lines, with which the frond is marked, seem to indicate a natural affinity to them. At the same time, it must be observed, that it differs from them in the two most essential points, the want of the concentric circles, from which the *Zonariæ* derive their name, and the root, which in them is a disk thickly covered with brown matted woolly fibres, but in *F. Ophioglossum* altogether resembles that of the other congeners of *F. pinnatus*, so as, if considered together with its texture and its color, to leave no doubt of the tribe to which it appertains, however it may differ from all the rest in the shape, and the reticulations of the frond, in which latter respect, it agrees precisely with *F. soboliferus*, *F. Phyllitis*, and several others of the membranaceous Fuci. The description given in the *Flora Egyptiaco-Arabica* is so short, that Forskal's plant might well have been regarded as an uncertain synonym, had there not fortunately been specimens preserved in his own Herbarium. These Dr. Weber and Dr. Mohr have seen, and they propose at some future time to illustrate more fully the history of this plant, which I hope and trust they will do; as probably no botanist now living has had equal opportunities of investigating it, and its singular nature well deserves any pains that may be bestowed upon it. They remark that leaves are occasionally met with devoid of any proliferous tendency, and that in this state the plant bears some resemblance in form to *F. Fascia*.

- a. *F. Ophioglossum*, natural size.  
 b. portion of the frond, magnified - - - 1.  
 c. root - - - - - 2.

\* With respect to this genus, which, I believe, has never yet been published, many interesting particulars are to be found in the *Beiträge zur Naturkunde*, I. p. 246—253. The plants that it is intended to comprise are a very natural tribe, consisting of *Ulva paxonia*, *atomaria*, *flabelliformis*, *squamaria*, and their congeners, the principal character of which depends upon the concentric circles in the frond. To illustrate these, was the intention of the late M. Draparnaud, of Montpellier, who gave the genus its very apposite name, and whose premature death has deprived marine Botany of one her most zealous, acute, and useful followers.





*Fucus Ophioglossum.*







*Fucus*, caule terete, filiformi, prostrato, repente, ramosissimo; ramis membranaceis, planis, enervibus, lineari-ellipticis, integerrimis, e margine et superficie proliferis.

*Fucus Ophioglossum*. *Beiträge zur Naturkunde*. I. p. 317. WEBER u. MOHR, *Archiv. für die Syst. Naturgeschichte*. I. p. 136.

*F. prolifer*. FORSKÅL, *Fl. Egypt*. p. 193. *Syst. Nat. Ed. Gmel.* II. p. 1390.

HABITAT Alexandriae, ad littora maris Mediterranei. Forskal.—Prope Barcelona lectam accepit D. Prof. Mertens.

*Perennis?*

RADIX lutescens, fibrosa, unguem et ultra longa, e fibris plurimis, nunc simplicibus, nunc ramosis, constans.

FRONS caule, ut videtur, instructa prostrato, repente, longitudinis mihi ignotæ, terete, filiformi, pennâ passerinâ tenuiore, hîc illic radicante, apice expanso in folium nervi venarumque prorsus expers, lineari-ellipticum, integerrimum, longitudine palmare, latitudine vix unguiculare, apice rotundatum, e margine et superficie proliferum, foliis aliis sparsis, primariorum similibus, ipsis tertiam eadem ratione edentibus seriem, ultimis minoribus, junioribus subrotundis:—præter hoc novi quoque caules filiformes e foliis oriuntur, et interdum caulis non teres, sed planus angustus et linearis evadit.

FRUCTIFICATIO hactenus latet: quamvis enim maculæ quædam fuscescentes sese hîc illic in foliis observandas præstiterint, nihil tamen in his seminum simile erat detegendum.

COLOR gramineo-viridis, interdum fusco, interdum albicante variegatus; soli diu expositæ aut in aquâ dulci servatæ albescens; exsiccata nitens quasi sit frons vernice oblita.

SUBSTANTIA quâvis ferè membranâ tenuior, tenerima; sub lente pulcherrimè reticulata.

Dubitari nequit quin *F. Ophioglossum* sit ea stirps quam præcipuè ante oculos habuerunt Weberus Mohriusque, quando, uti supra sub *F. pinnato* memoratur, affinitatem esse affirmarunt arctam inter hanc Algarum tribum et *Fucos* Gmelini *corallinos*, quos pro novo genere, \**Zonariæ* nomine insigniendo, Draparnaudius proposuit; neque is ego sum qui negare pergerem hunc *Fucum* externâ facie similitudinem præ se ferre magnam cum quibusdam ejus familiæ individuis, lineolasque parallelas, quibus frons striata conspicitur, plantas naturâ connexas indicare videri. Alterâ tamen est ex parte notandum discrepare duabus summi momenti rebus; circulis scilicet concentricis, unde nomen suum *Zonariæ* ducunt, et radice, quæ in his est callus discoideus fibris fulvis tomentosis densissimè implexis omninò cooperatus, dum in *F. Ophioglossum* aliorum *F. pinnati* congenerum instar evadit. Huic si colorem texturamque adjiciamus, scrupulus statim eximitur omnis de hujus stirpis in *Fucorum* dispositione loco, quantumvis frondis figurâ et facie reticulatâ a reliquis affinibus abhorreat, et in hoc accedat *F. sobolifero*, *F. Phyllitidi*, et plurimis aliis fronde membranaceâ præditis. Descriptio in *Florâ Egyptiaco-Arabicâ* plus æquo brevis plantam a Forskalio designatam quodammodò dubiam fortè reliquisset; nisi exemplaria auspiciatò in phytophylacio suo servata extarent. Hæc Weberus Mohriusque viderunt, qui se mox hujus *Fuci* historiæ indolique absolutius illustrandæ accincturos promittunt; quod ut citò præstent quàm maximè mihi est in votis, quoniam nulli forsàn nunc in terris Botanico par eum investigandi contigit facultas, neque ulla datur Alga cujus natura singularis indagantis curam magis rependet. Hi memorant specimina quandoque reperiri quorum folia simplicia vim nullam in se proliferam arguant, et plantam in hoc statu *F. Fasciam* formâ externâ aliquo modo referre.

- a. *F. Ophioglossum*, magn. nat.  
 b. *frondis pars*, magn. auct. - - - 1.  
 c. *radix* - - - - - 2.

\* Multa de hoc genere, quod nemo, quantum scio, Botanicus adhuc publici juris fecit, eximiè pro more disseruerunt Weberus Mohriusque, in opere suo, *Beiträge zur Naturkunde*, I. p. 246—253. Plantæ sub illo disponendæ, (*U. pavonia*, *atomaria*, *flabelliformis*, *squamaria*, harumque congeneres,) familiam perquam naturalem constituunt, cujus character essentialis e circulis in fronde concentricis constat. Nomen generi aptissimum indidit b. Draparnaudius, qui mox ad illustrandum omni curâ incubuisset, nisi mors immatura scientiam nostram amabilem discipulo privasset, qui, ob summum in Algis submersis indagandis studium, mentisque acumen singulare, magnum sui inter omnes Botánicos desiderium reliquit.



*Fucus coccineus*, frond compressed, between membranaceous and cartilaginous, much and irregularly branched; ramuli subulate, disposed in alternate parcels of three or four each; spherical sessile capsules, and lanceolate siliquæ.

*Fucus coccineus*. *Fl. Ang.* p. 586. *Linn. Trans.* III. p. 187. *With.* IV. p. 119. *Ner. Brit.* p. 106. t. *Frontispiece.* *Syn. Fuc.* II. p. 291. *Eng. Bot.* XVIII. t. 1242.

*F. Plocamium*. *Gmelin, Hist. Fuc.* p. 153. t. 16. f. 1. (excl. syn. *Linn.*) *Fl. Scot.* II. p. 957. *Esper, Ic. Fuc.* I. p. 18. t. 2. *Fl. Fr. Ed. 2da.* II. p. 31.

*F. cartilagineus*. *Æder, Enum. Plant. Fl. Dan.* n. 131.

*Ceramium Plocamium*. *Roth, Fl. Germ.* III. p. 458. *Cat. Bot.* II. p. 161. III. p. 107.

*Fucoides rubens variè dissectum*. *Raii Syn.* p. 37. n. 1.?

On the shores of the British Isles, plentifully.—On the shores of France, both where washed by the ocean and the Mediterranean. *Decandolle*.—Coast of Spain, near Cadiz. *Don Simon de Roxas Clemente*.

*Perennial.* June—October.

**Root**, fibrous, consisting of several pale-pink, branching fibres, closely matted together.

**FRONDS**, numerous from the same base, compressed, filiform, generally nearly half a foot, but sometimes not above three inches, and at others a foot long, their width about half a line, every where gently flexuose, \* much and irregularly branched from the very base, the whole of the branches and ramuli being placed in the same plane; branches separated by very uncertain intervals, all distichous, irregularly alternate, and patent, those nearest the root longest, and pinnated with other small ones, disposed in the same manner, which in their turns produce a third, or even a fourth, series; along the sides of the extreme branches are arranged the ramuli, two or three lines long, patent, subulate, and slightly incurved, growing in alternate rows, three or four on one side, and then as many on the other, in all which the lowest one is always simple, the rest fringed upon their upper side with others still smaller, so as to give them a pectinated appearance: these rows of ramuli, constantly preserving their alternate disposition, and constantly growing on the convex part of the frond alone, not unfrequently occupy the spaces between the branches in the primary and secondary shoots, thus adding greatly to the beauty of the plant.

**FRUCTIFICATION**, two-fold, upon † different individuals, the one consisting of sperical capsules, about the size of Poppy-seed, ‡ sessile upon the sides of the branches, especially the upper ones, of a deep blood-red color, containing a cluster of extremely minute numerous seeds; the other very small lanceolate capsules, sessile upon the upper branches, in some cases solitary, in others, racemose, each producing four or five largish and roundish seeds, surrounded by a pellucid limbus, and marked with rings internally, if examined under a powerful microscope.

**COLOR**, a most beautiful subdiaphanous tint, between crimson and scarlet, darker when dry; if exposed to the sun, or kept in fresh water, it grows pale, and turns to a greenish yellow or greenish, and at length to whitish.

**SUBSTANCE**, between cartilaginous and membranaceous, extremely thin and tender; membranaceous and flaccid after it is dried.

**OBS.** This plant is remarkable for the smoothness of its appearance:—in drying it adheres, though rather loosely, to paper or glass:—*Sertularia anguina* is most frequently found on this species:—my friend, Mr. Dillwyn, sent me some time ago from South Wales a variety, most probably accidental, with all the ramuli simple.

Of the zeal, with which the study of Marine Botany has been cultivated during the few years that have elapsed subsequently to the publication of the *Nereis Britannica*, and the *Synopsis of the British Fuci*, some idea may be formed from the circumstance of the double fruit of *F. coccineus*, being at that time regarded as a curiosity, and as so extraordinary to be in itself almost sufficient to justify the § dividing of the plant into two distinct species, whereas a similar appearance is now known to be observable in several of its congeners, and we have every reason to believe, that in the course of time it will also be discovered in many others. It has already been mentioned above, that a single specimen has been sent me by Mr. Brodie, bearing upon the same branches capsules of both forms, but I have never either seen or heard of any other instance of a like kind; and certainly in the plants found at Yarmouth, the remark made in the *Synopsis of the British Fuci* holds good, that the frond of those that produce the lanceolate siliquæ is in general, though by no means always, more narrow than that of the globuliferous ones. My excellent correspondent, Mr. Pigott, who, unfortunately for the cause of science, has been detained many years a prisoner in France, observed to Mr. Stackhouse, that he had seen the lanceolate capsules, after the discharge of their seeds, lose their color, and turn yellow. I am, however, still inclined to believe, that, instead of their falling off, as might be supposed from such an observation, they rather lengthen into new branches, a tendency to which I have more than once noticed. In a specimen

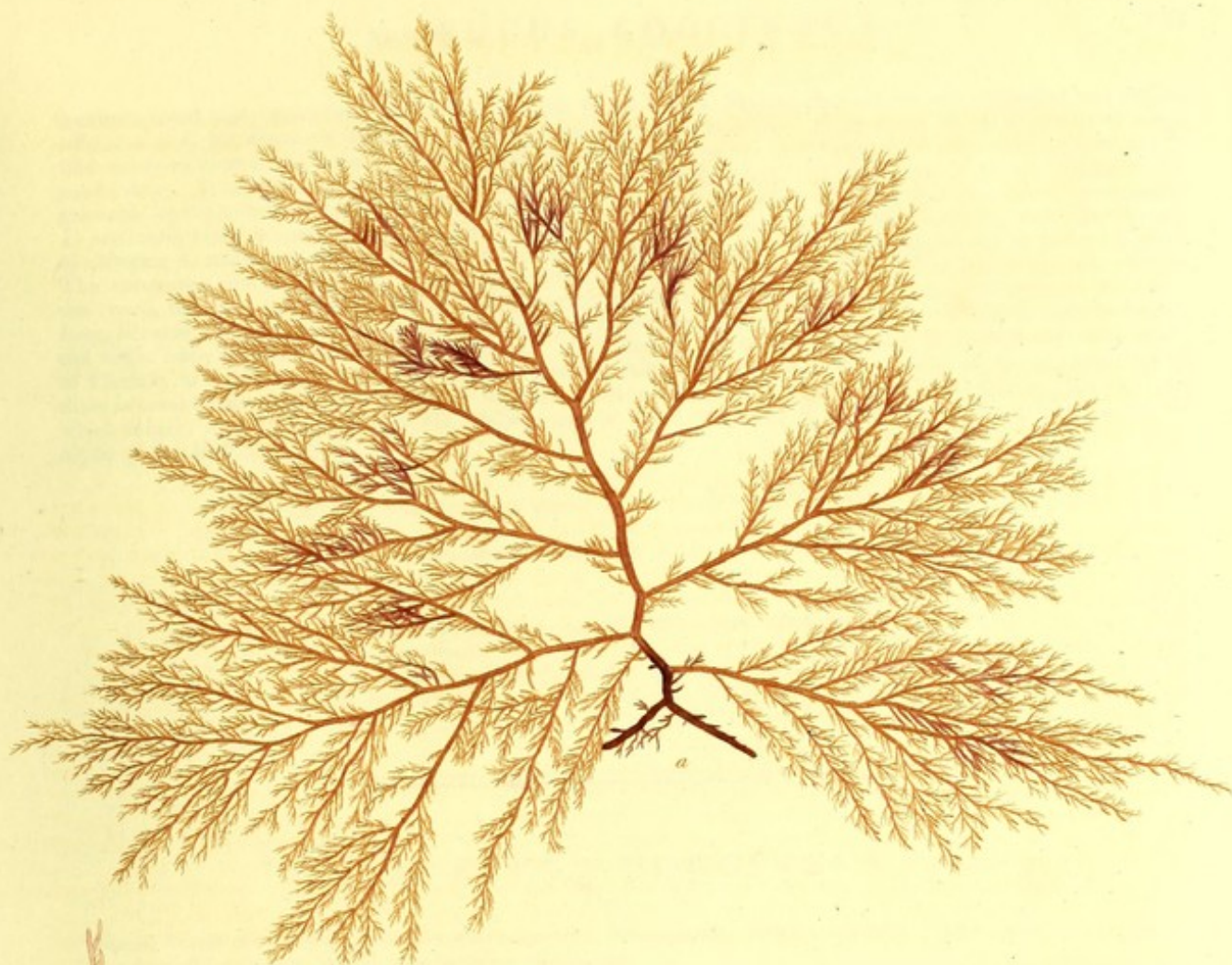
\* The description given of this plant in the *Flore Française* is so characteristic as to its mode of branching, that I am tempted here to transcribe a considerable part of it:—"Sa tige est très rameneuse, et toujours dans le même plan: l'ordre des ramifications est très remarquable; chaque rameau est légèrement flexueux, et n'émet de ramifications que du côté convexe: la première est un filet simple et pointu; la deuxième est un filet qui a trois dents du côté antérieur; la troisième est un filet qui a deux dents, et qui au lieu de la troisième dent pousse un filet muni d'une dent en dehors; la quatrième est un filet qui n'a qu'une dent, la deuxième dent est devenue un filet à une dent, et la troisième un filet rameux. Après ces quatre ramifications il y a un espace vide, et la tige émet des rameaux semblables du côté opposé."

† I have seen a single instance of both being found on the same frond in a specimen sent me by Mr. Brodie from the North of Scotland.

‡ Dr. Goodenough and Mr. Woodward say, that they are occasionally, though very rarely, pedunculate.

§ Mr. Stackhouse, in consequence of the two-fold fruit, has made it, in the *Nereis Britannica*, a part of the specific character of the plant, that it bears polymorphous fructification; and subsequently to the publication of that work, he stated it to me as his opinion, that it would hereafter be necessary to divide this *Fucus* into different species: such were also my sentiments, when in the *Synopsis of the British Fuci*, I separated it upon this account into two varieties.





*Fucus coccineus.*







specimen found many years since upon the Yarmouth beach by Mr. Mason, they are not only elongated and repeatedly branched, but singularly twisted, so as to form nearly globular clusters. *F. coccineus* is one of the most beautiful and most elegant of all the Fuci, and is also one of the most universal favorites with those who collect marine productions. It is liable to considerable variations in point of size, form, and color, but is always readily distinguishable by the peculiar arrangement of the ramuli, the shape and disposition of which first gave rise to the name of *F. pectinatus* being bestowed upon it in the Banksian Herbarium, a name so extremely apposite, that the necessity of changing it, and of substituting in its place the unmeaning appellation it now bears, cannot fail of being regretted. The specimens sent me from Spain are considerably smaller and more deeply colored than any I have met with on our coasts, but seem to resemble what Dr. Goodenough and Mr. Woodward have observed growing upon *F. vesiculosus*, *fibrosus*, and *crispus*, in which state they say "it frequently forms thick tufts not exceeding an inch in height, and might easily be mistaken for a different plant." It is singular that no mention should be made in any of the works of Linnæus of a species so extremely common upon the British shores; and, with regard to the synonym of Ray, there is considerable doubt, as he appears to have confounded together *F. coccineus* and *Conserva coccinea*, upon which subject some observations by Mr. Dillwyn may be found at the end of the history of this species, in the *Synopsis of the British Fuci*.

a. <i>F. coccineus</i> , natural size.						
b. branch, magnified	-	-	-	-	-	6.
c. branch, with lanceolate capsules	-	-	-	-	-	6.
d. portion of the same	-	-	-	-	-	3.
e. seeds	-	-	-	-	-	1.
f. branch, with lanceolate capsules that have discharged their seeds	-	-	-	-	-	6.
g. branch, with spherical capsules	-	-	-	-	-	6.
h. seeds	-	-	-	-	-	1.

## 59.—FUCUS COCCINEUS.

*Fucus*, fronde compressâ, membranaceo-cartilagineâ, ramosissimâ; ramulis subulatis, tripli-quadrupli-cato alternis; tuberculis sphaericis, sessilibus, siliquisque lanceolatis.

*Fucus coccineus*. *Fl. Ang.* p. 586. *Linn. Trans.* III. p. 187. *With.* IV. p. 119. *Ner. Brit.* p. 106. t. ad front. operis. *Syn. Fuc.* II. p. 291. *Eng. Bot.* XVIII. t. 1242.

*F. Plocamium*. *Gmelin, Hist. Fuc.* p. 153. t. 16. f. 1. (excl. syn. *Linn.*) *Fl. Scot.* II. p. 957. *Esper, Ic. Fuc.* I. p. 18. t. 2. *Fl. Fr. Ed. 2da.* II. p. 31.

*F. cartilagineus*. *Æder, Enum. Plant. Fl. Dan.* n. 131.

*Ceramium Plocamium*. *Roth, Fl. Germ.* III. p. 458. *Cat. Bot.* II. p. 161. III. p. 107.

*Fucoides rubens variè dissectum*. *Raii Syn.* p. 37. n. 1.?

**HABITAT** in Britanniarum oris, copiosè.—In Galliæ oris, et oceano et Mari Mediterraneo circumlatus. *Decandolle*.—Ad Hispaniæ littora prope Gades. *D. S. de Roxas Clemente*.

**Perennis.** Jun.—Oct.

**RADIX** fibrosa, fibris plurimis, dilutè roseis, ramosis, densè fasciculatim implexis.

**FRONDES**, ex eadem basi plurimæ, compressæ, filiformes, longitudine plerumque semipediales, sed aliquandò vix tripollicares, atque aliquandò pedales, latitudine ut plurimum circiter semilineari, ubique lenissimè flexuosæ, ab ipsâ basi \* ramosissimæ, ramis ramulisque omnibus in eodem plano progredientibus; *rami* intervallis incertissimis sejuncti, cuncti distichi, vagè alterni, patentesque, ii magis basi proximi longiores, aliisque minoribus simili ratione dispositis pinnati, qui seriem tertiam et quandoque quartam ferunt; ramorum extremorum latera occupant *ramuli*, duas tresve lineas longi, patuli, subulati, levitè incurvi, in fasciculis collocati alternis, singulis duos tres aut quatuor includentibus, e quibus inferiores semper sunt simplices, cæteri superficie supernâ aliis brevioribus obsiti, ut pectinati appareant: in surculis quoque primariis secundariisve intervalla inter ramos sæpe occupant hi ramulorum fasciculi, nunquam non alternatim positi, frondisque parti convexæ innascentes, unde stirpis facies longè pulchrior evadit.

## FRUCTIFICATIO

\* Traditur hujus Fuci in *Florâ Gallicâ* descriptio, quæ plantæ characterem quoad ramorum dispositionem adeò bene exprimit ut hic maximâ ex parte exscribendam crediderim:—"Sa tige est très rameuse, et toujours dans le même plan: l'ordre des ramifications est très remarquable; chaque rameau est légèrement flexueux, et n'émet de ramifications que du côté convexe: la première est un filet simple et pointu; la deuxième est un filet qui a trois dents du côté antérieur; la troisième est un filet qui a deux dents, et qui a lieu de la troisième dent pousse un filet muni d'une dent en dehors; la quatrième est un filet qui n'a qu'une dent, la deuxième dent est devenue un filet à une dent, et la troisième un filet rameux. Après ces quatre ramifications il y a un espace vide, et la tige émet des rameaux semblables du côté opposé."



FRUCTIFICATIO duplex, in \* diversis individuis, hæc e capsulis constans sphericis, papaveris seminis magnitudine, ad latera ramorum, præsertim superiorum, † sessilibus, coloris intensè sanguinei, seminum plurimorum, minutissimorum congeriem foventibus; illa e capsulis lanceolatis perquam exiguis, ramis superioribus insidentibus, nunc solitariis, nunc racemosis, singula semina quinque vel quatuor majuscula subrotunda, limbo pellucido cincta, sub lente acerrimâ internè annulata, includentibus:—hæ capsulæ effætæ producuntur, lineares fiunt, atque aliquando repetitoramosæ; vidi quoque quæ erant contortæ.

COLOR pulcherrimè coccineus, sub-diaphanus; exsiccata intensior; soli objectæ vel in aquâ dulci servatæ citò pallescit, et in virescenti-luteum vel virescentem, et demùm in albicantem transit.

SUBSTANTIA cartilagineo-membranacea, tenuissima, tenerima; siccitate flaccida et membranacea.

OBS. Planta glaberrima:—exsiccata chartæ vel vitro laxiusculè adhæret:—*Sertularia anguina* huic præcipuè Fucò innascens reperitur:—varietatem fortè ex aliquo casu pendentem ramulis ferè omnibus simplicibus e Cambriâ Australi olim misit amicissimus L. W. Dillwyn.

Quantâ curâ quantoque studio Algis submersis investigandis incubuere botanici, per paucos illos jam elapsos annos ab illo inde tempore quo *Nereis Britannica* et *Fucorum Britannicorum Synopsis* primùm publici juris sunt factæ, ex hoc judicare licet, quòd, cùm hi libri evulgarentur, *F. coccinei* ‡ fructificatio duplex res ita singularis sit habita ut ad duas species constituendas propemodùm per se sufficere censeretur; nunc verò innotuit idem in plurimis aliis huic affinis Fucis, et forsàn in multis aliis tempus insequens detegat. Citatur suprâ exemplar, ab amiciss. D. Brodie missum, cujus in ramis occurrunt utriusque formæ capsulæ; nihil tamen simile unquam aliàs vidi, et certè in iis apud Yarmouth lectis individuis non modò frondes dioicæ apparent, sed illud valet, quod est in *Fucorum Britannicorum Synopsi* observatum, scilicet plantas siliquis lanceolatis instructas plerumque (nequaquam autem semper) globuliferis angustiores reperiri. D. Pigott, vir mecum olim de his stirpibus literarum consuetudine devinctus, nunc, cheu, quod scientia dolet botanica, multos per annos captivus in Galliâ detentus, Stackhousium certiorè fecerat, se vidisse capsularum lanceolarum, seminibus jam emissis, colorem in flavescentem evanescere. Crederet fortasse ex hoc aliquis effætæ decidere; sed e contrario in novos ramos produci suspicor, et plus unâ vice offendi specimina tale aliquid arguentia, quorum in uno, quod multis ante annis inter maris rejectamenta apud Yarmouth legit b. D. Mason, non tantùm erant elongatæ, iterùmque atque iterùm ramosæ, sed, quod magis inusitatum, modo prorsùs singulari in formam quasi sphericam contortæ. Locum sibi *F. coccineus* inter Fucos pulcherrimos elegantissimosque summo jure vindicat, et est species, quæ, licet magnitudine formâ atque colore multùm ludat, se per ramulorum dispositionem semper dignoscendam præstat. Horum figura atque situs *F. pectinati* titulo, quo in Herbario Banksiano designatur, extiterunt causæ; fierique nequit quin lugeamus quòd nomen tam idonèum tali quale nunc fert mutare cogeremur. Exemplaria ex Hispaniâ accepta Britannicis, iis saltèm quæ ego vidi, sunt minora, et colore intensiore fucata; crederem verò ad ea appropinquare, quæ *F. vesiculosus*, *fibroso*, et *crispo* innascentia observârunt Goodenovius Woodwardiusque, qui de his dicunt, plantam sic parasiticam densos sæpe confingere cæspites vix pollicem altos, speciemque diversam mentiri. Singulare quidem est quòd stirpis, quâ ne una in littoribus Britannicis frequentius occurrit, nuspiam in operibus suis meminert Linnaeus; neque Raii synonymon dubio omni vacat, quoniam *F. coccineus* et *Confervam coccineam* commiscuisse videtur, de quo consulendum est quod ad hujus speciei historiæ finem in *Fucorum Britannicorum Synopsi* disseruit cl. Dillwyn.

a. <i>F. coccineus</i> , magn. nat.	-	-	-	-	-	-	6.
b. <i>ramus</i> , magn. auct.	-	-	-	-	-	-	6.
c. <i>ramus</i> , cum capsulis lanceolatis	-	-	-	-	-	-	6.
d. <i>ejusdem pars</i>	-	-	-	-	-	-	3.
e. <i>semina</i>	-	-	-	-	-	-	1.
f. <i>ramus</i> , capsulis lanceolatis jam effætis	-	-	-	-	-	-	6.
g. <i>ramus</i> , cum capsulis sphericis	-	-	-	-	-	-	6.
h. <i>semina</i>	-	-	-	-	-	-	1.

\* Semel quidem, in exemplare e Scotiâ septentrionali a D. Brodie misso, in eodem vidi.

† Has capsulas nonnunquam, sed rarissimè, pedunculatas dicunt Goodenovius Woodwardiusque.

‡ Stackhousius, hæc fructificatione duplici commotus, fructum polymorphum ad plantæ characterem specificum in *Nereide Britannicâ* ascivit, sententiamque suam nuperius mihi retulit, fore necessarium plantam in plures dispertire species. Idem et ipse sensi, cùm hanc ob causam in *Fucorum Britannicorum Synopsi* duas ex illâ varietates construxi.



*Fucus*, fronde compressâ, cartilagineâ, ramosissimâ; ramis supra-decomposito-pinnatis; ramulis oppositis, apice fructiferis; seminibus nudis, ramulorum apicibus quadrifidis septis.

*Fucus plumosus*. LINN. *Mant.* p. 134. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1385. *Fl. Ang.* p. 587. GMELIN, *Hist. Fuc.* p. 152. *Fl. Dan.* t. 350. *Fl. Scot.* II. p. 955. WITH. IV. p. 120. ESPEr,  *Ic. Fuc.* I. p. 92. t. 45. *Fl. Norv.* II. p. 91. LINN. *Trans.* III. p. 188. *Syn. Fuc.* II. p. 296. *Fl. Lus.* II. p. 436. *Eng. Bot.* XIX. t. 1308. *Fl. Fr. Ed. 2da.* II. p. 31.

*F. \*pectinatus*. *Fl. Norv.* II. p. 122. t. 2. f. 8. ESPEr,  *Ic. Fuc.* I. p. 97. t. 47. (excl. syn. Gmel.)

*F. \*ptilotus*. *Fl. Norv.* II. p. 135. t. 2. f. 15. ESPEr,  *Ic. Fuc.* I. p. 96. t. 46.

*Ceramium plumosum*. ROTH, *Cat. Bot.* III. p. 133.

*β. capillaris*; fronde tenuissimâ, teretiusculâ, articulatâ.

*F. plumosus*. *Ner. Brit.* p. 105. t. ad front. operis.

*Fucoides purpureum elegantè plumosum*. RAI *Syn.* p. 38. n. 2. t. 2. f. 5.

HABITAT Insularum Britannicarum ad oras, *F. digitati* stipitibus non rarò parasiticus, copiosissimè in Scotiâ et in Hiberniâ Septentrionali.—E freto, *Davis's Streights* dicto, quoque accepi.—In fundo maris Islandici. *Oeder*.—In Oceano Septentrionali. *Gunner*.—In Oceano Atlantico. *Koenig*.—Ad Insulas fortunatas. *Bory de St. Vincent*.—Ad Ostia Tagi. *Brotero*.—*β* in Scotiâ Septentrionali, prope Lossiemouth. *D. Brodie*.—Angliæ Australis in littoribus, haud infrequens.

*Perennis*. Jul.—Oct. *Hudson*.

RADIX callus exiguus, dilatatus, nigricans.

FRONS compressa, nervi venarumque expers, tres vel sex pollices longa, latitudine subæquali, in ramis primariis nunc vix semilineam, nunc lineam æquante, apices versus tantillum angustata, ab ipsâ basi ramosissima, ramis ramulisque omnibus distichis in eodem plano progredientibus; rami absque ordine sparsi, primarii plerumque elongati, distri-chorum, vel alii minoribus, ipsis quoque vagis, nunc densè nunc laxè obsiti, et hi quoque aliis, utrâque serie præcedente tenuiore; ramorum extremorum forma elongato-lanceolata; totam frondem obsident pinnæ horizontales, duas tresve lineas longæ, indivisæ, lineari-lanceolatae, approximatae, oppositæ, ipsæ eadem ratione pinnatæ aliis admodum minutis ut oculum inermem ferè fugiant, unde stirpis facies pulcherrimè plumosa: in ramis extremis et pinnis genicula sub lente apparent obsoleta, pallida, ramos in articulos sub-quadratos dividunt, quorum in reliquâ fronde nullum conspiciendum vestigium.

FRUCTIFICATIO † semina aliquot majuscula, coloris intensè sanguinei, limbo pellucido perquam manifesto cincta, pinnarum apicibus insidentia, et ‡ capsulâ inclusa nullâ; pinnæ verò apex tunc finditur, et involucrum quadri-sex-partitum, semina, quibus multo est longius, cingens refert. Semina hæc diffracta granula aliquot exigua subrotunda effundunt.

COLOR saturatè purpureo-ruber, fusco tinctus, in ramis primariis aliquandò ferè nigricans, in extremis dilutior, et sublimphaneus; *exsiccata* fit intensior, et in *aquâ dulci servata* sordidè fusco-virescit.

SUBSTANTIA cartilaginea, in surculis annosioribus crassiuscula et tenax, in junioribus tenuior.

*β* faciè multum discrepat; est ubique plusquam duplo angustior, et substantiæ ferè membranaceæ; color intensior, et ramuli sub lente evidentissimè geniculati, geniculis pellucidis, articulis sub-quadratis. Fructificatio in hac nulla est hucusque detecta similis ejus jam sub var. *α* descriptæ, sed pinnarum apicibus haud rarò infixum adhæret semen unicum, majusculum, sphaericum, liberum, et involucro nullo septum, sed limbo cinctum pellucido, atque intus lineis albis distinctum quæ in septem octove partes subrotundas dividunt.

Obs. *Exsiccata* chartæ adhæret.

Magnitudine atque figurâ tantum ludere solet *F. plumosus*, ut fieri nequeat quin cuius Botanico, qui plurima ejus exemplaria observavit, species perquam mutabilis videatur; atque idem etiam satis inter omnes quibus talis negatur facultas constabit, dummodò inter se conferre velint iconas Oederianas Stackhousianasque supra citatas, hanc minimum illam maximum plantæ statum sistentem. Has, si seorsum contempleris figuras, admodum faciliè pro stirpibus reverà distinctis haberes, ut solas respicienti major appareret in sententiâ adversâ difficultas; sed longè hoc a vero abest, quoniam ne unus datur in toto Algarum catalogo *Fucus*, cujus diversæ facies, a tenerrimâ et tenuissimâ ad latissimam maximèque cartilagineam, gradationibus tam certis atque conspicuis inter se conjunguntur. Hanc ob causam nemo adhuc in plures varietates dispertire est conatus, neque ipse tale aliquid nunc sim periclitatus, nisi suaderet

\* Hæc duo synonyma forsitan ad varietatem meam *β* pertinent, sed nihil est vel in icone vel in descriptione e quo res certè adjudicari potest.

† An semina, an capsulæ rectius dicenda?—sane nescio; sed, cum aliorum *Fucorum semina*, quæ dicuntur, in plures partes dividantur, ita hæc etiam in præsens semina nuncupavi.

‡ Capsuliferam hanc plantam dicit Rothius, qui plurimum fructificationi impendit curam; ego verò, licet anxius quæram et multa exemplaria perlustrem, nulla capsularum vestigia detegere possum, quâ de re quicquid ille de his scripserit hic exscribendum puto, nescius tamen quales sint illæ stirpes quas pro masculis habet:—"Juniores," inquit, "capsulæ, ovatae vel subrotundæ, atropurpureæ, receptaculo tuberculoso insident, quod successu temporis segmenta producit quatuor, quinque, seu nonnunquam sex, diversæ longitudinis, filiformia, subrotunda, et evidentissime geniculata, demum capsula duplo longiora, et ad apicem conniventia evadunt, quarum articuli et granulis duobus compositi videntur. Disruptâ capsulâ post granulorum contentorum dispersionem, tanquam inanis vesicula membranacea et lacerata per segmentorum interstitia transparet, et demum macerata fere plane evanescit, receptaculum verò cum segmentis persistit, et ex eorum numero constanter unicum tantum elongatur in pinnam ita, ut tandem in annosioribus speciminibus pinnæ inferiores ramorum alternatim distichæ, supra basin ad alterius latus fasciculo segmentorum setiformium, subalternorum, brevi pedunculo quasi insidente, auctæ conspiciantur. In quibusdam fasciculis palmarum evadit, et in novum ramum demum ex crescere videtur. In vesiculiferis, et pro masculis venditis individuis nunquam observatur segmentorum fasciculus ad interius latus pinnarum inferiorum ramis insidentium."—*Cat. Bot.* III. p. 136.



deret summa \* D. Brodiaei auctoritas, qui utramque abundè varietatem in littoribus sibi vicinis legit, et cui indies observandi haud deest occasio. Diu sunt rerum naturalium indagatores de hujus stirpis fructificatione omnes hallucinati, credentes illam e capsulâ constare sphaericâ, quæ matura in quatuor vel quinque dissilit partes, apice modò, *Andra-arum* ad instar, connexas. Primus hunc errorem discussit Rothius, neque tamen ipse, viri tanti pace, rem ad amussim rectè intellexisse mihi videtur, cum nullus dubitem quin fructus eum *Confervæ corallinæ* et *Confervæ setaceæ* referat, atque hæ plantæ, cum aliquot aliis Algis, quarum pars Fucis pars Confervis nunc annumeratur, genus pulcherrimum idemque naturæ convenientissimum mox constituent, cujus character essentialis in seminibus nudis, involucro capsulæ loco septis, atque limbo maximè manifesto cinctis, constet. Qualem de individuis illis pro † masculis vesiculiferisque a Rothio habitis sententiam feram dubius omninò hæreo. His ille *F. plumosum* Gmelini relegat, quem tamen synonymum dubium, et fortè rectiùs sub *Confervâ coccineâ* citandum, nequeo non putare. Quod si Gmelini opus perlustrans meo unius judicio fidendum existimarem, crederem *F. confervoidis* iconem, quam Mohrii auctoritati obtemperans sub *F. cristato* suprâ laudavi, esse ad *F. plumosi* exemplar confectam. Habitus ille plumosus, cui nomen suum aptissimum hæc species debet, multum etiam ad discriminandam adjuvat, et optimè memoraverunt Goodenovius, Woodwardiusque, *F. plumosum*, colore licet fulgido *F. coccineo* cedat, ramorum tamen dispositione elegante ei longè antecellere, et ob hanc plumæ pulcherrimè ramosæ speciem præ se ferre, et satis ab omnibus affinis distingui. Notatur quoque ab iisdem, exemplaria, quorum ramuli intervallo solito longiore sunt dissiti, aliquas e *F. cornei* varietatibus quodammodò referre, semper verò se per ramorum primariorum formam dignoscenda præbere, hos enim esse constantè filiformi-compressos, coloris reliquâ fronde intensioris, et opacos, dum in *F. corneo*, quantumvis angusto, plani, ramis aliis concolores, et nunquam non subdiaphani conspiciuntur.

a. <i>F. plumosus</i> , magn. nat.					
b. <i>ramus</i> , magn. auct.	-	-	-	-	6.
c. <i>ejusdem pars</i>	-	-	-	-	4.
d. <i>rami pars cum fructu</i>	-	-	-	-	3.
e. <i>semina</i>	-	-	-	-	2.
f. <i>granula in illis inclusa</i>	-	-	-	-	1.
g. <i>var. β ramus</i>	-	-	-	-	6.
h. <i>ejusdem pars</i>	-	-	-	-	3.
i. <i>pars rami cum semine</i>	-	-	-	-	2.
k. <i>semen seorsum</i>	-	-	-	-	1.

\* Se nunquam in distinguendis gravari dicit D. Brodie, qui de his refert:—"the one (α) is cartilaginous, rough, always covered with Flu-stræ, the stem and branches compressed, the branches divaricated, and both these and the ramuli acute at each extreme, and swelling in the middle. The other (β) is rather membranous, soft to a great degree before being washed, the stem branches, and ramuli, from the root to the top, perfectly round in every part, the delicate branches uncommonly long in proportion to the plant, and coming off from the stem in a very acute ascending angle, incurving as they ascend. The whole plant has (most strongly when fresh) the habit of a most beautiful *Conferva*; and this not only in the minute ramuli, but in the midrib of the branches, which has the appearance of a beaded spherical process, with a transparent line on each side."

† Dicit de his Rothius, "exceptis speciminibus hic descriptis fructiferis observantur alia, habitu quidem quodammodo aliena, at structurâ omnimode cum illis convenientia, quæ pro masculis non possum non habere."

"Fila cum ramis obiecta ramulis subimbricatis:

"Pinnæ pinnulaque pariter oppositæ, at magis approximatae, subimbricatæ, subincurvæ, apice non rarò subincrassatæ, evidentius geniculate.

"Vesiculæ in pinnis terminales, globosæ, subpellucidæ, coccineæ, breviter pedunculatæ, solitariae, nunc et plerumque plane nudæ, nunc basi utrinque pinnula patula suffultæ."—*Cat. Bot. III.* p. 135.





*Fucus plumosus.*







*Fucus plumosus*, frond compressed, cartilaginous, much and irregularly branched; branches repeatedly pinnated; ramuli opposite, bearing the fruit at their apices; seeds naked, surrounded by the quadrifid ends of the ramuli

*Fucus plumosus*. LINN. Mant. p. 134. Syst. Nat. II. p. 718. Syst. Nat. Ed. Gmel. II. p. 1385. Fl. Ang. p. 587. Gmelin, Hist. Fuc. p. 152. Fl. Dan. t. 350. Fl. Scot. II. p. 955. WITH. IV. p. 120. ESPEr, Ic. Fuc. I. p. 92. t. 45. Fl. Norv. II. p. 91. Linn. Trans. III. p. 188. Syn. Fuc. II. p. 296. Fl. Lus. II. p. 436. Eng. Bot. XIX. t. 1308. Fl. Fr. Ed. 2da. II. p. 31.

*F. \*pectinatus*. Fl. Norv. II. p. 122. t. 2. f. 8. ESPEr, Ic. Fuc. I. p. 97. t. 47. (excl. syn. Gmel.)

*F. \*ptilotus*. Fl. Norv. II. p. 135. t. 2. f. 15. ESPEr, Ic. Fuc. I. p. 96. t. 46.

*Ceramium plumosum*. ROTH, Cat. Bot. III. p. 133.

*β. capillaris*; frond very narrow, nearly cylindrical, jointed.

*F. plumosus*. Ner. Brit. p. 105. t. ad front operis.

*Fucoides purpureum eleganter plumosum*. Raii Syn. p. 38. n. 2. t. 2. f. 5.

On the shores of the British Isles; most plentifully in Scotland and the North of Ireland, often found growing on the stems of *F. digitatus*.—I have also received it from Davis's Straights.—In the sea about Iceland. Oeder.—In the Northern Ocean. Gunner.—In the Atlantic Ocean. Koenig.—At the Canary Islands. Bory de St. Vincent.—At the Mouth of the Tagus. Brotero.—*β.* near Lossiemouth, in the North of Scotland. Mr. Brodie.—Not uncommon on the southern shores of England.

Perennial. July—October. Hudson.

ROOT, a small, expanded, blackish, callous disk.

FROND, compressed, destitute of midrib or veins, from three to six inches long, its width in the primary branches nearly equal throughout, being scarcely half a line in some instances, in others, above a line, towards the apices somewhat narrowed, much and irregularly divided with branches beginning very near the base, all of them distichous, and disposed in the same plane; branches scattered without order, the primary ones in general elongated, and either ditrichotomous, or beset with other smaller ones, which are themselves irregularly disposed, and these also with others, each series being narrower than the preceding one; the form of the extreme branches is lineari-lanceolate; the whole frond is pinnated with horizontal pinnæ two or three lines long, undivided, lineari-lanceolate, opposite, placed close to each other, and in their turns also pinnated with others so minute as almost to escape the naked eye, whence the plant has a most beautiful feathered appearance: in the extreme branches and pinnæ there appear under the microscope pale obsolete dissepiments which divide the branches into nearly square joints, but of these there are no vestiges in the rest of the frond.

FRUCTIFICATION, a few largish †seeds, of a deep blood-red color, surrounded with a very conspicuous pellucid limbus, placed upon the apices of the pinnæ, and inclosed in ‡no capsule, instead of which the end of the pinna splits into four or five parts, so as to resemble a tetra-, or penta-, phyllous involucre, which is considerably longer than the seeds, and surrounds them.—The seeds, if broken, pour out a few small roundish granules.

COLOR, deep purplish-red, tinged with brown, sometimes almost blackish in the primary shoots, in the extreme ones paler, and subdiaphanous; in drying it becomes darker, and, if kept in fresh water, turns to a dirty brownish green.

SUBSTANCE, cartilaginous, thickish and tough in the elder shoots, more thin in the younger ones.

*β* differs considerably in appearance, and is every where more than twice as narrow, and of a substance nearly membranaceous; its color is darker, and the branches under the microscope most evidently jointed, the dissepiments being pellucid, the joints almost square. In this no fructification has yet been discovered, similar to that already described under var. *α*, but there is not unfrequently found attached to the ends of the pinnæ a single largish spherical seed, not inclosed by any involucre, but surrounded by a pellucid limbus, and internally marked with white lines, which divide it into seven or eight roundish parts.

Obs. When dried it adheres closely to paper.

That *F. plumosus* is an extremely variable plant in point of shape and size is an observation which can scarcely fail of being made by every Botanist who is in the least acquainted with it, and which to those who are not so well received sufficient

\* These two synonyms belong, perhaps, more properly to my var. *β*, but there is nothing either in the descriptions or the figures by means of which the point can be ascertained.

† Whether these ought more properly to be termed capsules or seeds is a point that I confess myself at a loss to determine; but, as what we called the seeds in other Fuci may be observed to divide into different parts, I have for the present given these the same name.

‡ Dr. Roth, who has bestowed great attention upon the fructification of this Fucus, says, that it does produce capsules; but, though I have sought for them with much care, and examined very many specimens for the purpose, I never could discover traces of any; on which account I think it best to copy what he has written upon the subject, observing, however, that I have no idea what it is that he means by male plants. "Juniores," inquit, "capsulæ, ovatæ vel subrotundæ, atropurpureæ, receptaculo tuberculoso insident, quod successu temporis segmenta producit quatuor, quinque, seu nonnumquam sex, diversæ longitudinis, filiformia, subtorulosa, et evidentissime geniculata, demum capsulâ duplo longiora, et ad apicem consuevit evadunt, quorum articuli e granulis duobus compositi videntur. Disruptâ capsulâ post granulorum contentorum dispersionem, tanquam inanis vesicula membranacea et lacerata per segmentorum interstitia transparet, et demum macerata fere plane evanescit, receptaculum verò cum segmentis persistit, et ex eorum numero constanter unicum tantum elongatur in pinnam ita, ut tandem in annosioribus speciminibus pinnæ inferiores ramorum alternatim distichæ, supra basin ad alterius latus fasciculo segmentorum setiformium subalternorum, brevi pedunculo quasi insidente, auctæ conspiciantur. In quibusdam fasciculus palmatus evadit, et in novum ramum demum exerescere videtur. In vesiculiferis, et pro masculis venditatis individuis nunquam observatur segmentorum fasciculus ad interius latus pinnatum inferiorum ramis insidentium."—Cat. Bot. III. p. 136.



sufficient illustration by a comparison of the figures given in the *Flora Danica* and the *Nereis Britannica*, where the two opposite extremes are represented. These, if considered separately, might easily be mistaken for two distinct species, and a Naturalist who had seen no others might even have a difficulty in persuading himself that they are not so; and yet, so far is this from being the case, that no *Fucus* whatever exhibits more regular gradations between the most narrow and delicate, and the broadest and most cartilaginous individuals; in consequence of which no attempt was ever previously made to separate it into different varieties, nor should I now have ventured upon the so doing, except under the sanction of the opinion of\* Mr. Brodie, who finds both the appearances plentiful in the vicinity of his own house, where he has continual opportunities of observing them. The error relative to the fructification of this plant, which was for a long time universally believed to consist of a capsule, which at maturity burst into four or five segments conniving or connected at their tips, as in the genus *Andraea*, was first rectified by Dr. Roth; yet even he, in my opinion, has not exactly understood it. On the contrary I am satisfied that it is precisely like that of *Conferva corallina* and *setacea*; and that, together with these and a few more submersed Algæ, some of them now arranged among the Fuci, others among the *Confervæ*, *F. plumosus* will hereafter constitute a beautiful and natural genus of plants, distinguished by their naked seeds, surrounded by an involucre instead of a capsule, and bordered by an extraordinarily large limbus. I have no idea what Dr. Roth can mean by his† *male vesiculiferous* individuals, to which he refers *F. plumosus* of Gmelin, a synonym that I still cannot help regarding as uncertain, and as probably belonging to *Conferva coccinea*. Were I inclined to trust to my own opinion, I should be inclined to think that the figure of *F. confervoides*, which on the authority of Dr. Mohr is quoted above as belonging to *F. cristatus*, was in reality copied from the plant before us. The appearance, whence *F. plumosus* derives its name, furnishes also one of its strongest characteristics, and it is well remarked by Dr. Goodenough and Mr. Woodward, that, "if it cannot rival *F. coccineus* in brilliancy of color, it is far superior in the elegant form of its ramifications, giving it the appearance of a beautifully branched feather, which sufficiently distinguishes it from all in the same division." The same gentlemen also observe, that "when the extreme ramuli are more distant than usual, it somewhat resembles some of the varieties of *F. corneus*; but that it may nevertheless always be distinguished by the form of the main branch and its subdivisions, which are always between filiform and compressed, of a darker color than the rest of the frond, and opaque; whilst in the narrow varieties of *F. corneus* they are flat, alike in color, and have always some degree of transparency.

a. <i>F. plumosus</i> , natural size.					
b. branch, magnified	-	-	-	-	6.
c. part of the same	-	-	-	-	4.
d. part of a branch with seeds	-	-	-	-	3.
e. seeds	-	-	-	-	2.
f. contents of seeds	-	-	-	-	1.
g. branch of var. β	-	-	-	-	6.
h. part of the same	-	-	-	-	3.
i. small part of branch with seeds	-	-	-	-	2.
k. seed	-	-	-	-	1.

\* Mr. Brodie says he never finds any difficulty in distinguishing them: that "the one (α) is cartilaginous, rough, always covered with *Flostræ*, the stem and branches compressed, the branches divaricated, and both these and the ramuli acute at each extreme, and swelling in the middle. The other (β) is rather membranous, soft to a great degree before being washed, the stem, branches, and ramuli from the root to the top perfectly round in every part, the delicate branches uncommonly long in proportion to the plant, and coming off from the stem in a very acute ascending angle, incurving as they ascend. The whole plant has (most strongly when fresh) the habit of a most beautiful *Conferva*; and this not only in the minute ramuli, but in the midrib of the branches, which has the appearance of a beaded spiral process, with a transparent line on each side."

† Respecting these Dr. Roth says, "exceptis speciminibus hic descriptis fructiferis observantur alia, habitu quidem quodammodo aliena, at structurâ omnimode cum illis convenientia, quæ pro masculis non possum non habere."

"*Fila* cum ramis obiecta ramulis subimbricatis.

"*Pinnæ* pinnulaque pariter oppositæ, at magis approximatae, subimbricatæ, subincurvæ, apicæ non rarò subincrassatæ, evidentius geniculatæ.

"*Vesiculæ* in pinnis terminales, globosæ, subpellucidæ, coccinæ, breviter pedunculatæ, solitariae, nunc et plerumque plane nudæ, nunc bas utrinque pinnula patula suffultæ."—*Cat. Bot.* III. p. 135.



*Fucus*, fronde cartilagineâ, debili, planâ, enervi, lineari, ramosissimâ; ramis pinuatis; ramulis lineari-lanceolatis, approximatis, apice seminiferis; seminibus nudis, ramulorum apicibus multifidis cinctis.

HABITAT ad Caput Bonæ Spei, Fucis majoribus adnascens. D. C. Brand, in *Herb. Banks.*

RADIX callus exiguus.

FRONDES ex eâdem basi plurimæ, longitudine circiter semipedales, planæ, nervi venarumque expertes, singulæ caule assurgentes unico, nunc indiviso, nunc semel, bis, terve vagè diviso, segmentis subfastigiatis, semper prope basin et apices aliquantùm attenuato, cætera latitudinem unius circiter lineæ ubique æqualem servante, parte radici proximâ nodiusculo, hinc per totam longitudinem pinnato ramis lineari-lanceolatis, approximatis, distichis, horizontalitèr patulis, quoad longitudinem perquam variis, et nunc vix duas tresve lineas, nunc pollicem et ultrâ æquantibus, illis simplicibus, his ramulis brevissimis iterùm simili ratione pinnatis:—interdùm etiam sed rariùs, rami tripinnati evadunt.

FRUCTIFICATIO, ramorum minorum ad latera sessilis, constat e duobus vel tribus seminibus majusculis, sphaericis, liberis, coloris intensè sanguinei, singulis limbo pellucido cinctis, et granula plurima subrotunda fusca includentibus, omnibus septis setis aliquot brevissimis, incurvis, involucri faciem præ se ferentibus.

COLOR purpureus, fusco tinctus, subdiaphanus; exsiccata intensior, magisque ad rubrum accedens; marcescentis aut in aquâ dulci servata sordidè albicans.

SUBSTANTIA cartilaginea, lenta, debilis.

Obs. Planta glaberrima, quæ exsiccata chartæ laxiusculè adhæret:—nulla geniculorum in totâ stirpe, ne quidem in spinulis involucriformibus, species.

Exemplar, quod hæc exhibet icon, et quod unicum hujus Fuci hucusque vidi, in Herbario servatur Banksiano, ubi posuit D. Brand, qui quadraginta ferè abhinc annis, (A. D. MDCCLXX.) legit. Nomen eidem, *F. flaccidus*, describitur, quod eâ de causâ retinendum judicavi, quoniam, quamvis plurimæ sint Fucorum species quibus illud exsiccatis paritèr vel etiam magis convenire videtur, fieri tamen potest ut nullius in statu recente characterem aptiùs exprimat. *F. flaccidus* arctissimè est *F. corneo* affinis, et colore habitu atque texturâ stirpem illam mutabilem adeò refert, ut inter varietates ejus majores forsân esset a Botanicis recensitus, nisi vetaret fructificatio, quæ statim ab eâdem eximit familiâ, et *F. plumoso*, *Confervæ corallinæ*, horumque congeneribus annumerandum docet: stabilitur quoque hinc illud quod est jamdudùm de his plantis in *Fucorum Britannicorum Synopsi* memoratum, scilicet paulùm modò in Algis submersis disponendis valere structuram articulatam continuamve, et necesse fore, priusquàm ad systema omnibus numeris absolutum attingere possimus, ea quæ nunc recipiuntur genera in unum redigere, neque de ullâ stirpe quærere utrum sit hactenus Fucus, an Confervis, an Ulvis associata, sed cunctas simul oculis subjicere, et rem totam de integro elaborare.

- |   |   |   |   |   |    |
|---|---|---|---|---|----|
| a. <i>F. flaccidus</i> , magn. nat.     |   |   |   |   |    |
| b. <i>ramus</i> , magn. auct.           | - | - | - | - | 6. |
| c. <i>ramulus</i> , cum fructificatione | - | - | - | - | 5. |
| d. <i>semina</i>                        | - | - | - | - | 3. |
| e. <i>semen granula effundens</i>       | - | - | - | - | 1. |



*Fucus flaccidus*, frond cartilaginous, flaccid, flat, nerveless, linear, much and irregularly branched; branches pinnated, ramuli linear-lanceolate, placed close to each other, bearing seeds at their apices; seeds naked, surrounded by the multifid ends of the ramuli.

At the Cape of Good Hope, parasitical on the larger Fuci. Mr. C. Brand, in the Banksian Herbarium.

ROOT, a small callous disk.

FRONDS, numerous from the same base, about half a foot long, flat, destitute of midrib or veins, each rising with a single stem, in some instances undivided, in others once, twice, or thrice, irregularly cleft into segments of nearly equal height, always slightly attenuated near the base and apices, but otherwise preserving a nearly equal width of about a line, towards the root naked, but afterwards pinnated throughout its whole length with linear-lanceolate branches, placed close to each other, distichous, between horizontal and patent, in point of length very variable, some of them being scarcely above two or three lines, while others are more than an inch long, the former are simple, the latter pinnated with extremely short ramuli, disposed in a similar manner:—sometimes also, though rarely, branches are found tripinnate.

FRUCTIFICATION, sessile upon the sides of the smaller branches, consisting of two or three largish spherical seeds, not inclosed in a capsule, of a deep blood-red color, each bordered by a pellucid limbus, and containing several roundish brown granules: the clusters of seeds are surrounded by about eight extremely short, incurved, spiniform setæ, which have the appearance of an involucre.

COLOR, purple, tinged with brown, semitransparent; darker, and more inclining to reddish brown when dried; turning, in decay or from exposure to the sun, to a dirty white.

SUBSTANCE, cartilaginous, but flexible and flaccid.

OBS. The plant is remarkably smooth, and in drying adheres slightly to paper:—there is no appearance of a tendency to be jointed in any part, not even in the ramuli which look like an involucre.

The specimens, from which the present figure was taken, the only ones of this *Fucus* that I have ever had an opportunity of seeing, are preserved in the Banksian Herbarium, to which they were communicated by Mr. Brand, who gathered them so long since as the year 1770. They are marked with the name of *F. flaccidus*, which I have therefore thought it proper to retain, as, though many other species may appear, after they are dried, equally, or even more deserving of such an appellation, it is nevertheless possible that it may be peculiarly characteristic of the present in a recent state. The nearest affinity of *F. flaccidus* is with *F. corneus*, among the larger varieties of which it would in all probability have been enumerated, since both in color, habit, and texture, it bears a striking resemblance to some of the appearances of that very variable plant, had it not been for the fructification, which at once removes it from the same division, and brings it near to *F. plumosus*, *Conferva corallina*, and their congeners; thus affording an additional proof in favour of the observation made some time since in the *Synopsis of the British Fuci*, that in the arrangement of the submersed Algæ the jointed or unjointed structure is of small importance, and that, previously to any permanent system being established upon this subject, it will be necessary to reduce to one mass the present genera of *Fucus*, *Ulva*, and *Conferva*, and to proceed in nearly the same manner as if nothing had been done before.

- |  |   |   |   |   |    |
|--|---|---|---|---|----|
| a. <i>F. flaccidus</i> , natural size. | - | - | - | - | 6. |
| b. small branch, magnified             | - | - | - | - | 5. |
| c. ramulus, with fruit                 | - | - | - | - | 3. |
| d. seeds                               | - | - | - | - | 1. |
| e. seed discharging its contents       | - | - | - | - |    |





*Fucus flaccidus.*







*Fucus*, fronde membranaceâ, planâ, sub-enervi, lineari, ramosissimâ; ramis horizontalibus, pinnatis; ramulis alternis, lineari-lanceolatis, serratis, margine superiore seminiferis; seminibus nudis, denticulorum apicibus multifidis cinctis.

*Fucus asplenioides*. ESPER,  *Ic. Fuc. II.* p. 78. t. 147.

HABITAT in Americæ Septentrionalis orâ Occidentali, in loco "Prince William's Sound" dicto. *D. Menzies*.—In littore Kamtschatico. *D. Horner*.—In Novæ Hollandiæ oris Australibus, ad Fretum "Bass' Streights" dictum. *D. Brown*.

*Perennis?*

RADIX callus exiguus, dilatatus.

FRONS plana, costâ obscurâ tenuissimâ vix nisi lentis ope conspiciendâ percurâ, longitudine semipedalis, vel do-drantalîs, latitudinē unius circiter lineæ, et ubique ferè æqualis, surculis primariis bis, ter, vel pluries vagè dichotomis, segmentis sub-fastigiatis, omnibus a basi usque ad apices pinnatis ramis distichis, horizontalibus, aut horizontalitèr patulis, approximatis, oppositis, alternisque, longitudine nunc tripollicaribus, nunc vix unguicularibus, majoribus minoribus absque normâ immixtis, cunctis per totam longitudinem pinnatis ramulis, duas tresve lineas longis, lineari-lanceolatis, obtusiusculis, lenitèr incurvis, horizontalitèr patulis, semper alternis, margine utrinque serratis, intervallo inter singulos vix lineam superante:—e ramis inter ramulos haud rarò pullulant rami alii minimi, ortu lanceolati, et simplices, ut siliquis nudo oculo mentiantur, mox sese in ramos pinnatos elongaturi.

FRUCTIFICATIO ramulis, et tantummodò lateri eorum superiori, imposita, e \*seminibus constat liberis, denticulorum, qui tunc pedicellorum vix funguntur, ad apices sitis, septisque setis plurimis, articulatis, minutissimis, involucri polyphylli faciem præbentibus.

COLOR obscurè coccineus fusco aliquantùm tinctus; *exsiccatæ* multò intensior; *marcescentis* aut *solî objectæ* sordidè lutescens.

SUBSTANTIA membranacea, tenera, in surculis tamen primariis crassior et sub-cartilaginea.

Obs. *Exsiccata* chartæ laxiusculè adhæret:—exemplaribus a *Menziesio* lectis sunt infixa Zoophyta quædam rotunda, plana, perquam exigua, albicantia, *Lecidæ effusæ* patellarum formâ atque colore simillima.—Annon novum Zoophytorum genus?

Adeò sese hæc pulchra *Fuci* species a reliquis omnibus hucusque detectis facilè dignoscendum præstat, ut nullus sit in discriminandâ labor. Quoad formam habitumque magis forsân insequenti quàm ulli alii accedit; sed quantum hæc duæ stirpes inter se discrepant quivis statim agnoscat Botanicus, qui crescendi rationi, ramulorum figuræ, et fructui animum intendit, ut silentio præteream surculos illos angustos cirrhiiformes, in quos unius rami modo maximè insigni excurrunt, qui verò in aliâ penitus desiderantur. Habet etiam *F. asplenioides* aliquam cum *F. corymbifero* similitudinem, sed hujus fructificatione atque ramuli magis quàm ii *F. cirrhosi* primo aspectu abludentes reperiuntur. Inter species Britannicas ne uni arctius affinis videtur quàm *F. plumoso*; neque est negandum quin illam ejus stirpis varietatem, quam sub *F. Ptiloti* nomine depinxit *Esperus*, plurimum colore habituque referat, dummodò sit iconi omnimodò fidendum. Fructificatio quoque utrique eadem; illud tamen habet *F. asplenioides* proprium, quòd setæ hanc involucri instar cingentes sint perquam manifestè geniculatæ, reliquæ verò frondis partes nihil articulati ostendant. Exemplar hic delineatum, cl. *Menziesio*, qui primus detexit, acceptum refero. Verisimile putarem *Fucum* in oris tam dissitis lectum olim fore a Botanicis inter vulgatiore recensitum, licet omnium de his plantis auctorum notitiam hucusque latuerit, *Espero* uno excepto, ad quem ipse misi, et qui, quantum ad *Aspleniorum* quorundam similitudinem accedat observato, *F. asplenioidis* nomen imposuit.

a. <i>F. asplenioides</i> , magn. nat.				
b. ramus, cum fructu, magn. auct.	-	-	-	6.
c. ramulus, cum fructu	-	-	-	4.
d. fructus	-	-	-	2.
e. semina?	-	-	-	1.
f. una e setis semina cingentibus	-	-	-	1.
g. ramus, e quo novî rami capsulas referentes oriuntur	-	-	-	6.
h. unus e ramis jam primum ortis	-	-	-	2.

\* In exemplare hic depicto, æquè ac in omnibus iis hujus *Fuci* quæ hactenus vidi, fructificationis ætas nimis protracta granula modò subrotunda, eorum in *F. plumosi* et *F. flaccidi* seminibus inclusorum similia, ostendebat. Nullus tamen dubito quin fructus illum harum plantarum ad amissim referat.



*Fucus asplenioides*, frond membranaceous, flat, almost nerveless, linear, much and irregularly branched; branches horizontal, pinnated; ramuli alternate, linear-lanceolate, serrated, producing seeds on their upper margin; seeds naked, surrounded with the multifid ends of the serratures.

*Fucus asplenioides*. ESPEL,  *Ic. Fuc. II.* p. 78. t. 147.

In Prince William's Sound, on the North West coast of America. *Mr. Menzies*.—Shores of Kamtschatka. *Dr. Horner*.—On the South side of New Holland, by Bass Streights. *Mr. Brown*.

*Perennial?*

ROOT, a small, expanded, callous disk.

FROND, flat, provided with an extremely thin dark midrib, scarcely discernible without the assistance of a microscope, from six to nine inches long, and every where preserving an equal width of about a line, the primary segments twice, thrice, or even more frequently irregularly dichotomous, with segments of nearly the same height, all of them pinnated from base to summit with distichous branches, horizontal, or between horizontal and patent, situated close to each other, both opposite and alternate, varying in length from scarcely half an inch to three inches, large and small being mixed together without any order; the whole of them are throughout their whole length pinnated with ramuli two or three lines long, of a linear-lanceolate form, bluntish, slightly incurved, between horizontal and patent, constantly alternate, their margins serrated, and separated from each other by intervals of not more than a line:—in the spaces between the ramuli are not unfrequently observable other exceedingly small branches, lanceolate and simple at their origin, so as to have to the naked eye the look of capsules, but afterwards lengthening into pinnated branches.

FRUCTIFICATION, situated only upon the upper side of the ramuli, consisting of \* seeds not inclosed in any capsule, placed on the apices of the serratures, which then perform the office of pedicelli, and split into several most minute jointed setæ, surrounding the seeds like a polyphyllous involucre.

COLOR, dark scarlet, somewhat tinged with brown, much deeper when dry, and turning in decay, or from exposure to the sun, to a pale and dirty yellow.

SUBSTANCE, membranaceous and tender, but thicker and inclining to cartilaginous in the primary shoots.

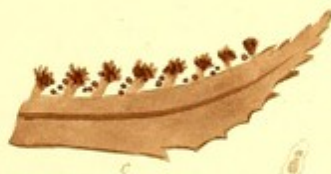
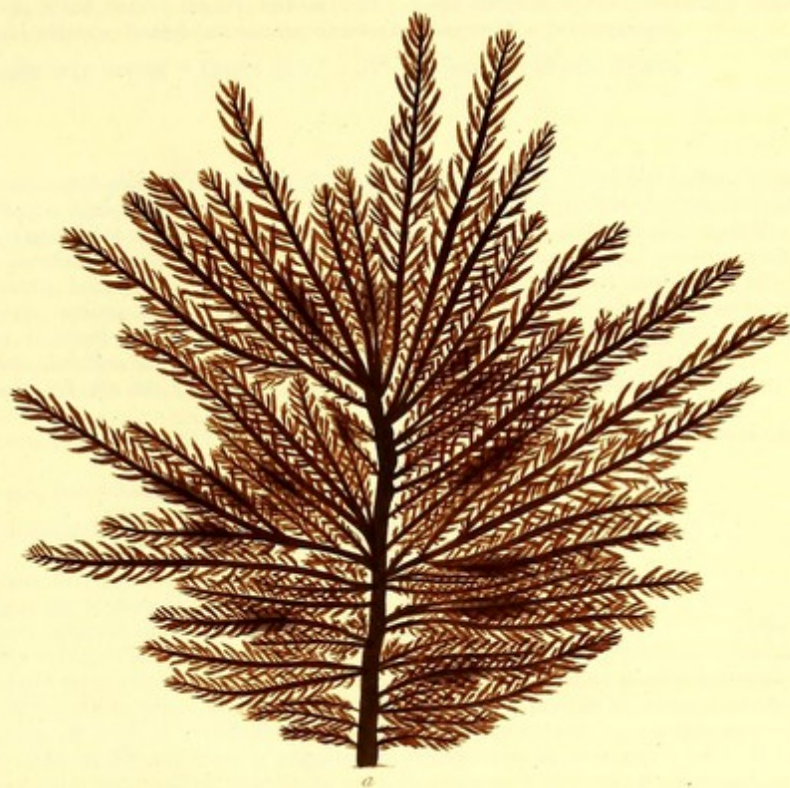
OBS. When dried it adheres, though slightly, to paper:—to the specimens gathered by *Mr. Menzies* were attached some very small, circular, flat, whitish Zoophytes, in shape and color very much resembling the shields of *Lecidea effusa*.—May not these prove a new genus of Zoophytes?

There is little danger of confounding this beautiful species with any other at present known, among all which there seems to be none to which it is so closely allied as to the following, though even from this it requires but slight attention in any botanist to perceive how widely it differs in its mode of growth, in the form of its ramuli, and in its fructification; not to mention those narrow shoots which so remarkably terminate the branches of the one, but are altogether wanting in the other. It has also some affinity with *F. corymbiferus* of Gmelin, but still less than with *F. cirrhosus*, the fruit and the ramuli being at first sight more strikingly dissimilar. Among the British species it, perhaps, approaches most nearly to *F. plumosus*, and in general habit, but not in any other particular, except color, considerably resembles that variety of this plant which Professor Esper has figured under the name of *F. Ptilotus*. It also agrees with it in fructification, and is remarkable for the circumstance of the setæ that surround the seeds being most evidently jointed, while no other part of the frond displays the least appearance of a similar tendency. To *Mr. Menzies*, who first found this *Fucus*, I am indebted for the specimen here figured, nor should I, if we may judge from its having been gathered upon shores so widely distant from each other, be surprized at its proving at some future time to be by no means an uncommon species, though it appears at present to have escaped the observation of all authors upon the subject, excepting Professor Esper, to whom it was communicated by myself, and who gave it the name of *F. asplenioides* from its resemblance to some species of *Asplenium*.

- |  |   |   |    |
|--|---|---|----|
| a. <i>F. asplenioides</i> , natural size.                          |   |   |    |
| b. branch, with fructification, magnified                          | - | - | 6  |
| c. ramulus, with fructification                                    | - | - | 4. |
| d. fructification  | - | - | 2. |
| e. seeds?  | - | - | 1. |
| f. one of the involucriform filaments                              | - | - | 1. |
| g. branch with young shoots between the ramuli resembling capsules | - | - | 6. |
| h. one of the young shoots in its earliest stage of growth         | - | - | 2. |

\* In the specimen here painted, as well as in all the others that I have yet seen of this *Fucus*, the fructification was too far advanced, and nothing was observable but roundish granules, similar to those contained in the seeds of *F. plumosus* and *F. flaccidus*. I have, however, not the least doubt but the fruit of all these three *Fuci* is the same.





*Fucus asplenoides.*







*Fucus*, fronde membranaceâ, planâ, enervi, lineari, ramosissimâ; ramis pinnatis, apice in surculos dentatos flagelli-formes attenuatis; ramulis alternis, lineari-lanceolatis, alternatim simplicibus pectinatisque.

HABITAT in Novæ Selandiæ oris, in sinu "Dusky Bay." D. Andrews, in Herb. Banks.

*Perennis?*

RADIX nondùm cognita.

FRONS plana, \*costæ venarumque omninò expers, longitudine pedalis, et ultrâ, latitudine circiter sesquilinearis, et ubique æqualis, in ramos aliquot distichos, sparsos, situ atque longitudine quàm maximè varios, plerumque tamen elongatos et simpliciusculos, vagè divisa; rami omnes per totam longitudinem pinnati ramulis distichis, sub alternis, approximatis, horizontaliter patulis, linearibus, apice tamen aliquantùm attenuatis, lenitè incurvis, circiter semiu-nguem longis, alternatim pectinatis, scilicet cuivis simplici proximus exoritur alius longior, ipse iterum aliis longè minoribus obsitus, quasi sit in novum ramum abiturus, unde pectinata facies; ramuli pectinati sunt integerrimi, simplices margine superiore integerrimi, inferiore serrati;—ramorum apices haud rarò in surculos elongatos, latitudine vix semilineares, simplices, vel bifurcos, dentibus brevissimis recurvis utrinque vagè obsitos, attenuantur.

FRUCTIFICATIO ramulorum ad alas sita, e capsulis aliquot cylindraceis, perquam minutis, confertis, bi-tri-fidis, coloris dilute carnei, constat.

COLOR coccineus aurantiaco immixtus, subdiaphanus; *exsiccata* intensior; *marcescentis* aut *solì objectæ* sordidè lutescens.

SUBSTANTIA membranacea, tenerrima, et tenuissima.

Obs. Frons lenti acerrimæ subjecta obsoletè reticulata apparet:—*exsiccata* chartæ adhæret.

Ad calcem exemplaris, quod in Herbario Banksiano servatum hæc exhibet icon, *F. dentati* nomen scripserat b. Lightfootius, qui optimam ejus stirpis descriptionem in *Florâ suâ Scoticâ* tradiderat, et cui tot recentem observandi facultates erant oblatae, ut fieri nequeat quin talem ejus admiremur errorem, idem licet in alio quovis naris minùs emunctæ Botanico nequaquam mirum videretur, quoniam formâ habituque, ut aiunt, generali multum inter se conveniunt. Utut verò hæc similitudo valeat, cuivis, vel mediocriter in hæc re versato, statim patebit quantum sit in colore, et quantum in ramulorum formâ discrimen. Hi sunt in *F. dentato* omnes uniformes atque integerrimi, excepto quòd apices habeant incisos, dum, contrâ, ii *F. cirrhosi* alternatim simplices ramosique conspiciuntur. Præter hæc nemo unquam aliquid in illo vidit simile surculorum angustorum spinosorum in quos hujus rami attenuati abeunt, neque fructus ambobus idem; cujus tamen, cùm sit in unico quod in præsens vidi *F. cirrhosi* exemplare valde imperfectus, vix ullam mentionem facere sustulissem, nisi capsulas omninò similes in alio quoque vidissem Fuco, quem a Capite Bonæ Spei acceptum mox sub *F. Corallorhizæ* nomine in hoc opere describere est in animo. Interest etiam in plurimis magna inter *F. cirrhosum* et *F. asplenoidem* similitudo; de quâ, et simul de characteribus per quos dignoscuntur, jamjam est sub hoc tractatum. Nomen ducitur a ramorum apicibus attenuatis, cirrhos formâ quodammodò referentibus, et forsitan ad idem ministerium a naturâ comparatis. Nihil horum simile est hactenus in ullo alio Fuco fronde planâ membranaceâque instructo observatum, et hi stirpis characterem cuivis maximè obvium suppeditant, notam licet haud minùs certam, quantumvis minùs manifestam, in ramulorum formâ dispositioneque Botanicus attentius lustrans detegat. Planta sub *F. cirrhifolii* nomine a Vahlîo descripta, huic nostræ quoad nomen simillima, toto tamen cœlo indole discrepat, et est, ut ex descriptione et synonymo allato videtur, ad *F. muscoidem* Wulf. referenda.

- |  |   |   |   |   |    |
|--|---|---|---|---|----|
| a. <i>F. cirrhosus</i> , magn. nat.  | - | - | - | - | -  |
| b. <i>frondis pars</i> , magn. auct.   | - | - | - | - | 6. |
| c. <i>ejusdem portio, in quâ fructus, structura reticulata, et costa conspiciuntur</i> | - | - | - | - | 3. |
| d. <i>fructus</i>  | - | - | - | - | 1. |

\* Ramorum quorundam ad apices sub lente maximè augente lustratos costa tenuis albicans conspicitur, sed hoc nequaquam in omnibus ramis, et nunquam nisi summis vitri viribus utenti, quare plantam pro enervi habeo.



*Fucus cirrhosus*, frond membranaceous, flat, nerveless, linear, much and irregularly branched, producing at its apices narrow, flagelliform, dentated shoots; ramuli alternate, linear-lanceolate, alternately simple, and pectinated.

At Dusky Bay, on the coast of New Zealand. Mr. Andrews, in the Banksian Herbarium.

Perennial?

ROOT, not at present known.

FROND, flat, destitute of \*midrib or veins, in length a foot or more, in width about a line and half, and every where equal, irregularly divided into a few distichous scattered branches, extremely uncertain in point of situation and length, but for the most part elongated and simple; all the branches are pinnated from top to bottom with distichous, sub-alternate, approximated ramuli, between horizontal and patent, linear, except that they are somewhat attenuated towards their apices, slightly incurved, about a quarter of an inch long, alternately pectinated, that is to say, next to every simple one is placed another longer than it, and beset with others much smaller, as if it were about to lengthen into a new branch, whence it has a pectinated appearance; the pectinated ramuli are quite entire, the simple ones entire in their upper, and serrated on the under side:—from the ends of the branches not unfrequently issue flagelliform shoots, an inch or two long, and not more than half a line wide, either simple or forked, irregularly beset on each side with very short recurved teeth.

FRUCTIFICATION, situated at the axillæ of the ramuli, consisting of a few very minute, clustered, cylindrical, bifid, or trifid, pale-pink capsules.

COLOR, scarlet, inclining to orange, semitransparent, darker when the plant is dry, and turning in decay, or from exposure to the sun, to a light and dirty yellow.

SUBSTANCE, membranaceous, extremely thin, and tender.

Obs. If examined with a strong microscope the frond appears obsolete reticulated:—in drying the plant adheres to paper.

Under the specimen of this *Fucus* preserved in the Banksian Herbarium, of which a figure is here given, the name of *F. dentatus* is written by the late Mr. Lightfoot, whose description of that species, which he had constant opportunities of observing upon the shores of Scotland, is so excellent, that from him such an error cannot fail to appear remarkable, though, with a less acute, or less careful Botanist, it would have been far from surprising, the two plants being in reality very closely allied in form and general habit. It will, however, be immediately perceived, that they differ essentially in their color, and still more so in the shape of their ramuli; those of *F. dentatus* being uniform, and quite entire, except that they are toothed at their apices, while in *F. cirrhosus* they are alternately simple and branched, and are all serrated in their lower margin, but entire in the upper. In addition to this, no appearance of the narrow spinous shoots, with which the branches of the present *Fucus* are so singularly terminated, has ever been noticed in the other, and the fructification of the two is likewise dissimilar; though this is so imperfect in the specimen of *F. cirrhosus* here represented, the only one which I have ever had an opportunity of examining, that I should scarcely have ventured upon noticing it at all, had I not met with capsules that seem altogether analogous in a species from the Cape of Good Hope, which I purpose shortly describing in this work under the name of *F. Corallorhiza*. *F. cirrhosus* bears also considerable resemblance in several particulars to the subject of the preceding plate, in the account of which are pointed out the differences that most obviously distinguish them. The name is derived from the long narrow shoots into which, as is above-mentioned, the extremities of the branches are attenuated, and which wear the appearance, and probably perform the office, of tendrils. It is upon these that the plant depends for its most striking character, nothing at all similar having been observed in any other flat and membranaceous *Fucus*; but an equally certain, though less apparent, distinction is to be found in the shape and disposition of the ramuli. From the similarity of names, it might be supposed, that the present plant is allied to *F. cirrhifolius* of Vahl, which is far from being the case, this latter being, according to the description, the same as *F. muscoides* of Wulfen.

- |    |   |   |   |   |   |    |
|----|---|---|---|---|---|----|
| a. | <i>F. cirrhosus</i> , natural size.                                       |   |   |   |   |    |
| b. | part of the frond, magnified  | - | - | - | - | 6. |
| c. | portion of the same, to show the fruit, reticulated structure, and midrib | - | - | - | - | 3. |
| d. | fruit   | - | - | - | - | 1. |

\* Towards the end of some of the branches is observable, with the highest powers of the microscope, a thin whitish midrib, but this is not to be seen in all the shoots, and never without the assistance of very strong glasses, on which account I have thought it best to call the plant nerveless.





*Fucus cirrhosus.*







*Fucus*, fronde cartilagineâ, planâ, lineari, dichotomâ, costatâ, margine integerrimâ ciliatâ; ciliis teretiusculis, subsimplicibus, apice in capsulas sphaericas intumescens.

*Fucus vittatus*. LINN. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. *Fl. Norv.* II. p. 35.

ESPER,  *Ic. Fuc.* II. p. 53.

*F. ornatus*. LINN. *Mant.* p. 312.

*F. ciliatus*. ESPER,  *Ic. Fuc.* I. p. 21. t. 4. (quoad fig. 1, 2, 4, excl. syn. forte omnibus.)

*F. caulescens*. Gmelin,  *Hist. Fuc.* p. 173. t. 20. f. 2.?

*F. marinus, ramosus, caule folioso, foliis angustis, ad margines pilosis*. SEBA, *Thes.* III. p. 192. t. 102. f. 11.?

*Alga marina, foliis longis, angustis, germinantibus, tenui tomento in ambitu ornatis*. SEBA, *Thes.* III. p. 192. t. 103. f. 5.?

HABITAT ad Caput Bonæ Spei. Linnaeus.—In Americæ Australis oris. D. Cavanilles.

Perennis?

RADIX callus majusculus, dilatatus, purpurascens.

FRONDES ex eâdem basi plurimæ, planæ, lineares, longitudine pedales, sesquipedales, et ultra, latitudine circiter unguiculares, aveniæ, sed costâ crassiusculâ apices versus attenuatâ et obsoletâ percuras, nunc omnino simplices, nunc bis terve dichotomæ, nunc ramis distichis patulis e margine exeuntibus vagis sparsim pinnatæ, nunc aliis e costâ natis proliferæ, sed hoc, nisi fallor, vix nisi plantâ casu aliquo læsâ accidit, quamvis, uti in exemplare hic depicto, stirps non rarò iterum atque iterum prolifera vim talem a naturâ accepisse videatur; rami omnes ortu tenuissimi et teretiusculi, sed ferè statim plani, longitudinis quàm maximè incertæ, vel indivisi, vel dichotomi, vel aliis minoribus e margine costâque ortis instructi, apices versus lenitèr angustati ut minores oblongo-lineares evadant: Membranâ frondis ad basin fluctibus sæpe detritâ, costâ ibi denudata stipitis brevissimi teretis faciem præ se fert:—frondis margines ubique \* planos et integerrimos per totam longitudinem cingunt ramenta ciliiformia, teretiuscula, lineari-elliptica, lineam aut sesquilineam longa, approximata, quædam simplicia, alia minoribus eâdem ratione ciliata, alia enormitèr divisa: similia quoque aliquando, sed rariùs et non nisi sparsim, costæ vel etiam frondis utrique paginæ innascentia reperiuntur.

FRUCTIFICATIO in ciliis sita, quæ tunc intumescens formam sphaericam vel ellipticam induunt, et semina plurima subrotunda exigua intensè purpurascens intus fovent.

COLOR pulchrè purpureus subdiaphanus; *exsiccatâ* intensior, et ad violaceum accedens; *in aquâ dulci servatâ* vel *soli objectâ* sordidè lutescens, et demùm albicans.

SUBSTANTIA cartilaginea, crassiuscula, lenta, et tenax; in *exsiccatâ* sub-cornea.

Obs. Planta glaberrima, per siccitatem sæpe nitida, quasi sit vernice oblita:—frons haud infrequentèr versicolor apparet, colore hic integro, illic deperdito:—chartæ nequaquam adhæret.

Ex iconibus suprâ citatis non desunt aliquæ quæ *F. vittati* formam characteresque satis bene exprimunt, vix una tamen dubio prorsus vacavit, unde factum est plantæ hujus historiam semper fuisse apud auctores dubiorum nebulis involutam, ipsa licet magis quam Fuci plerique exotici Botanicis innotuerit. Errorum horum prima causa est in Linnaei operibus quærenda, qui primitus in *Systemate Naturæ* sub nomine hic servato descripsit, et mox pro novâ specie, *F. ornatus* dictâ, in Mantissâ protulit, quæ duæ demùm sunt pro varietatibus in *Systemate Plantarum* recensitæ, quamvis, uti ex † Herbario suo constat, ne minima inter utramque dissimilitudo interest; dum in eodem opere (quod confusionem cumulat) *F. ciliati* icon Oederiana, cùm sub *F. vittato*, tùm sub *F. ciliato*, citatur, Gmelini verò *F. caulescens*, illius ‡, me iudice, synonymon indubium, ad hunc refertur, a quo toto cælo discrepat. Talibus in secundo *Iconum Fucorum* tomo nititur Esperus ad sese culpâ liberandum, quòd sub *F. ciliati* nomine stirpem hic depictam in primo delineaverit. Gunneri synonymon nequeo pro certo habere, quoniam characterem modò Linnaeanum specificum repetiit, nihilo mutato adjectove, totusque ex auctoritate Tonningii, *F. vittatum* in § tractatu de rarioribus *Norvegiæ* enumerantis, pendere videtur. Haud igitur ei usque aded fidere sum ausus, ut Norvegiæ oras inter locos natales memorem; neque enim temerè nec nisi summâ cum curâ in stirpium nostrarum Europearum numerum ascribere debemus plantam, quæ tantummodò ad Caput Bonæ Spei vel ad Americæ Australis littora, unde olim ad Stackhousium b. Cavanilles misit, hucusque est reperta. Quod ad *F. vittati* affinitates attinet, nulli forsitan arctius est a naturâ connexus Fuco quàm *F. erinaceo*, sub quo jam suprâ traditur Linnaeus ambos in Herbario suo commiscuisse, ibidemque simul exponuntur notæ per quas invicem dignoscuntur. Ab *F. ciliato*, quocum etiam est commistus, in omnibus ferè dissentit, et a reliquis Fucis frons linearis fimbriata costataque semper ad distinguendum sufficient.

a. <i>F. vittatus</i> , magn. nat.	-	-	-	-	-
b. <i>frondis pars</i> , magn. auct.	-	-	-	-	6.
c. <i>ejusdem pars, cum fructu</i>	-	-	-	-	5.
d. <i>cilia in capsulas tumefacta</i>	-	-	-	-	3.
e. <i>capsulæ</i>	-	-	-	-	2.
f. <i>semina</i>	-	-	-	-	1.

\* Dicit de hac stirpe Linnaeus in *Systemate Naturæ*, "frondes dentato-crispatæ," quod cùm maximè a vero abhorreat, suspicari licet illam olim sibi sub hoc nomine plantam proposuisse diversam, quam postea cum hac commiscuit.

† Extant in phytophylacio Linnaeano quinque hujus Fuci exemplaria, duobus papyri agglutinata foliis, utroque aciculâ conjuncto; horum unus ad calcem, cujus specimina colorem perdididerant, *F. vittati* nomen scripserat Linnaeus, alterum verò, in quo perfecta remanserunt, *F. ornatus* nominatur.

‡ De Gmelini Sebaque synonymis confer ea quæ jam sunt scripta sub *F. nervoso*, p. 93.—Dubitationis signa, quæ aliorum auctoritati cedens, his subjeci, totissimè aliquis, nisi fallor, sustolleret.

§ *Amanitates Academicæ* VII. p. 477.



*Fucus vittatus*, frond cartilaginous, flat, linear, dichotomous, midribbed, quite entire, and ciliated at its margin; cilia sub-cylindrical, mostly simple, their ends swelling into spherical capsules.

*Fucus vittatus*. LINN. *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. *Fl. Norv.* II. p. 35. ESPER,  *Ic. Fuc.* II. p. 53.

*F. ornatus*. LINN. *Mant.* p. 312.

*F. ciliatus*. ESPER,  *Ic. Fuc.* I. p. 21. t. 4. (quoad fig. 1, 2, 4, excl. syn. forte omnibus.)

*F. caulescens*. GMELIN, *Hist. Fuc.* p. 173. t. 20. f. 2.?

*F. marinus, ramosus, caule folioso, foliis angustis, ad margines pilosis*. SEBA, *Thes.* III. p. 192. t. 102. f. 11.?

*Alga marina, foliis longis, angustis, germinantibus, tenui tomento in ambitu ornatis*. SEBA, *Thes.* III. p. 192. t. 103. f. 5.?

At the Cape of Good Hope. *Linnaeus*.—Shores of South America. *Cavanilles*.

*Perennial?*

**ROOT**, a largish, expanded, purplish, callous disk.

**FRONDS**, numerous from the same base, flat, linear, a foot, or foot and half, or even more, long, about half an inch wide, veinless, but provided with a thickish midrib, which towards the apices grows more thin and obsolete; they are in some instances quite simple, in others, twice or thrice dichotomous, in others, irregularly pinnated with scattered, distichous, patent branches arising from the margin, and again in others proliferous with similar branches originating from the midrib, but this latter, I suspect, is only the case in injured specimens, though it not unfrequently happens that individuals are found, which, like the one here figured, are so repeatedly proliferous as to justify the belief that such is the natural growth of the plant; all the branches are at their origin very narrow, and nearly cylindrical, but they almost immediately expand, and become flat, their length is most uncertain, and they are either undivided, or dichotomous, or furnished with others produced from their margin or midrib, towards their apices they are slightly narrowed, so that the form of the smaller ones is between oblong and linear:—at the base of the frond the membrane is generally worn away by the action of the waves, and the naked midrib then wears the appearance of an extremely short cylindrical stipes:—throughout the whole length of the frond the margin, which is constantly \*flat and entire, is fringed with rammenta resembling cilia, sub-cylindrical, of a linear-elliptical form, a line, or a line and half long, placed close to each other, some simple, others ciliated in the same manner with still smaller ones, and others irregularly branched: similar ones are also occasionally, but not commonly, observable, scattered about the midrib and membrane of the frond.

**FRUCTIFICATION**, situated in the cilia, which then swell into a spherical or elliptical shape, and contain several roundish, minute, deep-purple seeds imbedded in their substance.

**COLOR**, a beautiful semitransparent purple, darker and approaching to violet when dry, and turning, from exposure to the sun, or from being kept in fresh water, to a dirty yellowish, and at last to white.

**SUBSTANCE**, cartilaginous, thickish, flexible, and tough; almost horny after it is dried.

**OBS.** The plant is remarkably smooth, and, when dry, often shines as if it had been varnished:—the frond has not unfrequently a speckled appearance, from the color being lost in some places, though it remains perfect in others:—it does not adhere to paper.

*F. vittatus* is one of the species that are most generally and most certainly known among Botanists, but its history has, nevertheless, always been involved by authors in great confusion, and it will be observed, that of the figures above quoted, some of which are far from unfaithful representations of it, there is not one which has not been in some measure perplexed with doubt. The primary cause of these errors is to be traced in the writings of *Linnaeus*, who first described this plant in his *Systema Naturæ* under the name here given, and then again introduced it in his *Mantissa* by the name of *F. ornatus*, as a distinct species, whereas afterwards, in the *Systema Plantarum*, these two are made varieties of each other, though, according to the † original specimens in his Herbarium, there does not appear to be the least difference between them, and, to complete the obscurity, Oeder's figure of *F. ciliatus* is in the same work quoted as a synonym both of *F. vittatus* and *F. ciliatus*, while Gmelin's *F. caulescens*, which, in ‡ my opinion, belongs to the former, is referred to the latter, with which it cannot possibly have any connection. It is upon these circumstances that Professor Esper rests his justification for having figured the present *Fucus* as *F. ciliatus*, in the first volume of his *Icones*, a mistake which he has corrected in the second. Gunner's synonym appears to me far from a certain one, since, without giving any description or figure of the plant, he merely quotes the *Linnaean* specific character, and seems to rely altogether upon the authority of *Toming*, who simply enumerates it in his § *Treatise on the Rariora Norvegiæ*. I have not therefore ventured so far to trust to him, as to mention the shores of Norway among its *loci natales*, such authority being, in my opinion, too slight to justify us in claiming as a denizen of our Northern Flora, a species which has hitherto been gathered only at the Cape of Good Hope, and upon the opposite coast of Spanish South America, whence specimens were sent by *Cavanilles* to Mr. *Stackhouse*. With regard to the natural affinities of *F. vittatus*, it does not seem to be so strongly allied to any other *Fucus* as to *F. erinaceus*, under which

\* *Linnaeus* in his *Systema Naturæ*, says of this plant, "frondes dentato-crispatæ," which is so far from accurate, that it may lead to the idea of his having originally intended a different species, and afterwards confounded the present with it.

† There are in the *Linnaean* Collection, five specimens of this *Fucus*, fastened on two sheets of paper, both which are pinned together; on the one, which is named *F. vittatus*, the plants have lost their color; those of the other are perfect in this respect, and these are called *F. ornatus*.

‡ Respecting the synonyms of Gmelin and Seba, see what has been said under *F. nervosus*, p. 93. The marks of doubt subjoined to these references might, I believe, safely be removed.

§ *Amœnitates Academicae*. VII. p. 477.





*Fucus villosus.*

W. J. H. E. G. del.







which is already noticed the circumstance of their being joined together in the Linnæan Herbarium, as well as the points which distinguish them. *F. ciliatus*, with which this species has also been confounded, differs too strongly in almost every particular for it to be necessary here to mention any single one; and from all other Fuci the fringed linear frond, pervaded with a midrib, will sufficiently serve to separate it.

- |  |   |   |   |   |    |
|--|---|---|---|---|----|
| a. <i>F. vittatus</i> , natural size.                | - | - | - | - | -  |
| b. portion of the frond, magnified                   | - | - | - | - | 6. |
| c. smaller portion of the frond, with fructification | - | - | - | - | 5. |
| d. cilia swelled in capsules                         | - | - | - | - | 3. |
| e. capsules  | - | - | - | - | 2. |
| f. seeds   | - | - | - | - | 1. |

## 65.—FUCUS PILULIFER.

*Fucus*, caule filiformi, compresso, pinnato; ramis alternis, simplicibus; foliis angustis, linearibus, dichotomis, integerrimis; vesiculis sphaericis, petiolatis; petiolis planis.

β. *major*; vesiculis utrinque leviter attenuatis, apice foliiferis.

HABITAT utraque varietas in Portu Nangasaki. D. Horner.

Perennis?

RADIX nondum a me visa.

FRONS longitudine bi- tri-pedalis, et ultra, forsàn et multò longior, cùm nihil quod basi proximum apparet viderim, caule instructa compresso, ancipiti, latitudinem aequalem unius ferè lineæ ubique servante, in meis saltem exemplaribus indiviso, sed per totam longitudinem laxè obsito ramis spiralitèr alternis, singulis intervallo circitèr pollicari sejunctis, horizontalibus, flexuosis, simplicibus, vix duos pollices longis, caulis similibus, nisi quòd duplò sint tenuiores, folia vesiculasque sustentantibus; folia tantummodò in ramis orta, laxè disposita, alterna, horizontalitèr patula, sessilia, plana, linearia, longitudine pollicem, latitudine semilineam sub-æquantia, ter quater dichotoma, nervo tenui nigricante percursa, margine integerrima; vesiculæ in ramis sparsæ, 3-7 in singulis, plerumque foliorum ad alas sitæ, sphaericæ, *Pilularia globulifera* nucularum magnitudine, iisque haud absimiles, extrinsecus læves, intus omninò cavæ, petiolo plano, bi- tri-lineari fultæ.

FRUCTIFICATIO hactenus latet.

COLOR foliorum et vesicularum olivaceus fusco immixtus, caulis intensior; *exsiccatæ* ubique nigricans.

SUBSTANTIA caulis coriacea, lenta, foliorum vesicularumque sub-membranacea et tenuis, ubique insignitèr debilis.

β variat partium omnium staturâ duplò majore; vesiculis infrequentibus, ut rarò plus quam una in eodem ramo occurrat, figuræ inter ellipticam et sphaericam, utrinque attenuatis, *Pisi sativi* seminum magnitudine, et nunquam non terminatis folio reliquorum simili, quamvis hoc quandòque abruptum mucronis modò faciem præ se ferat.

OBS. Exsiccata chartæ nequaquam adhæret.

*F. Pilularia* nomen, nisi esset jamdudum a Gmelino alii multùmque diversæ speciei inditum, huic certè ascriptum voluissem, quæ, quantum ex icone judicare licet, talem longè optimè titulum merere videtur; et non modò vesicularum formâ, uti suprâ memoratur, *Pilulariam globuliferam* refert, verùm etiam harum situ, totiusque stirpis habitu, quod aiunt, generali, nomen inde ductum summo sibi jure vindicat. Fructificatio licet in præsens lateat, nemo est Botanicus qui dubitabit quin deceat hanc plantam in *F. natantis* asciscere familiam, quâcum convenit crescenti modo notisque essentialibus omnibus, exceptis modò foliis, quæ, angusta, linearia, et repetito-divisa, iis *F. mucronati* non sunt primo aspectu absimilia. Naturâ tamen prorsus discrepant; quoniam in *F. mucronato* et affinibus folia nulla vera locum habent, partesque eæ, quæ, ortu planæ, foliorum speciem præ se ferunt, nihil sunt aliud nisi rudimenta ramorum, quorum in formam maturescentes citò turgent, dum *F. piluliferi* folia figuram suam primordiale non retinent, nullique sunt mutationi obnoxia. Varietates duas hic descriptas misit olim Mertensius, qui utramque eandem credidit, et cujus occasiones hanc stirpem observandi adeò meis antecelluerunt, ut tali assentiri sententiæ non dubitarem, quamvis frondis totius et præsertim vesicularum magnitudine tantum inter se discrepant quantum cuivis utriusque specimina modò singularia lustranti scrupulos facillè injiceret.

- |                                     |   |   |   |    |
|-------------------------------------|---|---|---|----|
| a. <i>F. pilulifer</i> , magn. nat. | - | - | - | -  |
| b. frondis pars, magn. auct.        | - | - | - | 6. |



*Fucus pilulifer*, stem filiform, compressed, pinnated; branches alternate, simple; leaves narrow, linear, dichotomous, entire; vesicles spherical, petiolated; petioli simple.

*β. major*; vesicles slightly attenuated at each end, and producing leaves at their apices.

Both varieties are found in the Harbour at Nangasaki. Dr. Horner.

*Perennial?*

ROOT, I have not yet seen.

FROND, two or three feet, or more, long, perhaps even considerably longer, as I have at present observed nothing that indicated any proximity to a base, furnished with a compressed two-edged stem, which preserves every where an uniform width of nearly a line, and is, at least in my specimens, undivided, but beset throughout its whole length with branches disposed in a spirally alternate order, separated from each other by intervals of about an inch, horizontal, flexuose, simple, scarcely two inches long, similar to the stem, except that they are twice as narrow, and bearing leaves and vesicles; leaves growing only upon the branches, placed rather loosely, alternate, between horizontal and patent, sessile, flat, linear, about an inch long, and half a line wide, three or four times dichotomous, provided with a thin blackish midrib, quite entire at their margins; vesicles scattered over the branches, from three to seven upon each, generally situated at the axillæ of the leaves, spherical, of the size of the fructification of *Pilularia globulifera*, and not unlike it, externally smooth, internally quite hollow, supported upon a flat petiolus two or three lines in length.

FRUCTIFICATION, at present unknown.

COLOR, in the leaves and vesicles olive-green, tinged with brown, in the stem darker; when dry, everywhere blackish.

SUBSTANCE, coriaceous and flexible in the stem, in the leaves thin and almost membranaceous, throughout the whole plant weak and flaccid.

*β* differs in the greater magnitude of all its parts, which is equal to double that of *α*; it has also much fewer vesicles, so that seldom more than one is observable on the same branch; the form of these is between elliptical and spherical, and they are attenuated at each extremity; their size is not less than that of the seeds of *Pisum sativum*, and they are constantly terminated with a leaf similar to the others, though this in some instances, from being broken off, appears only like a short mucro.

OBS. When dried the plant does not adhere in the least to paper.

Had not the name of *F. Pilularia* been unfortunately bestowed long since by Gmelin upon a very different species of Fucus, and one that, according to his figure, seems to have very little right to it, I should undoubtedly have wished to have seen it appropriated to the present, which not only resembles the *Pilularia globulifera* in the form of its vesicles, as is above mentioned, but, also from their situation, and from something in its general habit, seems to lay peculiar claim to such an appellation. In spite of the fructification being unknown, there can be no hesitation about referring this plant to the tribe of *F. natans*, with the individuals constituting which, it agrees in its mode of growth, and in every other essential character, though it differs from them in the form of its repeatedly divided leaves, which are in this respect not unlike those of *F. mucronatus*. In this latter Fucus, however, and its congeners, no real leaves can be properly said to exist, the parts that are at first flat and wear the resemblance of leaves, being nothing more than the beginning of branches, into which they soon naturally swell, while in *F. pilulifer* they seem constantly to preserve their original appearance, without being subject to any change whatever. The two varieties, above described, were sent me as the same species by Professor Mertens, whose opportunities of examining this Fucus have been so much superior to mine, that I have felt no hesitation in following his opinion, though the difference in their general size, and particularly in the size of their vesicles, might reasonably excite doubts in the mind of any botanist who had seen no more than single specimens of each.

a. *F. pilulifer*, natural size.

b. part of the frond, magnified - - - 6.





*Fucus piluliferus.*







*Fucus*, caule filiformi, terete, pinnato; ramis alternis, simplicibus; foliis lineari-spatulatis, sub-integerrimis, enervibus; vesiculis pyriformibus, mucronulatis, sub-sessilibus; receptaculis cylindraceis, solitariis.

HABITAT in mari Coreano. D. Horner.

Perennis?

RADIX nondum a me visa.

FRONS instructa caule terete, filiformi, pennae corvinæ crassitie, (sed quàm sit longus, et an divisus necne dicere nequeo,) ramis obsito spiralitèr alternis, pollicem unum alterumve longis, simplicibus, horizontalitèr patulis, caulis similibus, nisi quòd triplo sint tenuiores, infernè nudis, vel tantummodò petiolorum diffractorum reliquiis exasperati, supernè foliis, vesiculis, fructuque densè obsiti; folia in ramis, præsertim juxta apices, frequentia, undique imbricata, nervi venarumque expertia, figuræ inversè lanceolatae, apice plerumque lenitèr rotundata, quandoque autem acutiuscula, basi in petiolum brevem teretiusculum attenuata, margine nunc integerrima, nunc hic illic enormitèr minutè denticulata, superficie sparsim nigro punctata; vesiculæ foliis copiosè immixtæ, nunc solitariae, nunc binæ ternæve, pyriformes, *Gymnostomi pyriformis* capsulis, operculo adhuc insidente, formâ haud absimiles, sed duplò majores, eæ ramorum basin versus maximæ, et figuræ magis ad sphaericam accedentis, reliquæ minores, et magis elongatæ angustatæque, omnes infernè in petiolum perbreve teretem attenuatæ, apice umbonatæ, umbone tenui, vix lineam longo, et nunquam, quantum vidi, sese in folium producente aut dilatante, extrinsecus læves, intus omninò vacuæ.

FRUCTIFICATIO ramis, precipuè foliorum ad alas, innascens, e receptaculis constat cylindraceis, plerumque solitariis, apices versus levitèr attenuatis, obtusiusculis, duas circitèr lineas longis, sessilibus, † poris minutissimis ubique pertusis, sub quibus latent semina atra, figuræ haud certæ, limbo nullo cincta, nec in tuberculis sita, sed serie simplice juxta peripheriam, sicut in *F. lumbricali*, disposita.

COLOR in caule nigricans, cætera fulvescens, ubique luridus et nitoris prorsus expers.

SUBSTANTIA caulis ad ligneam accedens, attamen pulposa, ramorum tenera et succosa, foliorum et vesicularum cartilagineo-membranacea, flaccida, tenuis.

Obs. Exsiccata chartæ nequaquàm adhæret, sed caulis ramique tum insignitèr contrahuntur, et rugosi fiunt.

Costæ folia percurrentis absentia notam certam, et cuius, vel in sterilibus, satis obviam suppeditat, quâ *Fucus* hic depictus, unâ cum insequente, et aliquot aliis, quos nondum descriptos e mari Coreano simul retulit D. Horner, ab *F. natantis* familiâ primo statim aspectu dignoscuntur. Discrepant etiam in hoc ab *F. Horneri*, suprâ depicto, t. 17, cujus fructus omninò idem, nisi quòd *F. fulvelli* et *F. pallidi* semina magis ad ea *F. lumbricalis* formâ coloreque accedant, et illorum instar in tres partes demùm dehiscere videantur. Dubitationi nullus datur locus quin, quum Fuci in plura dispertientur genera, hæc stirpes olim familiam Naturæ convenientissimam constituent, quæ *F. natantis* et affinium quoad formam simillima, erit tamen ab iis per fructificationem disjuncta. Inest etiam in omnium texturâ aliquid proprium atque peculiare quod verbis capi nequit; et color, si non cunctis idem, ab eo Fucorum reliquorum differt: folia verò, quod habent cum *F. natante* commune, neutiquàm in ramos transeunt. Vesicularum foliorumque forma *F. fulvellum* a congeneribus distinguit. Sub *F. fulvescentis* nomine misit Mertensius; quod cum nomen esset ab Espero jamdudum speciei diversissimæ inditum hic *fulvello* mutavi.

a. <i>F. fulvellus</i> , magn. nat.	
b. <i>rami pars</i> , magn. auct.	- - - 6.
c. <i>receptaculum horizontalitèr dissectum</i>	- - - 3.
d. <i>semina</i>	- - - 1.

\* Videntur hæc puncta quiddam in se peculiare habere, et differre cum ab iis *F. natantis* et congenerum, quorum plurima a receptaculorum poris nondum clausis originem ducunt, tum ab iis *F. serrati*, *F. vesiculosi*, et aliorum, quæ fibras minutissimas emittentia forsân plantæ alende inserviunt.

† Non obstant hi pori quominus receptacula sint extrinsecus prorsus teretia, et nequaquàm hic illic, sicut in *Fucis propriis*, torulosa.



*Fucus fulvellus*, stem filiform, cylindrical, pinnated; branches alternate, simple; leaves lineari-spatulate, nearly entire, nerveless; vesicles pyriform, mucronated, sub-sessile; receptacles cylindrical, solitary.

In the Streights of Corea. Dr. Horner.

Perennial?

ROOT, I have not yet seen.

FROND, provided with a cylindrical, filiform stem, (about the length of which, or its being branched or not, I am unable to say any thing,) as thick as a crow's quill, beset with alternate branches, disposed in a spiral manner, an inch or two long, simple, between horizontal and patent, similar to the stem, except that they are not more than a third of its thickness, towards their lower part either naked, or only rough with the remains of broken petioli, but upwards thickly clothed with leaves, vesicles, and fructification; leaves numerous, especially towards the extremities of the branches, imbricated on all sides, destitute of midrib or veins, of an inversely lanceolate shape, for the most part slightly rounded at their apices, but sometimes sharpish, attenuated at their base into a short sub-cylindrical petiolus, their margins entire in some specimens, in others minutely and irregularly denticulated, their surface marked with scattered black \* dots; vesicles plentifully mixed with the leaves, in some cases solitary, in others, growing two or three together, pyriform, in appearance not unlike the capsule of *Gymnostomum pyriforme*, while still covered with its operculum, but twice as large, those placed towards the base of the branches largest, and most approaching to a spherical shape, the others smaller, more elongated, and more narrow, all of them tapering at their base into a very short cylindrical petiolus, and umbonated at their apices with a thin mucro, which is scarcely a line long, and never, as far as I have seen, lengthens or widens into a leaf; externally they are smooth, and internally completely empty.

FRUCTIFICATION, placed upon the branches, principally at the axillæ of the leaves, consisting of sessile, cylindrical, mostly solitary, receptacles, slightly attenuated at their extremities, but bluntish, every where perforated with most minute † pores, under which lie black seeds, of no fixed shape, and neither surrounded by a limbus, nor disposed in tubercles, but arranged in a single row immediately under the surface, as in *F. lumbricalis*.

COLOR, blackish in the stem, in other parts a pale tawny brown, every where lurid, and quite destitute of gloss.

SUBSTANCE, of the stem somewhat ligneous, but soft and juicy, of the branches tender and full of moisture, of the leaves and vesicles between cartilaginous and membranaceous, flaccid and thin.

Obs. In drying it does not adhere in the least to paper, but the stem and branches shrink remarkably, and become wrinkled.

The Fuci which are the subject of the present and the following plate, together with a few others, that were collected at the same time by Dr. Horner in the Streights of Corea, but are not at present described, may immediately and satisfactorily be distinguished from the family of *F. natans*, even when barren, by the circumstance of their leaves being completely destitute of any appearance of a midrib; in which respect they differ also from *F. Horneri*, already figured in this work, t. 17., with which they agree in their fruit, except that the seeds of *F. fulvellus* and *F. pallidus* approach in their form and color still more closely to those of *F. lumbricalis*, and seem, like them, ultimately to split into three parts. There can be little doubt but that, when the Fuci shall be separated into several genera, founded upon the fructification, the only certain mark of generic distinction, these plants will hereafter form an extremely natural genus, separated from *F. natans* and its affinities, by means of their fruit, though closely allied to them in point of external appearance, and strikingly so in the circumstance of the leaves never growing into branches. There is also a strong peculiarity in their texture, which I feel it impossible to define by words, but which will be allowed, by those Botanists who are acquainted with them, to furnish a striking characteristic of the whole family. The present species is distinguished from its congeners by the shape of the vesicles and the leaves: it was sent me by Professor Mertens under the name of *F. fulvescens*, a name previously appropriated by Dr. Esper to an entirely dissimilar plant, on which account I changed it to *F. fulvellus*, retaining, as far as I was able, the original intention of my valued friend.

- |  |   |   |   |    |
|--|---|---|---|----|
| a. <i>F. fulvellus</i> , natural size. |   |   |   |    |
| b. part of a branch, magnified         | - | - | - | 6. |
| c. receptacle cut through horizontally | - | - | - | 3. |
| d. seeds                               | - | - | - | 1. |

\* These dots seem to have something peculiar in their nature, and to be different, as well from those of *F. natans* and its congeners, the greater part of which originate from the unclosed pores of the receptacles, as from those of *F. serratus*, *F. vesiculosus*, and others, out of which grow tufts of minute white fibres, that probably contribute towards the sustenance of the plant.

† These pores do not prevent the exterior of the receptacles from being completely cylindrical and even, and by no means swollen in places, as in the *Fuci propii* of Weber and Mohr.





*Fucus fulvellus.*







*Fucus*, caule filiformi, compresso, pinnato; ramis sub-alternis, simplicibus; foliis elliptico-linearibus, integerrimis, enervibus, pertusis; vesiculis sphaericis, petiolatis; receptaculis cylindraceis, solitariis.

HABITAT in mari Coreano. D. Horner.

*Perennis?*

RADIX callus parvus, explanatus, nigricans.

FRONS instructa caule sesquipedali et ultrâ, e plano compresso, ancipiti, basi ferè lineam lato, et inde usque ad apices adeò sensim attenuato ut potiùs ubique æqualem diceret, indiviso, sed per totam longitudinem, excepto quâ radici proximus, ramis obsito; *rami* plani, filiformes, semilineam lati, distichi, horizontalitèr patuli, plerumque, nequaquam tamen semper, alterni, intervallis sejuncti brevibus, vix unguicularibus, simplices, inferiores longiores, et dodrantales, vel pedales, inde gradatim breviores ut summi vix duos pollices æquent, cuncti folia, vesiculas, fructumque ferentes: *folia* in ramis laxè sparsa, ut sit spatium inter singula ferè semiunguiculare, disticha, sub-alterna, sessilia, linearia, aut elliptico-linearia, acutiuscula, semiunguem vel unguem longa, et lineam vel sesquilineam lata, nervi venarumque expertia, sed poris majusculis plerumque pertusa, margine integerrima; *vesiculæ* foliis immixtæ, haud ita numerosæ, sphaericæ, *piperis nigri* granorum magnitudine, petiolis brevissimis, planis fultæ, extrinsecùs læves, intùs omninò vacuæ.

FRUCTIFICATIO receptacula solitaria, cylindracea, semiunguem longa, ramorum nunc ad apices nunc ad latera sita, pedunculis tenuibus, bi- tri-linearibus, vel etiam pollicaribus insidentia, extrinsecùs lævia, æqualia, et poris nullis pertusa, intùs semina foventia plurima, fusca, enormitèr subrotunda, nequaquam limbo cincta:—si receptaculum horizontalitèr dissecetur, semina in tubercula subrotunda obsoleta conglomerari videntur; sed hoc neutiquàm in omnibus ex æquo manifestum.

COLOR foliorum et vesicularum pallidè lutescens, fusco immixtus, et sub-diaphanus, caulis aliquantùm intensior, receptaculorum fusco-nigricans.

SUBSTANTIA caulis et ramorum cartilaginea, foliorum et vesicularum membranacea et tenuissima, ubique debilis et flexilis.

Obs. Exsiccata caulis et receptacula minimè, ut in præcedente, contrahuntur, vel rugosi fiunt, sed contrà tota stirps faciem lævem etiam tunc servat:—chartæ haud adhæret.

Omne illud, quicquid sub *Fuco* præcedente de ejus indole, fructu, affinitatibusve memoratur, jure non minus æquo ad hunc pertinet, cujus vesiculæ eas *F. natantis* formâ magis referunt, et cujus folia illud in se proprium habent, quòd pori in foraminula non rarè dilatati dehiscant, quorum margines nigricantes faciem præ se ferunt eandem semiustam in iis *F. Agari* notabilem, quâ de re neque in uno nec in altero e casu modò pendere, sed potiùs aliquid ipsi frondis indoli insitum designare verisimillimum apparet. Per receptacula ubique extrinsecùs clausa neque meatibus ullis pertusa videtur *F. pallidus* arctiùs *F. Horneri* quàm *F. fulvello* esse affinis, dum per semina in tuberculis posita neque serie simplice juxta peripheriam disposita, dummodò se res ita verè habeat, ab utroque recedit. Ut verum tamen fatear tuberculorum vestigia adeò obsoleta apparuerunt ut nihil sit pro certo de iis proferendum, et fortasse hæc seminum dispositio receptaculorum medium versus tantummodò e fructificationis ætate nimium propectâ pependit, quoniam idem ferè de *F. lumbricali* (descriptione et icone jam in hoc opere evulgatis) nuperrimè observavit vir amicissimus, D. G. R. Leathes, qui me, cùm per literas tum per exemplaria missa, certiore fecit, semina, fructu deliquescente, mutare situm, et per totam receptaculorum substantiam diffundi; de quo tamen erit plenius in alio disceptandum loco, quum omnia quæcunque de *Fucorum* fructificatione hucusque innotuerunt in medium proferre conabimur.

a. <i>F. pallidus</i> , magn. nat.					
b. <i>rami pars</i> , magn. auct.	-	-	-	-	6.
c. <i>folium</i>	-	-	-	-	5.
d. <i>receptaculum horizontaliter dissectum</i>	-	-	-	-	3.
e. <i>semina</i>	-	-	-	-	1.



*Fucus pallidus*, stem filiform, compressed, pinnated; branches mostly alternate, simple; leaves between elliptical and linear, entire, nerveless, perforated; vesicles spherical, petiolated; receptacles cylindrical, solitary.

In the Streights of Corea. Dr. Horner.

Perennial?

ROOT, a small, expanded, blackish, callous disk.

FROND, provided with a stem a foot and half and more long, between flat and compressed, two-edged, nearly a line wide at the base, and thence to the apices so imperceptibly narrowing, that it may almost be called filiform, undivided, but beset with branches throughout its whole length, except in the part nearest to the root; branches flat, filiform, half a line wide, distichous, between horizontal and patent, in general, but by no means constantly, alternate, separated by intervals of scarcely half an inch each, simple, the lowest longest, and nine inches or a foot in length, thence gradually shortening, so that the upper ones do not exceed two inches, all of them furnished with leaves, vesicles, and fructification: leaves so loosely scattered over the branches, that there is almost the space of a quarter of an inch between each, distichous, sub-alternate, sessile, linear, or between elliptical and linear, rather sharp, from a quarter of an inch to half an inch long, and from a line to a line and half wide, destitute of midrib or veins, but generally perforated with largish pores, their margins quite entire; vesicles mixed with the leaves, not very numerous, spherical, of the size of pepper-corns, supported upon very short, flat petioli, extremely smooth, internally quite hollow.

FRUCTIFICATION, solitary, cylindrical receptacles, a quarter of an inch long, situated both on the ends and sides of the branches, and placed upon peduncles, which in length vary from two or three lines to an inch, in their outside smooth, even, and not perforated with any pores, but within containing numerous brown irregularly roundish seeds, unprovided with any limbus:—upon cutting a receptacle through, in a horizontal direction, the seeds appear to be collected into obsolete roundish tubercles, but this appearance is far from equally obvious in every specimen.

COLOR, of the leaves and vesicles, pale yellowish, tinged with brown, and semitransparent, of the stem, somewhat darker, of the receptacles, blackish brown.

SUBSTANCE, cartilaginous in the stem and branches, membranaceous and very thin in the leaves and vesicles, every where weak and flexible.

OBS. In a dried state the stem and branches are by no means contracted and wrinkled, as in the preceding species, but on the contrary, the whole plant even then preserves its natural smoothness:—it does not adhere to paper.

The whole of what has been mentioned under the preceding *Fucus*, with regard to its nature, its fructification, and its affinities, may be considered as scarcely less applicable to the present, which, in addition to the peculiarities there noticed, has vesicles still more like those of *F. natans*, and leaves remarkable for the circumstance of their pores not uncommonly widening into small cavities surrounded by a blackish margin, with the same singed appearance as those of *F. Agarum*; on which account I am led to conclude that these perforations are neither in the one species nor in the other the effect of accident alone, but are most probably the result of some property essentially inherent in the nature of the plants. The completely closed receptacles of *F. pallidus* seem to indicate a more near affinity in point of fructification to *F. Horneri* than to *F. fulvellus*, while the apparent existence of immersed tubercles, and the disposition of the seeds in these, instead of their being situated in a single row immediately under the epidermis, would tend to remove it equally from both. I must, however, candidly confess that I entertain the greatest doubts how far these tubercles have any real existence; and that, in all the receptacles which I have dissected, the traces of them have been so faint, that I am rather inclined to believe that the arrangement of the seeds towards the centre of the capsules may depend altogether upon the advanced age of the individual; since the Rev. G. R. Leathes has observed something similar in *F. lumbricalis*, subsequently to the publication of that species, and has shewn me, by his observations and specimens, that, as the fructification decays, the seeds lose their original position, and become scattered indifferently through the whole substance of the receptacles; upon which subject I shall have occasion to enlarge in the general observations that I propose prefixing to this work respecting the fruit of the Fuci.

- |   |   |   |   |    |
|---|---|---|---|----|
| a. <i>F. pallidus</i> , natural size.   |   |   |   |    |
| b. part of a branch, magnified          | - | - | - | 6. |
| c. leaf                                 | - | - | - | 5. |
| d. receptacle, cut through horizontally | - | - | - | 3. |
| e. seeds                                | - | - | - | 1. |





*Fucus pallidus.*







*Fucus*, fronde membranaceâ, tenerrimâ, planâ, venosâ, sub-dichotomâ; ramis sub-linearibus, apice rotundatis, margine crispo-lacinulatis, undulatis: tuberculis hemisphaericis, immersis, seminibusque nudis in maculas oblongas dispositis.

*Fucus laceratus*. Gmelin, *Hist. Fuc.* p. 179. t. 21. f. 4. *Syst. Nat. Ed. Gmel.* II. p. 1387. Linn. *Trans.* III. p. 155. (excl. var.  $\gamma$ , ejusque synonymis.) *Ner. Brit.* p. 77. t. 13. *Syn. Fuc. I.* p. 154. *Eng. Bot.* XV. t. 1067. *Fl. Fr. Ed. 2da.* II. p. 28. (excl. var.  $\delta$ , et  $\epsilon$ , eorumque synonymis, necnon syn. *Stack.*) *Fl. Lus.* II. p. 437.

*F. crispatus*. *Fl. Ang.* p. 580. Linn. *Syst. Nat.* II. p. 1718. *Syst. Nat. Ed. Gmel.* II. p. 1387. Wulfen, in *Jacq. Coll.* III. p. 162. t. 16. f. 2. Wulfen, *Crypt. Aquat.* n. 11. Esper,  *Ic. Fuc. I.* p. 130. t. 90. (excl. syn. *Burb. et Fl. Dan.*) *Fl. Norv.* II. p. 32.

*F. cristatus*. With. IV. p. 103. (excl. syn. *Fl. Dan.*)

*F. endiviaefolius*. *Fl. Scot.* p. 948. t. 32. With. IV. p. 103.

*F. volubilis*. Gmelin, *Hist. Fuc.* p. 180. (excl. syn. omnibus.)

\* *F. tener, gelatinosus, per siccitatem spiralis*. Rait *Syn.* p. 49. n. 43.

*F. gramineus, parvus, ramosissimus, fuscus*. Buddle, *H. S. I. fol.* 2.

$\beta$ . *papyraceus*; ramis ramulisque linearibus, tenuioribus, sub-sinuatis.

*F. laceratus*.  $\beta$ . Linn. *Trans.* III. p. 155. *Syn. Fuc. I.* p. 154.

$\gamma$ . *granateus*; fronde subrotundâ; ramis sursum dilatatis, sub-indivisis, apice lobatis.

*F. laceratus*.  $\gamma$ . *Syn. Fuc. I.* p. 154.

*F. granateus*. Lamouroux, *Diss. Fuc.* p. 68. t. 33. f. 3, 4.

$\delta$ . *elegans*; fronde subrotundâ; ramis sursum dilatatis, repetito-divisis, apice sinuatis.

$\epsilon$ . *fimbriatus*; ramis linearibus, margine proliferis.

$\zeta$ . *uncinatus*; ramis linearibus, angustis; apicibus cartilagineis, uncinatis.

$\eta$ . *lingulatus*; ramis sursum dilatatis, apice palmatis; segmentis simplicibus, oblongo-lanceolatis, semina lineis duabus parallelis disposita ferentibus.

$\theta$ . *multifidus*; ramis sub-linearibus, repetito-divisis; segmentis ultimis plurimis, angustis, elongatis, ramosis.

$\iota$ . *incrassatus*; ramis sub-linearibus, planiusculis, apicibus bifurcis, furcis patentibus, lineari-lanceolatis, acutis.

HABITAT  $\alpha$  in Britanniarum oris, haud infrequens.—In Franciæ oris Septentrionalibus, copiosè. Decandolle.—Tergesti. Baro de Wulfen.—Ad ostia Tagi et Durii. Brotero.— $\beta$  apud Ilfracombe in comitatu Damnoniensi. Goodenough et Woodward.—Apud Torquay, et in Cornubiâ. D<sup>na</sup> Griffiths.— $\gamma$  inter rejectamenta maris apud Yarmouth.—In Insulæ Vectis littoribus. D. G. R. Leathes.— $\delta$ ,  $\epsilon$ , et  $\iota$ , apud Bantry Bay. D<sup>na</sup> E. Hutchins.— $\zeta$  juxta Plymouth. D<sup>na</sup> E. Hill.— $\eta$  apud Tenby. Comitissa de Aylesford.—In Devoniæ oris, D<sup>na</sup> Griffiths.—In littoribus comitatûs Antrim, in Hiberniâ. D. Scott.

Perennis? † Jul.—Oct.

RADIX callus exiguus, explanatus.

FRONDES vel solitariae, vel ex eadem basi plurimæ, planæ, costâ nullâ percursæ, sed venis aliquot, frondi nunc concoloribus, nunc magis obscuris, tenuibus, sub-parallelis, a radice incipientibus, et usque ad apices attingentibus instructæ, longitudine a palmari ad dodrantalem, latitudine ab unguiculari ad sesquiunguicularem variabiles, ubique propemodum lineares, ab ipsâ basi plerumque ramosæ, sed hoc nequaquam certum; *rami* nunc, et quidem sæpissimè omnes dichotomi, furcis erecto-patulis, sexies septiesve repetitis, intervallo inter singulas circiter pollicari, nunc bini ternive ordine palmato dispositi, utrumque non rarè in eodem individuo occurrit, quandoque etiam, quod plerumque juxta apices occurrit, frons lacinii alternis, brevibus, decurrentibus sparsim obsita, apices rotundati, margines undulati, in his integerrimi, in illis crispo-lacinulati, vel minutissimè crenulati, ut ciliati appareant, vel processibus exiguis ovatis fimbriati, vel, præsertim extremitates versus, levitè sinuati.

FRUCTIFICATIO tubercula hemisphaerica, in ipsâ frondis substantiâ immersa, hinc gibbosa, illinc plana, coloris reliquâ fronde intensioris, *Brassicæ Rapæ* seminum ferè magnitudine, diaphana, nunc ubique per ramos superiores sparsa, nunc juxta margines modò sita, et nunc tantummodò in processibus marginalibus disposita; semina in his plurima, enormitèr subrotunda, intensè rubra; reperiuntur quoque non rarè semina, jam memoratis majora, et sub lente in tres partes dehiscentia, iisdem quibus tubercula frondis partibus imposita, membranâ nullâ oblecta, sed in formam rotundam congesta, unde oculo mermi vix sunt a tuberculis dignoscenda.—Quidnam est de his judicandum?—anne est huic stirpi, sicut *F. Hypoglosso* et aliis, fructificatio duplex?—suadet quidem analogia, sed obstat seminum forma:—an semina, membranâ deperditâ, nuda frondi insident, et in majorem molem excrescunt?—In priorem ego sententiam propendeo.

COLOR ruber, nunc dilutior, et ad roseum, nunc intensior, et ad fuscum accedens, nunquam non diaphanus; *exsiccata* intensior; *marcescentis* sordidè lutescens.

SUBSTANTIA membranacea, tenuissima, et tenerrima, ut rarè inveniatur exemplar, nisi aliquâ parte laceratum, unde nomen.

Var.  $\beta$ , quam Goodenovii Woodwardique auctoritati obtemperans recenseo, “omnia,” ut eorum verbis utar, “cum  $\alpha$  communia habet, at ab omni parte minor et tenuior.—In ramulos plurimos sæpiùs dividitur.—Hi autem non rarè perbreves sunt, adeo ut rami sinuosi potiùs quam ramosi videntur.”

Forma

\* Hoc synonymon et insequens amicissimi Dillwynii fide, qui exemplaria in Herbario Buddleano vidit, citantur.

† Senel etiam mense Martio fructiferam legi.



Forma frondis in var.  $\gamma$  multum ab eâ præcedentium abludit, altitudine vix pollicem vel sesquipollicem superat, finditurque juxta basin in tres quatuorve ramos, basi angustatos, inde leviter dilatatos, integerrimos, nisi quod apice sint lobati, lobis oblongis rotundatis; color pulchrè roseus; substantia ut in  $\alpha$ .—Crescendi modo et formâ hæc varietas ad *F. laciniatum*, a quo color et textura diversissimus, accedit: speciem distinctam simulat, præsertim cum venæ non sint detegendæ, nisi luci objiciatur vel sub lente observetur. Lamourouxii synonymon, supra citatum, huc retuli Mertensii fide, qui utriusque exemplaria accepit. Icon tamen plantam nostram laud bene exprimit, et nihil \*tuberculum ab ipso depictorum simile unquam ego vidi.

Var.  $\delta$  est præcedente aliquantùm major, et longè ab illâ diversa, quamvis peripheria sit ferè eadem: finditur ad ipsam basin in ramos multos ortu tenuissimos, hinc sensim ampliatos, iterum atque iterum palmatos, segmentis brevissimis, apice sinuatis; color infernè fusco-ruber, sursum versus dilutior, et quasi flavicante perfusus, unde stirps pulcherrimè bicolor; substantia ut in præcedentibus; venæ oculo inermi obsoletæ.

Var.  $\epsilon$  in eo modò ab  $\alpha$  discrepat, quòd ramos habeat, non, ut in illâ, ciliatos, sed aliis ramis, nunc simplicibus, nunc divisis, unguem ferè longis, per totam longitudinem vagè proliferis.

Var.  $\zeta$  in omnibus cum  $\beta$  convenit, excepto quòd multi ex apicibus, non tamen omnes, sint, falcis in formam, introrsum curvati, et, quòd maximè singulare, substantiam habeant cartilagineam, reliquâ fronde multoties crassiorem. Credit D<sup>na</sup> Hill plantam per hos alios Fucis inhaerere solere.

Ad *F. bifidi* var.  $\gamma$  formâ accedit var.  $\eta$ , cujus duo modò specimina a Borrero missa in præsens vidi: longitudo his sesquipollicaris, frondis figura et rami var.  $\gamma$  similes, sed apices palmati, segmentis plurimis elongatis, oblongo-lanceolatis, quibus imposita jacent semina, in duas maculas oblongas parallelas intervallo brevi cartilagineo et reliquâ fronde crassiore sejunctas, ut in *F. Hypoglosso*, congesta; substantia et color sicut in  $\alpha$ ; venæ obsoletæ.

Var.  $\theta$  per frondis apices in segmenta plurima elongata angusta repetito-ramosa ab  $\alpha$  differt: facies huic ob ramorum multitudinem singularis.

Annon var.  $\iota$  pro distinctâ specie sit habenda multum dubito, sed, cum *F. lacerati* varietatem putet D<sup>na</sup> Hutchins, acutissima harum plantarum indagatrix, hic in præsens posui. Longitudo ferè palmaris; latitudo trium linearum, ubique æqualis; rami constantèr dichotomi; margines planiusculi, integerrimi; apices bifurci, acuti; venæ obsoletæ; color dilutè ruber; substantia reliquis crassior:—inter *F. laceratum* et *F. bifidum* ambigit.

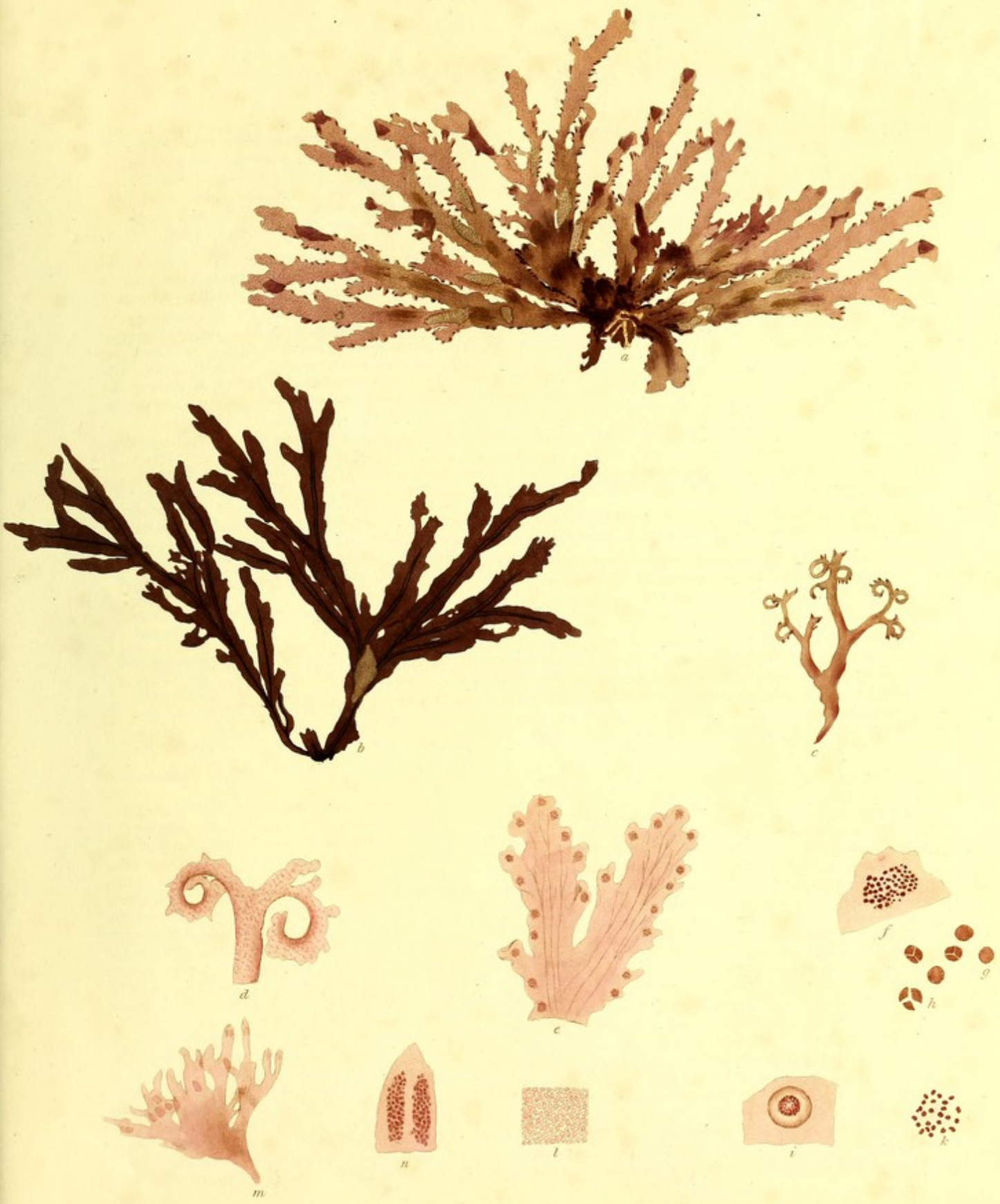
Obs. Habitus in stirpe recente mirè cripatus, ut Lightfootii nomen, *F. endiviaefolius*, sit aptissimum:—frons singulari modo repit, sese per margines saxis vel Fucorum majorum, quibus innasci solet, stipitibus affigens, nunquam tamen, quantum vidi, per hos sibimet ipsi hærens, in quo differt ab *F. bifido*:—exsiccata chartæ laxiusculè adhæret:—sub lente pulcherrimè est reticulata, ut, vitro maximè augente inspecta, *Confervam reticulatam* membranæ roseæ superimpositam referat:—venæ frondem percurrentes sunt in omnibus varietatibus notabiles, plantæque characterem maximè essentialem ministrant; nequaquam tamen sunt in omnibus ex æquo manifestæ, et in quibusdam, præsertim junioribus, non nisi lentis ope dignoscuntur.

Fuci, præ plurimis mutabilis, varietatibus jam in longum descriptis, pauca hic modò de synonymiâ adjiciam, relicturus characteres, per quos ab *F. laciniato*, *F. ulvoide*, et *F. bifido* dignoscitur, sub iis speciebus memorandos. Nomina supra citata satis superque ostendunt quantum fuit hæc stirps ab auctoribus vexata et cum aliis commista. Gmelini synonymon eâ de causâ dubium censet Mertensius, quia vir in describendo accuratissimus frondes ei *avenias* tribuat; quod tamen me paulum movet. Nonne enim idem dixerunt Hudsonus, Lightfootius, et Wulfenius, nonne Decandollius, nonne Goodenovius Woodwardisque, viri, si qui alii, summâ laude dignissimi, qui omnes has venas pariter prætermiserunt. Lamourouxii *F. laceratus*, quem pro novâ ille specie recenset, videtur mihi ad *F. Sarniensem* referendus, et sub hoc citavisse, nisi malè cautus neglexissem.

- |  |   |   |   |   |    |
|--|---|---|---|---|----|
| a. <i>F. laceratus</i> , obsoletè venosus, magn. nat.        | - | - | - | - | -  |
| b. exemplar aliud, coloris intensioris, et venis manifestis. | - | - | - | - | -  |
| c. var. $\zeta$ portio.                                      | - | - | - | - | -  |
| d. ejusdem apex, magn. auct.                                 | - | - | - | - | 6. |
| e. frondis apex, cum seminibus nudis                         | - | - | - | - | 6. |
| f. seminum congeries   | - | - | - | - | 4. |
| g. semina  | - | - | - | - | 2. |
| h. semen in tres partes fissum                               | - | - | - | - | 1. |
| i. tuberculum  | - | - | - | - | 4. |
| k. semina (fibris immixta?)                                  | - | - | - | - | 1. |
| l. portio frondis, ut structura reticulata appareat          | - | - | - | - | 2. |
| m. var. $\eta$ portio  | - | - | - | - | 6. |
| n. ejusdem apex  | - | - | - | - | 4. |

\* Dicit de his Lamourouxius, "Lorsque le tubercule commence à paraître, vu au microscope, il présente au sommet une petite pointe émousée; cette pointe grossit avec l'âge, s'ouvre et forme, quelques jours avant la maturité des semences, une couronne membraneuse, créno-dentée, presque semblable à celle des grenades."—*Diss. Fuc.* p. 69.





*Fucus laceratus.*







*Fucus laceratus*, frond membranaceous, very tender, flat, veined, mostly dichotomous; branches sub-linear, their apices rounded, margins lacinulated and waved; hemispherical tubercles immersed in the frond, and naked seeds collected into oblong clusters.

*Fucus laceratus*. Gmelin, *Hist. Fuc.* p. 179. t. 21. f. 4. *Syst. Nat. Ed. Gmel.* II. p. 1387. *Linn. Trans.* III. p. 155. (excl. var.  $\gamma$  ejusque synonymis.) *Ner. Brit.* p. 77. t. 13. *Syn. Fuc.* I. p. 154. *Eng. Bot.* XV. t. 1067. *Fl. Fr. Ed. 2da.* II. p. 28. (excl. var.  $\delta$ , et  $\epsilon$ , eorumque synonymis, necnon syn. *Stackh.*) *Fl. Lus.* II. p. 437.

*F. crispatus*. *Fl. Ang.* p. 580. *Linn. Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. Wulfen, in *Jacq. Coll.* III. p. 162. t. 16. f. 2. Wulfen, *Crypt. Aquat.* n. 11. *ESPER, Ic. Fuc.* I. p. 130. t. 90. (excl. syn. *Buxb. et Fl. Dan.*) *Fl. Norv.* II. p. 32.

*F. cristatus*. *With.* IV. p. 103. (excl. syn. *Fl. Dan.*)

*F. endiviaefolius*. *Fl. Scot.* p. 948. t. 32. *With.* IV. p. 103.

*F. volubilis*. Gmelin, *Hist. Fuc.* p. 180. ? (excl. syn. omnibus.)

\* *F. tener, gelatinosus, per siccitatem spiralis*. *Raii Syn.* p. 49. n. 13.

*F. gramineus, parvus, ramosissimus, fuscus*. *Buddle, H. S. I. fol.* 2.

$\beta$ . *papyraceus*; branches and ramuli linear, more narrow, sub-sinuated.

*F. laceratus*.  $\beta$ . *Linn. Trans.* III. p. 155. *Syn. Fuc.* I. p. 154.

$\gamma$ . *granateus*; frond roundish; branches widened upwards, mostly simple, lobed at the ends.

*F. laceratus*.  $\gamma$ . *Syn. Fuc.* I. p. 154.

*F. granateus*. *Lamoureux, Diss. Fuc.* p. 68. t. 33. f. 3, 4.

$\delta$ . *elegans*; frond roundish; branches widened upwards, repeatedly divided, sinuated at their apices.

$\epsilon$ . *fimbriatus*; branches linear, proliferous at their margin.

$\zeta$ . *uncinatus*; branches linear, narrow, their apices hooked, and cartilaginous.

$\eta$ . *lingulatus*; branches widened upwards, palmate at their apices, with simple segments, between oblong and lanceolate, producing seeds disposed in two parallel oblong lines.

$\theta$ . *multifidus*; branches nearly linear, repeatedly divided; the extreme segments very numerous, narrow, elongated, branched.

$\iota$ . *incrassatus*; branches nearly linear, flattish; apices forked, with patent acute segments, between linear and lanceolate.

Not uncommon on the shores of the British Isles.—On the Northern coast of France, plentifully. *Decandolle*.—At Trieste. *Baron de Wulfen*.—At the mouths of the Tagus and the Douro. *Brotero*.— $\beta$  at Ilfracombe, in Devonshire. *Goodenough and Woodward*.—At Torquay, and in Cornwall. *Mrs. Griffiths*.— $\gamma$  among the rejectamenta of the sea at Yarmouth.—Shores of the Isle of Wight. *Rev. G. R. Leathes*.— $\delta$ ,  $\theta$ , and  $\iota$  at Bantrey Bay. *Miss Hutchins*.—near Plymouth. *Miss Hill*.— $\zeta$  at Tenby. *Countess of Aylesford*.—Devonshire. *Mrs. Griffiths*.—Coast of the county of Antrim. *Dr. Scott*.— $\eta$  on the beach at East Bourne. *Mr. Borrer*.

*Perennial*. † July—October.

**ROOT**, a small, expanded, callous disk.

**FRONDS**, either solitary, or numerous from the same base, flat, unprovided with any midrib, but furnished with a few, thin, sub-parallel veins, which originate from the root and extend to the apices, and are sometimes of the same color as the frond, and sometimes darker; the length of the frond varies from three to nine inches, and its width from half to three quarters of an inch, it is every where nearly linear, and in general, but by no means constantly, is divided immediately close to the root; branches most frequently all dichotomous, with divisions seven or eight times repeated at intervals of about an inch, the segments being between erect and patent, but sometimes two or three are placed together in a palmate manner, and instances of both not uncommonly occur upon the same individual, sometimes too, but this is seldom observable except near the extremities, the frond is irregularly bordered with short, alternate, decurrent laciniae, the apices are rounded, the margins undulated, quite entire in some specimens, in others, curled and laciniated, and again in others most minutely crenulated, so as to appear ciliated, or fringed with small ovate processes, or, particularly towards the apices, slightly sinuated.

**FRUCTIFICATION**, hemispherical tubercles, immersed in the substance of the frond, and of a darker color than it, nearly as large as turnip-seed, transparent, either scattered irregularly all over the upper branches, or placed only near their edges, or confined simply to their marginal processes, containing several dark-red roundish seeds; other seeds, larger than these, and appearing under the microscope composed of three parts, are also not uncommonly found upon the same parts of the frond as the tubercles, which, from their being collected into round patches, they completely resemble to the naked eye, though they are destitute of any membranous covering.—Respecting these, I am at a loss what opinion to form, and whether to think that this plant is endowed, like *F. Hypoglossum*, and others, with a twofold fructification, or whether to believe that the seeds remain attached to the frond after the delicate membrane that covered them decays, and in that situation continue to increase in size.—The former of these opinions is most favourable to analogy, and I incline to it, though the shape of the seeds is not such as might in a similar case be expected.

\* This and the following synonym are quoted upon the authority of Mr. Dillwyn, who saw the specimens in Buddle's Herbarium.

† Once also I gathered it in fructification in March.



**COLOR**, red, in some specimens pale, and inclining to pink, in others darker, and tinged with brown, in all transparent; deeper when dry, and turning in decay to a dirty yellowish white.

**SUBSTANCE**, membranaceous, so extremely thin and tender, that plants are seldom met with free from injury, from which circumstance the name is derived.

The variety  $\beta$ , which I introduce upon the authority of Dr. Goodenough and Mr. Woodward, has, according to them, every thing in common with  $\alpha$ , but is in all its parts smaller and more thin:—it is generally divided into several ramuli, but these are not uncommonly so short, that the branches seem rather to be sinuose, than again branched.

The variety  $\gamma$ , differs extremely from the preceding ones in the form of its frond; its height scarcely exceeds an inch or inch and half, and it is divided near the base into three or four branches, narrow at their origin, and thence gradually dilated, quite simple and entire, except that at the apices they are lobed, with oblong rounded lobes: the color is a beautiful pink; the substance like that of  $\alpha$ .—In its mode of growth, and form, this variety approaches *F. laciniatus*, from which its color and texture are widely different: it looks like a distinct species, especially as the veins are seldom to be detected, except when the plant is held to the light, or examined under a microscope. The synonym of Lamouroux rests upon the authority of Professor Mertens, who has seen specimens both of his plant and of mine, of which latter his figure is not a happy representation in general, nor did I ever meet with any thing similar to the \* tubercles that he describes.

The frond of var.  $\delta$  is somewhat larger than that of the preceding variety, which it resembles in its outline, but by no means in other respects: it is cleft down to the very base into several branches, extremely narrow at their origin, but thence gradually widening, and repeatedly palmate, with very short segments, sinuated at their apices; the color at the lower part is a brownish red, which grows upwards more pale, and has a yellowish tinge, which adds greatly to the beauty of the plant; the substance is like that of the foregoing ones; the veins appear to the naked eye obsolete.

The variety  $\epsilon$ , differs from  $\alpha$  only in having its branches not ciliated; but irregularly proliferous throughout its whole length with other branches, either simple or divided, and nearly half an inch long.

The variety  $\zeta$ , agrees in every respect with  $\beta$ , except that several of its apices, but by no means all, are bent inwards like a sickle, and what is very remarkable, are of a cartilaginous substance much more thick than the rest of the frond. Miss Hill is of opinion that the plant fastens itself by means of these to other Fuci.

Of var.  $\eta$ , I have at present seen only two specimens, both sent by Mr. Borrer, which are in form not unlike *F. bifidus* var.  $\gamma$ ; their length is an inch and half; the shape of the frond and the branches resembles that of var.  $\gamma$ , but the apices are palmate, with numerous oblongo-lanceolate segments, upon which the seeds lie in two oblong parallel rows, as in *F. Hypoglossum*, separated by a narrow interval of a cartilaginous texture, and thicker than the rest of the frond; the substance and color are like those of  $\alpha$ ; the veins obsolete.

The variety  $\theta$ , differs from  $\alpha$  in having the apices of the frond cleft into numerous, elongated, narrow, and repeatedly branched segments, the multiplicity of which gives this plant a singular appearance.

With regard to var.  $\iota$ , I have great doubts whether it ought not to be regarded as a distinct species, but in referring it to *F. laceratus*, I follow the opinion of Miss Hutchins, who sent it to me, and whose knowledge of these plants is most accurate and extensive. Its length is three or four inches; its width three lines, every where equal; its branches constantly dichotomous; its margins nearly flat, and quite entire; its apices forked and acute; its color pale red; its substance thicker than the rest. It seems almost intermediate between *F. laceratus* and *F. bifidus*.

**Obs.** The habit of *F. laceratus* is, when fresh, extraordinarily curled, so that Lightfoot's name of *F. endiviaefolius* is peculiarly expressive:—the frond creeps in a singular manner, attaching itself by means of its edges to the rocks, or to the stems of the larger Fuci that it frequently grows upon, but never, as far as I have seen, thus adhering together, like *F. bifidus*, in different parts:—when dried it sticks slightly to paper:—it is so beautifully reticulated, that, under a powerful microscope, it looks like a specimen of *Conferva reticulata* laid upon a pink membrane:—the veins in the frond are to be seen in all the varieties, and afford the most essential character of the plant, but they are far from being equally observable in all, and in some, particularly in a young state, are scarcely distinguishable without a glass.

Having already described at considerable length the most striking varieties of this very changeable Fucus, I will merely subjoin a few remarks touching the synonymy, and reserve any observations upon the manner in which it differs from *F. laciniatus*, *F. ulvoides*, and *F. bifidus*, to be mentioned in the history of those species. How completely this plant has been perplexed by authors, and how frequently confounded with others, is obvious from the different names that have been assigned to it. Professor Mertens is inclined to regard Gmelin's *F. laceratus* as a doubtful synonym, because, contrary to his usual accuracy, he has described the frond as destitute of veins: this, however, I must confess, appears to me of little moment; for the veins have also been overlooked by Hudson, Lightfoot, Wulfen, and Decandolle, and even by Goodenough and Woodward, men whose accuracy of observation no one will call in question. The Fucus, which is named by Lamouroux *F. laceratus*, and is by him regarded as a new species, ought,

\* Respecting these, Lamouroux says, "Lorsque le tubercule commence à paraître, vu au microscope, il présente au sommet une petite pointe émoussée; cette pointe grossit avec l'âge, s'ouvre et forme, quelques jours avant la maturité des semences, une couronne membranée, crénelo-dentée, presque semblable à celle des grenades."—*Diss. Fuc.* p. 69.



in my opinion, to be referred to *F. sarniensis*, and would have been quoted above as a synonym of that plant, had it not unintentionally been omitted.

a. <i>F. laceratus</i> , specimen in which the veins are obsolete, natural size.	
b. another specimen, of a darker color, with veins very apparent.	
c. portion of var. ζ,	
d. apex of the same, magnified	- - - - - 6.
e. apex of the frond, with naked seeds	- - - - - 6.
f. cluster of seeds	- - - - - 4.
g. seeds	- - - - - 2.
h. seed split into three parts	- - - - - 1.
i. tubercle	- - - - - 4.
k. seeds (mixed with fibres?)	- - - - - 1.
l. portion of the frond, to shew the reticulated structure	- - - - - 2.
m. part of var. η	- - - - - 6.
n. apex of same	- - - - - 4.

## 69.—FUCUS LACINIATUS.

*Fucus*, fronde cartilagineo-membraceâ, planâ, enervi, ramosâ; ramis dilatatis, apice palmatis, obtusis, marginibus planis, crenatis, proliferisque; tuberculis hemisphæricis, marginalibus, immersis; seminibusque nudis ubique sparsis.

*Fucus laciniatus*. *Fl. Ang.* p. 579. *Fl. Scot.* II. p. 947. *With.* IV. p. 102. *Syn. Fuc.* I. p. 161. *Eng. Bot.* XV. t. 1068. *ESPER, Ic. Fuc.* II. p. 63. t. 140.

*F. ciliatus*. *GMELIN, Hist. Fuc.* p. 176. t. 21. f. 1. (excl. syn. omnibus.)

*F. crispus*. *ESPER, Ic. Fuc.* I. p. 41. t. 18. (excl. syn. omn. præter Gmel.)

*F. crispatus*. *Ner. Brit.* p. 92. t. 15.

*F. laceratus*. γ. *Linn. Trans.* III. p. 156.

*F. laceratus*. δ. *Fl. Fr. Ed. 2da.* II. p. 28.

β. *ovalifolius*; fronde margine proliferâ, processibus elliptico-subrotundis, simplicibus, brevissimè petiolatis.

**HABITAT** α in Britanniarum oris, haud ita infrequens.—In Galliæ Septentrionalis littoribus. *Decandolle.*—g apud Port-Rush, in comitatu Antrim, in Hiberniâ. *D. Scott.*

**Perennis.** Feb.—Jul.

**RADIX** callus discoideus, explanatus, nigricans.

**FRONDES**, nunc solitariae, nunc ex eâdem basi plurimæ, nervi venarumque omninò expertes, longitudine plerumque circiter tripollicares, aliquandò autem semipedales, et semel atque iterùm dodrantes vidi, ad ipsam radicem divisæ, ramis tribus vel quatuor basi aliquantùm attenuatis, inde sensim, quod tamen magis in quibusdam individuis quàm in aliis valet, lenitèr dilatatis, latitudinis, ubi maxima, plus quam unguicularis, intervalloque brevi divisis, ordine vel dichotomo, vel, ut sæpiùs accidit, palmato, deinceps iterùm atque iterùm simili ratione ramosis, ita ut totius frondis explanatæ peripheria circuli segmentum majusculum exhibeat; apices nunquam non palmati, segmentis brevibus, reliquâ fronde angustioribus, linearibus, levitèr rotundatis, vel sub-truncatis; margines plani, ne minimum quidem crispatis undulatis, in his integerrimi et nudi, in illis minutè crenati, in aliis demùm sparsim proliferi, surculis ortu subrotundis, basi angustissimis, mox elongatis, linearibus aut dilatatis, et palmatis.—Exemplaria vetusta ab aliis in hoc discrepant, quod ramos habeant longiores, sub-divaricatos, vix aut ne vix sursùm dilatatos, ita ut tota frons, apicibus demptis, sit linearis.

**FRUCTIFICATIO** tubercula hemisphærica, processibus tantummodò marginalibus immersa, exigua, frondi fere concolora, seminum rubrorum subrotundorum minutissimorum congeriem intus foventia.—Præter hæc sunt semina enormitèr sphærica, saturatè rubra, nuda, per frondis superficiem, nullo ordine servato, sparsa, sed ita parva ut oculum inermem penitus fugiant.

**COLOR** inter sanguineum et coccineum medius, perpulcher, nequaquàm diaphanus, fugacissimus; *exsiccata* multo intensior, magisque ad sanguineum accedens, sæpe quoque nitens; *in aquâ dulci servata* citò fit pallidior, lividoque immixtus; et *solî objectæ* protinùs sordidè albescit.

**SUBSTANTIA** membranaceo-cartilaginea, crassiuscula, tenaxque; siccitate fit tenuior magisque membranacea.

**Var.** β formâ tantum ab α recedit ut vix hujus loci credidissem, nisi vir acutissimus, D. Scott, qui recentem legit, ad



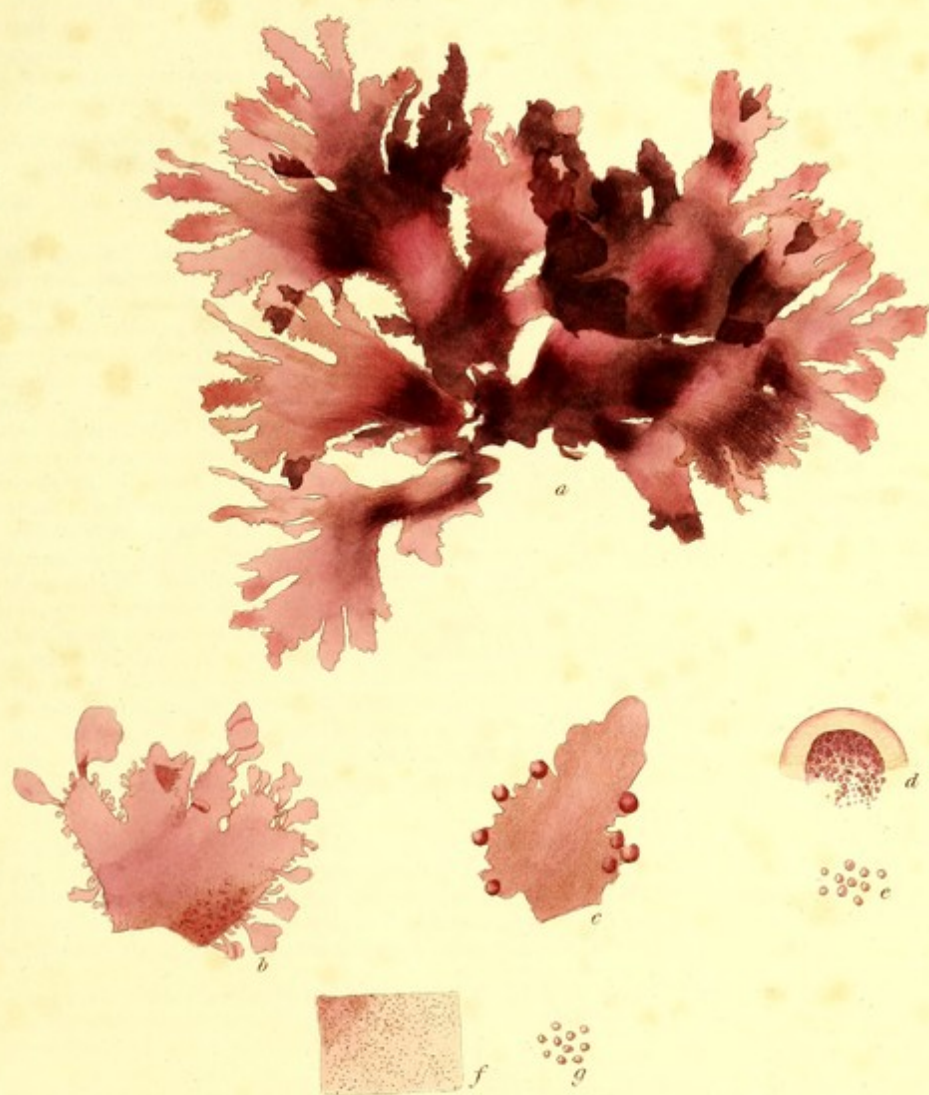
ad *F. laciniatum* referendam docuisset:—color et substantia idem, sed frons in duas modò lacinias oblongas, hanc simplicem, illam bifurcam, finditur, utramque margine proliferam, foliis simplicibus, elliptico-subrotundis, sesquiunguem longis, et unguem latis, margine integerrimis, petiolo angusto, vix semilineari fultis.

OBS. Exsiccata chartæ arcetè adhæret:—frons sub lente mediocriter augente obsolete reticulata apparet, quod tamen evanescit, si microscopium potentius adhibeatur, atque prorsus uniformis evadit.

Cùm Goodenovii Woodwardii Decandolliique sententiis obstaverim, *F. laciniatum* ab *F. lacerato* in *Fucorum Britannicorum Synopsi* disjungendo, nullam, illo opere jam evulgato, occasionem prætermittendam duxi, quò melius satisfacere mihi possem an sic faciendo, rectè necne fecerim. Observationibus igitur nuperioribus nunc pro distinctis magis confidenter propono, neque dubito quin ii Botanici, qui solent recentes videre, huic opinioni assentiantur. Minus quidem est in exsiccatis compressisque discrimen, quando hujus crispatus tortosque habitus penitus deletur, et substantiarum discrepantia ægrius detegitur. Frondis quidem forma et ramorum dispositio pluribus sunt in utroque mutationibus obnoxia, ut, si ex his solùm penderent diagnoses specificæ, nemo ferè Botanicus diversas declarare auderet. Timendum tamen est, ne, dum Charybdin, ut aiunt, effugere conamur, in Scyllam incidere pericitemur; et, quia non est talibus omninò fidendum, idcirco sprete rejectaque pro nihilo habeamus: certum enim est, quantumvis exemplaria singula figurâ ludant, *F. laciniati* frondem longè frequentius quàm ea *F. lacerati* palmatim findi, et gaudere peripheriâ constantius ad orbicularem accedente. Characteres qui maximè in dignoscendis valent, ni fallor, hi sunt; substantiæ dissimiles, nota haud minùs in junioribus quàm in adultis obvia, neque tamen, nisi in madefactis et simul ante oculos positis, probè observanda; venæ pellucidæ, quæ in uno manifestæ, in altero desunt; textura sub microscopio diversa; color non ambobus idem, qui quoque nequaquàm solet æquè in algis submersis ac in vegetabilibus terrenis variare, maximeque sæpe est in Fucis investigandis momenti; denique, et ante omnes, fructificatio, cùm tubercula tantummodò in processibus marginalibus sint sita, neque, eorum *F. lacerati* instar, per ramos superiores enormiter spargantur, contra verò semina nuda ubique supra frondem solitaria, sicut in *Ulvæ*, occurrant, nec in maculas figurâ certâ donatas collecta reperiantur. De *F. laciniati* synonymiâ multum est inter auctores erratum, et perpaucae sunt species quæ minùs Botanicis innotuerunt. Auctores omnes vetustiores latuisse videtur, quod non mirum, quoniam in littoribus nostris infrequentè occurrit. Hallucinatus est Gmelinus, quòd sub *Fuco suo ciliato*, de quo, cùm ex iconibus tum e descriptione, nil dubium quam rectè fecerit *Floræ Anglicæ* auctor ad hunc nostrum referendo, Raii Morisoni Hudsonique stirpes citaverit. E contrario Fucus, qui illi *F. laciniatus* audit, suprâ in hoc opere pro *F. rubentis* synonymo habetur. Nec minùs erravit Esperus, qui in primo *Iconum Fucorum* tomo *F. laciniati* exhibet iconem, subdito *F. crispus* L. nomine, docetque esse ad eundem referendam Morisoni t. 8. f. 5., quæ noster *F. dentatus*, *F. miniatum* Fl. Dan. t. 769, qui ad *F. rubentem* pertinet, *Ulvamque* Gunneri *delicatulam*, quam vir summopere reverendus *F. crispus* varietatem autumat, quæ tamen aliquas *Ulvæ ligulatæ* formas tam bene exprimit ut ejus exemplar repræsentare crederem.

a. <i>F. laciniatus</i> , magn. nat.						
b. <i>frondis pars, marginibus proliferis</i> , magn. auct.	-	-	-	-	-	6.
c. <i>frondis apex, cum capsulis</i>	-	-	-	-	-	6.
d. <i>capsula longitudinaliter dissecta</i>	-	-	-	-	-	3.
e. <i>semina</i>	-	-	-	-	-	1.
f. <i>frondis pars, cum seminibus sparsis</i>	-	-	-	-	-	5.
g. <i>semina</i>	-	-	-	-	-	1.





*Fucus laciniatus.*







*Fucus laciniatus*, frond between cartilaginous and membranaceous, flat, nerveless, branched; branches dilated upwards, palmate and blunt at their apices, their margins flat, crenate, and proliferous; immersed hemispherical tubercles in the marginal processes, and naked seeds scattered all over the frond.

*Fucus laciniatus*. *Fl. Ang.* p. 579. *Fl. Scot.* II. p. 947. *With.* IV. p. 102. *Syn. Fuc.* I. p. 161. *Eng. Bot.* XV. t. 1068. *ESPER, Ic. Fuc.* II. p. 63. t. 140.

*F. ciliatus*. *GMELIN, Hist. Fuc.* p. 176. t. 21. f. 1. (excl. syn. omnibus.)

*F. crispus*. *ESPER, Ic. Fuc.* I. p. 41. t. 18. (excl. syn. omni. præter Gmel.)

*F. crispatus*. *Ner. Brit.* p. 92. t. 15.

*F. laceratus*. *γ. Linn. Trans.* III. p. 156.

*F. laceratus*. *δ. Fl. Fr. Ed. 2da.* II. p. 28.

*β. ovalifolius*; frond proliferous at its margin, with simple processes, of a form between elliptical and roundish, placed upon extremely short petioli.

*α* is found on the shores of the British Isles, not very uncommonly.—On the Northern coast of France. *Décandolle*.—*β* at Port-Rush, in the county of Antrim. *Dr. Scott*.

*Perennial.* Feb.—July.

**ROOT**, an expanded, blackish, callous disk.

**FRONDS**, either solitary, or numerous from the same base, completely destitute of midrib or veins, generally about three inches long, but occasionally extending to half a foot, and in particular situations to nine inches, divided down to the very root into three or four *branches*, somewhat attenuated at their bases, and thence gradually (but more strikingly in some specimens than in others) widening upwards, so as in their greatest width to exceed half an inch, always divided at a short interval either in a dichotomous or palmate manner, and afterwards again and again branched in a similar mode, so that the outline of the whole frond, when expanded, forms a large segment of a circle; the apices are constantly palmate, with short, linear, slightly rounded, or truncated segments, considerably more narrow than the other branches; the margins are flat, never in the least inclining to be curled or undulated, in some instances entire and perfectly naked, in others minutely crenated, in others very thickly fringed throughout their whole length with extremely small ovate processes, and again, in others, proliferous, with scattered shoots, roundish in their first stage, and quite narrow at their base, but afterwards elongated, linear, or dilated, and palmated.—Old specimens of this plant differ from the others in having their branches longer, nearly divaricated, and scarcely perceptibly widened upwards, so that, excepting the apices, the whole frond is linear.

**FRUCTIFICATION**, hemispherical tubercles, only to be found immersed in the marginal processes, small, nearly of the same color as the frond, containing a cluster of very minute, roundish, red seeds:—besides these, other seeds, of an irregular spherical shape, and deep red color, are observable, scattered naked, without any order, all over the surface of the frond, but they are so small as to be invisible to the naked eye.

**COLOR**, a bright and pleasant, but opaque red, intermediate between scarlet and blood-color, exceedingly fugitive; in a dried state darker, and not unfrequently glossy; if kept in fresh water it soon becomes pale and acquires a livid hue; and, when exposed to the sun, turns almost immediately to a dirty whitish.

**SUBSTANCE**, between cartilaginous and membranaceous, thickish, and tough; more thin and membranaceous after it is dry.

The variety *β* differs so much in its form from *α*, that I should scarcely have suspected it of belonging to the same plant, but for the opinion of Dr. Scott, who gathered it fresh:—it agrees in its color and substance, but the frond is divided only into two oblong segments, the one simple, the other forked, each of them proliferous at its margin, with undivided leaves, of a shape between elliptical and roundish, three quarters of an inch long, and half an inch wide, quite entire, and supported upon a narrow petiolus, scarcely half a line in length.

**OBS.** This plant, when dried, adheres closely to paper:—if examined by a common pocket magnifier, the frond appears obsoletely reticulated, but all appearance of this kind vanishes under a powerful microscope, when it looks completely uniform.

Since the publication of the *Synopsis of the British Fuci*, I have neglected no opportunity that might enable me more fully to satisfy myself respecting the specific difference between *F. laciniatus* and *F. laceratus*, and the result of all my observations has been, that they are really and essentially distinct. I believe, too, that every Botanist, who is in the habit of examining the two plants in a recent state, will accede to this opinion; for the characters that separate them are at such a time far more obvious than after they have been dried and subjected to pressure, when the curled and twisted habit of the latter ceases to be observable, and the dissimilarity of their substances becomes less apparent. \* The form, indeed, of the frond and mode of ramification are in both liable to considerable variation, so that, were there no better criterion for distinguishing them, few naturalists would venture upon pronouncing them different species: and yet, at the same time, that this is granted to be the case, it would be no less wrong to run into the opposite extreme, and, because implicit credit is not to be placed on these circumstances, therefore to reject them entirely, and allow them no weight whatever; as, however single specimens may vary, it is nevertheless certain that the branches of *F. laciniatus* are more generally palmate than those of *F. laceratus*, and the outline of its frond more

\* The principal part of what follows is copied from the account of this *Fucus* in the *Synopsis of the British Fuci*.



regular. The most important proofs of distinction between them appear to consist in the difference of the substance, a mark no less conspicuous in young than in old specimens, but one that cannot be properly judged of, unless they are examined together in water; in the pellucid veins, so singular in the one species, but wholly wanting in the other; in the dissimilar appearance they exhibit under a microscope; in the diversity of their colors, which are much less liable to variation in aquatic than in terrestrial plants, so that in the investigation of the marine Algae, considerable dependence must often be placed upon them; and, above all, in the fructification, the tubercles of *F. laciniatus* being confined to the marginal processes, and not scattered, like those of *F. laceratus*, indifferently over the upper branches, while its naked seeds, instead of being collected into regular spots, are dispersed in the same manner as those of the Ulvæ. The synonymy of *F. laciniatus* has been much confused, and few species have been in general less understood. Its being a *Fucus* of by no means common occurrence will account for its having escaped the observation of the older writers. From Gmelin's description, as well as his figure, there can be little doubt of Hudson's being right in considering it the *F. ciliatus* of that author, though he has unfortunately erred in his references to Ray, Morison, and the *Flora Anglica*. His *F. laciniatus*, on the other hand, seems to be our *F. rubens*, under which it is above quoted. Professor Esper has, in the first volume of his *Icones Fucorum*, figured the present plant as *F. crispus* of Linnaeus, in which he is no less mistaken, and has quoted Morison t. 8. f. 5., our *F. dentatus*, and the *F. miniatus* of the *Flora Danica*, t. 769., which belongs to *F. rubens*, together with Gunner's *Ulva delicatula*, *Fl. Norv.* t. 8. f. 2., which, though supposed by the reverend author to be only a variety of *F. crispus*, seems intended for Mr. Woodward's *Ulva ligulata*, and is a good representation of some appearances of that plant.

- |  |    |
|--|----|
| a. <i>F. laciniatus</i> , natural size.                  |    |
| b. part of the frond, with proliferous margin, magnified | 6. |
| c. apex of the frond, with capsules                      | 6. |
| d. capsule cut through longitudinally                    | 3. |
| e. seeds   | 1. |
| f. part of frond, with scattered seeds                   | 5. |
| g. seeds   | 1. |

## 70.—FUCUS CILIATUS.

*Fucus ciliatus*, frond between membranaceous and cartilaginous, flat, nerveless, generally lanceolate, branched in a pinnated manner, ciliated at its margins and surface; cilia mostly simple, patent, subulate, producing tubercles at their apices.

*Fucus ciliatus*. *Fl. Ang.* p. 580. LINN. *Mant.* p. 136. et p. 519. (excl. syn. Gmel.) *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. (excl. var.  $\beta$ , ejusque syn.) *Fl. Scot.* II. p. 944. *Fl. Dan.* t. 353. *Linn. Trans.* III. p. 160. (excl. *F. ciliati* Gmel. syn.) *Fl. Norv.* II. p. 96. *Ner. Brit.* p. 90. t. 15. (excl. var.  $\delta$ , ejusque syn.) *Syn. Fuc.* I. p. 169. *Eng. Bot.* XV. \*t. 1069. ESPER,  *Ic. Fuc.* II. p. 55. t. 136. WULFEN, *Crypt. Aquat.* n. 41. (excl. syn. Esp.)

*F. holosetaceus*. GMELIN, *Hist. Fuc.* p. 177. t. 21. f. 2. *Syst. Nat. Ed. Gmel.* II. p. 1387. WITH. IV. p. 104.

*F. ligulatus*. GMELIN, *Hist. Fuc.* p. 178. t. 21. f. 3. (quoad ic.) *Syst. Nat. Ed. Gmel.* II. p. 1387.

*Ulva ciliata*. *Fl. Fr. Ed. 2da.* II. p. 13. (excl. syn. omn. sub var.  $\alpha$  citatis.)

*Fucus membranaceus rubens angustifolius, marginibus ligulis armatis*. RAI *Syn.* p. 47. n. 33.

*F. humilis membranaceus acaulos elegantissimus ruber, capillis longis fimbriatus*. MORIS. *Hist. Or.* III. p. 646. n. 10.

$\beta$ . *pinnatifidus*; frond lanceolate, pinnatifid; segments lanceolate, elongated, unbranched.

*F. ciliatus*.  $\beta$ . *Syn. Fuc.* I. p. 169.

$\gamma$ . *palmatus*; frond lanceolate, almost naked, either undivided, or palmated.

*F. ciliatus*.  $\gamma$ . *Syn. Fuc.* I. p. 170.

$\delta$ . *jubatus*; frond bordered with numerous, long, thin, filiform, cylindrical, branching cilia.

*F. ciliatus*.  $\delta$ . *Syn. Fuc.* I. p. 170.

*F. jubatus*. LINN. *Trans.* III. p. 162. t. 17. f. 2. *Ner. Brit.* p. 51. t. 11. ESPER,  *Ic. Fuc.* II. p. 35. t. 127.

$\epsilon$ . *lanceolatus*; frond lineari-lanceolate, narrow, much and irregularly branched; cilia long, compressed, linear, acuminate, branched.

\* This figure, which is far from good, is intermediate between the first and second varieties.





*Fucus ciliatus.*







*F. ciliatus*.  $\alpha$ . *Syn. Fuc.* I. p. 170.

*F. ciliatus*.  $\beta$ . *Fl. Scot.* II. p. 946. *Linn. Trans.* III. p. 161. *Ner. Brit.* p. 91. t. 15.

*F. ciliatus*.  $\gamma$ . *Ner. Brit.* p. 91. t. 15.

*F. ciliatus*. var. *ESPER*, *l.c. Fuc.* II. t. 136. *A*.

*F. lanceolatus*. *WITH.* IV. p. 104.

$\zeta$ . *angustus*; frond linear, much and irregularly branched; branches extremely narrow, compressed.

*F. ciliatus*.  $\zeta$ . *Syn. Fuc.* I. p. 170.

$\eta$ . *spinosus*; frond linear, compressed, much and irregularly branched, every where covered with short, simple, subulate, spiniform ramuli.

On the shores of the British Isles, not uncommon. Coasts of France exposed to the Ocean. *Decandolle*.—In the Northern Ocean. *Oeder*.—In the Mediterranean and Adriatic. *Wulfen*.— $\beta$  on the shores of New Zealand. *Sir Jos. Banks*.—At the Isle of Wight, together with  $\gamma$ ,  $\delta$  and  $\epsilon$  in Devonshire and Cornwall. *Mrs. Griffiths*.— $\delta$  at Port-Rush, in the county of Antrim. *Dr. Scott*.— $\epsilon$  on the coast of Guernsey.—At Bayonne. *Professor Mertens*.— $\zeta$  at Exmouth. *Sir Thomas Frankland*.— $\eta$  Devonshire coast. *Mrs. Griffiths*.

Perennial? October—February.

ROOT, \* fibrous, composed of several narrow, cylindrical, long, branched fibres, closely matted together, of a pale pink color, creeping, and at length rising into numerous fronds.

FRONDS, flat, destitute of veins or midrib, half a foot, or more, long, filiform and narrow in the part nearest the root, but immediately expanding, so as to be in general half an inch wide before they are four lines in height, and thence gradually growing wider and wider, till they equal one or two inches; their form is either lanceolate, or between linear and lanceolate, or occasionally oblong, with sharp apices, and they are in some instances simple, in others, variously cleft into several segments of unequal depth, all which preserve nearly the same form, and are either simple, or bifid, or themselves divided in a similar manner; all along the margins of the frond are disposed compressed subulate cilia, of the same color and substance with it, between horizontal and patent, slightly curved, in general about a line long, and simple, and separated by very short intervals, but sometimes remote, and forked, or variously branched, and not unfrequently growing to a much greater size, and expanding into lanceolate leaves, themselves also ciliated, whence the plant acquires a proliferous appearance: other cilia, similar to the marginal ones, but few in number, are also in general scattered over both surfaces of the frond.

FRUCTIFICATION†, spherical tubercles, of the size of a small pin's head, placed upon the apices both of the marginal and superficial cilia, of a pale pink color, transparent, containing a mass of very minute roundish seeds: the ends of the cilia not uncommonly protrude beyond the tubercles, which then become lateral, like those of *F. gigantinus*.

COLOR, a deep, semitransparent red, very permanent; so much darker in a dried state, as to look of a chocolate brown, unless held to the light; in decay it turns paler, and fades into a dull white.

SUBSTANCE, between cartilaginous and membranaceous, firm and tough.

The frond of var.  $\beta$  is lanceolate, and undivided, but pinnated on both sides with long simple lanceolate shoots, placed near to each other; the margins are every where fringed with short, subulate, simple cilia.

Var.  $\gamma$  has a very singular appearance, and is, in point of form, intermediate between *F. ciliatus* and *F. palmatus*; it agrees in size with  $\alpha$  and  $\beta$ , but is more remarkably attenuated at each extremity; its outline is lanceolate, in some instances undivided, in others bifid or trifid, in a palmate manner; its cilia are few and scattered, so that the margins appear almost naked.

The frond of  $\delta$  is narrower than that of the preceding varieties, so as to be scarcely four lines wide, and is at the same time of humbler growth, so as to be seldom three inches high; what, however, is most remarkable in it is, that its narrow and filiform cilia frequently extend to an inch and half, or two inches in length, and are repeatedly branched: the plant employs these like tendrils, and attaches itself, by means of them, to other plants. Miss Hill, who has had the best opportunities of examining it when growing, is of opinion that they finally break off, and become new individuals.

$\epsilon$  is an extremely elegant variety, and very different in appearance from the others: its length is from two to three inches; its form between linear and lanceolate; its apices acuminate; its width scarcely two lines in the widest part; it is repeatedly branched in a sub-pinnated manner, and has long cilia, but shorter than those of var.  $\delta$ .

With respect to var.  $\zeta$ , I am at a loss what to say, and I can hardly believe that it really belongs to *F. ciliatus*; its frond is much and irregularly branched, compressed rather than flat, filiform, not above a line wide; its branches long, and acuminate, beset with a few scattered spiniform cilia.

\* Wulfen, whose description of this Fucus is in other respects a pattern for elegance and accuracy, calls the root a small expanded disk, but I have never seen any thing of the kind.

† Weber and Mohr have given a very detailed account, in their *Neue Beiträge*, p. 279, of the microscopic appearance of this fructification, in which they have seen a great deal more than I could do. For all this, I must refer my readers to my purposed dissertation upon the fruit of the Fuci.



Var.  $\gamma$  has the same size and form as  $\alpha$ , but is every where covered with simple subulate cilia, about a line long.

Obs. The plant in drying adheres very slightly to paper.

From the description, as well as the figure, here given, it must be sufficiently evident, that *F. ciliatus* is in point of form an extraordinarily changeable plant; nor can it be a matter of wonder if different opinions have prevailed among Botanists how far some of those, which are now regarded as varieties, ought not more properly to be considered as distinct species. It has \*already been observed, that there is at first sight much less affinity visible between the third and fifth appearances above noticed, than the former of these bears to *F. palmatus*, or the latter to *F. confervoides*, and that there is scarcely any *Fucus* in which the transitions through the several gradations are detected with greater difficulty. To the Naturalist, however, who has an opportunity of collecting specimens from distant places, this difficulty will vanish, and the var.  $\delta$  in particular, which even Dr. Goodenough and Mr. Woodward considered as really distinct, will be found to be so connected with the broadest and most frequent form of the plant, as to leave no doubt of their identity. It seems most probable that both this and all the more narrow varieties originate from some peculiarity in their places of growth, which, instead of allowing the fructification to be produced† as usual, gives rise to an unnatural and sterile luxuriance. This idea is greatly confirmed by Miss Hill's opinion, already mentioned, that the cilia of  $\delta$  actually tend to propagate the plant in a proliferous manner. *F. ciliatus*, if dried, without sufficient care being taken to wash out the saline particles, will be found covered with a whitish efflorescence, like *F. saccharinus*: if boiled, it fixes, like *F. tenax* or *F. crispus*, into a firm gelatine, which becomes again liquid from exposure to heat. It is eaten, according to Lightfoot, both by the Scotch and Irish, promiscuously with *F. palmatus*. With regard to its synonymy, there has been great confusion, as may naturally be expected with so variable a species. Gmelin's *F. ciliatus* has already been quoted under the preceding *Fucus*: his figures of *F. holosetaceus* and *F. ligulatus* are both excellent representations of that here figured, but his description of the latter is far from agreeing with the plate, and seems to be designed for a different plant, an error, of which, there is unfortunately more than one instance in his excellent work. It is not a little extraordinary that Linnaeus, who has preserved the true species in his ‡Herbarium, should at the same time have overlooked both these figures, and quoted as a synonym Gmelin's *F. caulescens*, thus giving rise to the errors noticed under *F. vittatus*. Wulfen, who is quite correct in his other references, has himself been mistaken in supposing Esper's t. 4. f. 3. to be copied from the present plant, whereas it seems designed to represent a singularly battered fragment of *F. laceratus*; nor have the authors of the *Flore Française* escaped error in joining together *F. ciliatus*, *ligulatus*, and *holosetaceus* of Gmelin. These Botanists confess that they are unacquainted with the fructification, and this can alone account for their having referred *F. ciliatus* to the *Ulva*. From Mr. Stackhouse's figure of his var.  $\delta$ , I have no doubt of its actually belonging to *F. corneus*, with which he remarks that he found it intermixed. *Ceramium Teedii* of Roth is a very near affinity of *F. ciliatus*, and scarcely distinguishable, except by its discoid root, its color, and its more membranous substance.

- a. *F. ciliatus*, natural size.
- b. apex of frond, in fructification.
- c. capsule, magnified - - - - - 5.
- d. the same, cut through longitudinally - - - 3.
- e. seeds - - - - - 1.
- f. part of frond of var.  $\delta$ , natural size.
- g. plant of var.  $\alpha$ .
- h. plant of var.  $\gamma$ .

\* Synopsis of the British Fuci, I. p. 173.

† Only the first and second appearances here described have been found in fruit, except two single specimens of var.  $\delta$  at different times, one by Mrs. Griffiths, the other by Miss Hill.

‡ In the Linnaean Herbarium are four specimens under the name of *F. ciliatus*, one of which, on a single sheet of paper, is the real plant, the other three are *F. corneus*.



*Fucus*, fronde membranaceo-cartilagineâ, planâ, enervi, sub-lanceolatâ, pinnato-ramosâ, superficie marginibusque ciliatâ; ciliis simpliciusculis, patentibus, subulatis, apice globuliferis.

*Fucus ciliatus*. *Fl. Ang.* p. 580. LINN. *Mant.* p. 136. et p. 519. (excl. syn. Gmel.) *Syst. Nat.* II. p. 718. *Syst. Nat. Ed. Gmel.* II. p. 1387. (excl. var.  $\beta$ , ejusque syn.) *Fl. Scot.* II. p. 944. *Fl. Dan.* t. 353. *Linn. Trans.* III. p. 160. (excl. *F. ciliati* Gmel. syn.) *Fl. Norv.* II. p. 96. *Ner. Brit.* p. 90. t. 15. (excl. var.  $\delta$ , ejusque syn.) *Syn. Fuc.* I. p. 169. \* *Eng. Bot.* XV. t. 1069. *ESPER, Ic. Fuc.* II. p. 55. t. 136. WULFEN, *Crypt. Aquat.* n. 41. (excl. syn. Esp.)

*F. holosetaceus*. GMELIN, *Hist. Fuc.* p. 177. t. 21. f. 2. *Syst. Nat. Ed. Gmel.* II. p. 1387. WITH. IV. p. 104.

*F. ligulatus*. GMELIN, *Hist. Fuc.* p. 178. t. 21. f. 3. (quoad ic.) *Syst. Nat. Ed. Gmel.* II. p. 1387.

*Ulva ciliata*. *Fl. Fr. Ed. 2da.* II. p. 13. (excl. syn. omn. sub. var.  $\alpha$  citatis.)

*Fucus membranaceus rubens angustifolius, marginibus ligulis armatis*. RAII *Syn.* p. 47. n. 33.

*F. humilis membranaceus acaulos elegantissimus ruber, capillis longis fimbriatus*. MORIS. *Hist. Or.* III. p. 646. n. 10.

$\beta$ . *pinnatifidus*; fronde lanceolatâ, pinnatifidâ, segmentis lanceolatis, elongatis, indivisis.

*F. ciliatus*.  $\beta$ . *Syn. Fuc.* I. p. 169.

$\gamma$ . *palmatus*; fronde lanceolatâ, indivisâ, palmatâve, marginibus sub-nudis.

*F. ciliatus*.  $\gamma$ . *Syn. Fuc.* I. p. 170.

$\delta$ . *jubatus*; fronde margine superficieque ciliatâ, ciliis plurimis, elongatis, tenuissimis, filiformibus, cylindricis, ramosis.

*F. ciliatus*.  $\delta$ . *Syn. Fuc.* I. p. 170.

*F. jubatus*. LINN. *Trans.* III. p. 162. t. 17. f. 2. *Ner. Brit.* p. 51. t. 11. *ESPER, Ic. Fuc.* II. p. 35. t. 127.

$\epsilon$ . *lanceolatus*; fronde lineari-lanceolatâ, angustâ, ramosissimâ; ciliis elongatis, compressis, linearibus, acuminatis, ramosis.

*F. ciliatus*.  $\epsilon$ . *Syn. Fuc.* I. p. 170.

*F. ciliatus*.  $\beta$ . *Fl. Scot.* II. p. 946. LINN. *Trans.* III. p. 161. *Ner. Brit.* p. 91. t. 15.

*F. ciliatus*.  $\gamma$ . *Ner. Brit.* p. 91. t. 15.

*F. ciliatus*. var. *ESPER, Ic. Fuc.* II. t. 136. A.

*F. lanceolatus*. WITH. IV. p. 104.

$\zeta$ . *angustus*; fronde lineari, ramosissimâ; ramis compressis, angustissimis.

*F. ciliatus*.  $\zeta$ . *Syn. Fuc.* I. p. 170.

$\eta$ . *spinatus*; fronde lineari, compressâ, ramosissimâ, ubique oblectâ ramulis brevibus, simplicibus, subulatis, spiniformibus.

**HABITAT**  $\alpha$  in Britanniarum oris, haud infrequens.—In Galliae oris, ubi alluitur Oceano. *Decandolle*.—In Oceano Islandico. *Oeder*.—In Mari Mediterraneo et Atlantico. *Wulfen*.— $\beta$  in Novae Selandiae littoribus. *D. J. Banks Baronet*.—Ad Insulam Vectis, unâ cum var.  $\gamma$ .— $\delta$  et  $\epsilon$  in Devonîâ et Cornubiâ. *Dna Griffiths*.— $\delta$  apud Port-Rush, in comitatu Antrim. *D. Scott*.— $\epsilon$  in Sarniae oris.—Lapardi. *D. Prof. Mertens*.— $\zeta$  apud Exmouth. *D. T. Frankland, Baronet*.— $\eta$  in Devonîae oris. *Dna Griffiths*.

**Perennis**. Oct.—Feb.

**RADIX** †fibrosa, fibris plurimis, densè implexis, teretibus, angustissimis, elongatis, ramosis, coloris dilutè rosei, repentibus, et demùm assurgentibus in

**FRONDES** plurimas, planas, nervi venarumque expertes, longitudine semipedales, et ultrâ, quâ basi proximâ, filiformes et angustas, sed statim ampliatas, ut priusquàm trium quatuorve linearum altitudinem attigerint in latitudinem plerumque unguicularem excreverint, exinde sensim magis magisque latescentes, donec pollicem unum duosve aequent; figura his lanceolata, vel lineari-lanceolata, vel quandoque oblonga, apicibus acutis, et sunt nunc simplices, nunc variè in plures inaequalitè profundas dissectæ lacinias, quæ omnes eandem ferè formam servant, et hæ quoque vel simplices, vel bifidæ, vel ipsæ simili ratione divisæ; frondis totius margines obsident cilia homogenea et concolora, compressa, subulata, horizontalitè patula, lenitè incurva, plerumque circiter lineam longa, simplicia, et intervallis brevissimis sejuncta, aliquandò tamen remota, et bifurca, vel variè ramosa, nec rarò in molem multo majorem ex-crescentia, seque in folia lanceolata, ipsa eodem modo ciliata, dilatantia, unde stirpis facies prolifera; utrique etiam frondis paginae sæpius innascuntur cilia alia, marginalium similia, sed enormitè sparsa, et haud ita magno numero.

‡**FRUCTIFICATIO** tubercula sphaerica, aciculæ capite minora, ciliorum marginalium superficialiumque apicibus insidentia, coloris dilutè rosei, diaphana, seminum minutissimorum sub-rotundorum congeriem intùs fovientia: ciliis apex haud rarò ultra tuberculum producitur, quod tunc fit, *F. gigartini* capsularum instar, laterale.

**COLOR** saturatè ruber, semidiaphanus, diu persistens; *exsiccatæ* intensior, ut, nisi luci obiciatur, castaneus videatur; in *marcescente* pallescit, et demùm in sordidè albicantem evanescit.

**SUBSTANTIA** cartilagineo-membranacea, lenta, tenax.

\* Hæc icon, in se nequaquam optima, inter  $\alpha$  et  $\beta$  ambigit.

† Radicem exiguum placentulam dicit Wulfenius, ego verò nihil in stirpe discoideum unquam vidi: descriptio ejus cætera optima omnem laudem meretur.

‡ Fusè et optimè de hæc fructificatione sub microscopio visâ disseruerant, in opere "*Neue Beiträge*" dicto, p. 279, Weberus Mohriusque, qui longè plura quam ego in capsulis viderunt. Hæc autem omnia ad dissertationem de Fucorum fructu relinquo.



Var.  $\beta$  frondem habet lanceolatam, indivisam, sed utrinque pinnatam surculis approximatis, elongatis, ipsis simplicibus lanceolatisque; margines ubique ciliati, ciliis brevibus, subulatis, simplicibus.

Var.  $\gamma$  facie est prædita perquam singulari, et est quoad formam inter *F. ciliatum* et *F. palmatum* intermedia; staturâ cum  $\alpha$  et  $\beta$  convenit; sed frondes utrinque multò insigniùs attenuantur; figura lanceolata, in his indivisa, in illis bifida, vel palmatim trifida; cilia rara et sparsa, unde margines nudiusculi apparent.

Frons in var.  $\delta$  præcedentibus angustior ut latitudine vix quatuor lineas, humilior ut altitudine rarè palmum superet, sed, quod maximè singulare, cilia angusta filiformia in sesquipollicarem bipollicaremve longitudinem sæpe producuntur, et sunt ramosissima: his, sicut cirrhis, planta utitur, et horum ope sese aliis stirpibus affigit: eredit quoque D<sup>na</sup> Hill, cui optima fuit recentem observandi facultas, hæc demùm abrumpi, et in novas proles excrecere.

$\epsilon$  est varietas summopere elegans, et quæ facie a reliquis diversissimâ gaudet; longitudo bi- tri- pollicaris; figura lineari-lanceolata; apices acuminati; latitudo, ubi latissima, vix bilinearis; sub-pinnatim est ramosissima, ciliaque habet elongata, sed iis var.  $\delta$  breviora.

De var.  $\zeta$  nescio quid dicam, et vix mihi persuadere possum ut sit hujus verè loci; frons ramosissima, compressa potius quam plana, propemodùm filiformis, vix lineam lata, ramis elongatis acuminatis, ciliis aliquot sparsis spiniformibus obsitis.

Var.  $\eta$  staturam formamque habet eandem quæ  $\epsilon$ , sed frons ubique obtegitur ciliis densè dispositis, simplicibus, subulatis, circiter lineam longis.

Obs. Exsiccata chartæ laxè adhæret.

Quàm summopere sit *F. ciliati* inconstans forma, et qualibus præcipuè mutationibus sit obnoxia, icon et descriptio nostra satis declarant, nec mirum si diversè statuerint Botanici, annon aliquæ ex illis hic pro varietatibus habitis rectiùs species distinctæ prædicarentur. \* Alibi jam memoratum extat, similitudinis apparere minus inter eas, quæ  $\gamma$  et  $\epsilon$  titulis designantur, quàm quæ illi cum *F. palmato* vel huic cum *F. confervoide* intercedit; Fucumque dari vix ullum cujus facies discrepantes gradationum serie minùs apertâ connectantur. Exemplaria autem e locis dissitis accipienti talis extenuatur et evanescit difficultas, et var. ipsa  $\delta$ , quam viri cautissimi, Goodenovius Woodwardiusque, disjungendam censuerunt, in  $\alpha$  transire liquebit. Verisimilimum quidem mihi videtur hanc et omnes fronde angustâ præditas ex eo modò pendere, quòd loci natales aliquid in se peculiare habeant, propter quod † fructum non, ut natura jussit, ferunt, sed monstrosè sterilitèrque luxuriant; cui etiam opinioni favet D<sup>na</sup> Hill sententia, quæ e ciliis in  $\delta$  cirriformibus novas frondes proliferè generari credit. Tantum in se salis marini *F. ciliatus* includit, ut nisi cautè sit elotus, priusquàm exsicceetur et comprimatur, *F. saccharini* instar, frons efflorescentiâ albâ olim obducta reperietur. Ex elixo, sicut ex *F. tenace* vel ex *F. crispo*, spissa fit gelatina, quæ quotiescunque calori objicitur liquefacta solvitur. Comedi etiam a Scotis et Hibernis, unâ cum *F. palmato*, testem habemus Lightfootium. Fuci præ ceteris mutabilis synonymia multùm est ab auctoribus confusa. Stirps, quæ Gmelino *F. ciliatus* audit, jam sub specie præcedente citatur; contrâ verò earum, quas *F. holosetaceum* et *F. ligulatum* appellat, icones huic nostræ optimè respondent. Fateri tamen necesse est posterioris descriptionem plantam a delineatâ diversam respicere videri, qualismodi hallucinationes plus unâ vice in opere egregio offendes. Linnæus, harum utrâque prætermisâ, genuinæ licet in ‡ Herbario suo stirpis exemplar servaret, *F. caulescentem* Gmel. pro *F. ciliati* synonymo citavit, quo sunt fonte derivati errores jam sub *F. vittato* memorati. Erravisse etiam Wulfenium suspicor, dum Esperî t. 4. f. 3, quæ tantummodò *F. lacerati* frustum variè diffractum mihi videtur, ad *F. ciliatum* verum depictum censet; nec magis mendo caruerunt *Floræ Gallicæ* auctores, Gmelini *F. ciliatum*, *ligulatum*, et *holosetaceum* conjungendo. Prædicant hi palàm se fructificationem nunquam vidisse, quod ni sit jure mirum haberetur quâ de re commoti plantam globuliferam *Ulvæ* associaverint. Varietatis suæ  $\delta$  iconem a Stackhousio datam perpendenti scrupulus nullus restat, quin ad *F. corneum*, quocum immixtam legit, jure pertineat. Rothii *Ceramium Teedii* est *F. ciliato* summopere affine, et vix, nisi radice discoideâ, colore, et substantiâ tenuiore membranaceâ, dignoscendum.

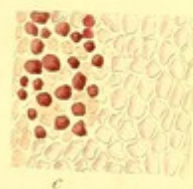
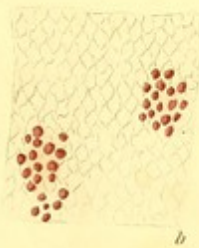
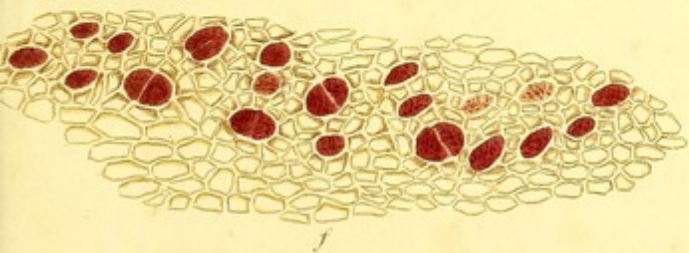
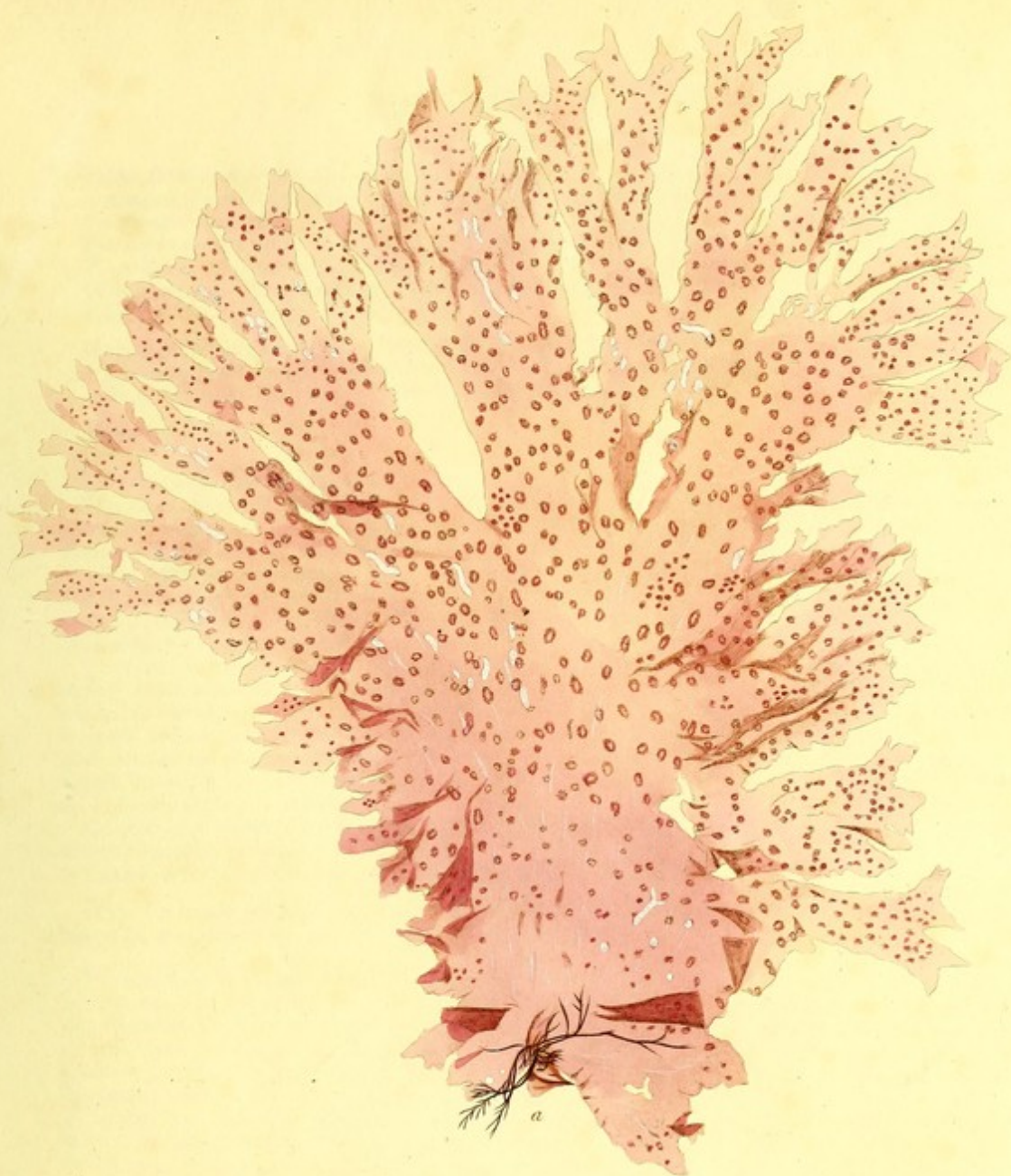
- a. *F. ciliatus*, magn. nat.
- b. *frondis capsuliferæ apex*.
- c. *capsula*, magn. auct. - - - 5.
- d. *eadem longitudinalitèr dissecta* - - - 3.
- e. *semina* - - - - - 1.
- f. *var.  $\delta$  frondis portio*, magn. nat.
- g. *var.  $\epsilon$* .
- h. *var.  $\eta$* .

\* *Syn. Fuc. I. p. 173.*

† E varietatibus hic descriptis  $\alpha$  modò et  $\beta$  sunt in præsens capsuliferæ detectæ, exceptis duobus var.  $\delta$  exemplaribus, quorum unum D<sup>na</sup> Griffiths, alterum D<sup>na</sup> Hill legit.

‡ Quatuor in Phytophylacio Linnæano sub *F. ciliati* nomine specimina servantur: e quibus unum, chartæ folio separatim agglutinatum, est ipse *Fucus*, reliqua tria ad *F. corneum* pertinent.





*Fucus punctatus.*







*Fucus*, fronde membranaceâ, tenerrimâ, planâ, enervi, sub-dichotomâ; ramis sub-linearibus; apice bifidis, obtusis; margine planis integerrimis; tuberculis hemisphaericis, immersis, ubique sparsis, seminibusque nudis in maculas oblongas congestis.

*Fucus punctatus*. WITH. IV. p. 405. Eng. Bot. XXII. t. 1573.

*F. ocellatus*. LAMOUROUX, Diss. Fuc. p. 65. t. 32.

*Ulva punctata*. STACKHOUSE, in Linn. Trans. III. p. 236.

*Ulva ocellata*. Fl. Fr. Ed. 2da. II. p. 12.

HABITAT in Cornubiæ oris. D<sup>na</sup> Griffiths.—Inter rejectamenta maris apud Weymouth. D. Stackhouse.—In Cambriæ Australis littoribus, apud Swansea. D. Dillwyn.—Apud Larnie in Hiberniâ. D. Drummond.—In Sinu, "Bantry Bay" dicto. D<sup>na</sup> Hutchins.—In Hispaniæ, Galliæ, Corsicæque oris. Lamouroux.

Annua. Æstate.

RADIX callus exiguus, nigricans.

FRONDES nunc solitariae, nunc ex eadem basi plurimæ, planæ, nervi venarumque prorsus expertes, longitudine a palmari ad semipedalem, latitudine ab unguiculari ad tripollicarem variabiles; crescendi quoque modus in diversis individuis diversus, in his enim est frons a basi usque ad apices dichotoma, furcis erecto-patulis septies octiesve repetitis, intervallo inter singulas brevi, ramis sub-linearibus, in illis, sicut in exemplare hic depicto, ad dimidium altitudinis indivisa assurgit, ibique vel dichotomè vel palmatim finditur in aliquot ramos, ipsos quoque iterum palmatos, aut bis ter dichotomos, utrâque ramorum serie præcedente angustiore, apicibus bifidis, segmentis brevibus, sub-divaricatis, obtusis; margines semper integerrimi, aliquandò levitèr undulati, sed nunquam crispati.

FRUCTIFICATIO \* tubercula elliptica vel hemisphaerica, *Brassicæ Rapæ* seminum magnitudine, utriusque frondis paginæ a basi usque ad apices † sparsim, copiosè tamen, innascentia, semper solitaria, e membranâ adeò tenui constantia, ut semina, quæ includunt, subrotunda intensè rubra translucant: præter hæc, et quidem sæpius, occurrunt in fronde semina nuda, congesta in maculas ejusdem quâ tubercula formæ, eodemque omninò modo sita, ut discrimen inter utraque vix ullum oculo inermi detegatur, sub lente in duas vel tres partes dehiscentia:—anne sit *Fucus* fructus duplex, an semina, tuberculorum membranâ deperditâ, frondi adhæreant, neque de hac stirpe, neque, uti suprà dicitur, de *F. lacerato* adhuc satis liquet.

COLOR lætè roseus, in quibusdam individuis sanguineo immixtus, diaphanus; exsiccata nitens; marcescentis in luteo-virescentem transiens.

SUBSTANTIA membranacea, tenuissima, et tenerrima.

OBS. Frons sub lente, *F. lacerati* et *F. ulvoidis* instar, pulcherrimè reticulata:—exsiccata chartæ tam arctè adhæret, ut, integritate salvâ, non sit, vel madefacta, avellenda.

Primus, sedecim abhinc annis, hujus *Fuci* exemplar inter alia maris rejectamenta apud Weymouth legit cl. Stackhousius, qui mox Societati Linnæanæ descriptum impertivit, et, seminibus nudis modò visis, *Ulva* generi, nec tamen sine scrupulis, ascribendum censuit; in quâ et ipse certè fuissem sententiâ, nisi stirpes tuberculis veris præditas videndi nuper fuerit facultas. Magno mihi hoc fuit gaudio, quòd, his detectis, fructificatio ejus *F. lacerati* omninò similis appareat, nec ulterius opus sit ut duas plantas naturâ evidentissimè inter se connexas in duo genera distrahamus. Ea quidem est hæc affinitas, ut dubitet Lamourouxius an hæc stirps, quam optimo nomine *F. ocellatum* appellat, et *F. lacerati* var. nostra γ, quæ illi *F. granatus* audit, sint reverâ distinctæ. Discrepant autem *F. punctati* colore lætiore, venarum omnium frondem percurrentium absentia, marginibus planis, nequaquam crispatis crenatisve, substantiâ longè tenuiore, ut vix ulla sit adeò tenuis membrana cui conferri recuset, et fructificatione per totam frondem sparsâ. Arctius adhuc speciei insequenti accedit, de quo sub illâ tractabitur. *F. punctatus*, quamvis in multis per Britanniarum oras locis detectus, nullibi, quod scio, nisi perparcè occurrit. Exemplar hic depictum, solito majus pulchriusque, benevolè misit D<sup>na</sup> Hutchins: formâ quàm maximè discrepat illud a Lamourouxio delineatum, cujus rami elongati sunt et angusti, sed inæqualis ubique latitudinis, et frons variè absque normâ divisa. De synonymo tamen locus est dubitationi nullus. Fructificationis iconem ad lit. f. sub lente maximè augente et ad exemplar adhuc recens adumbratam Dillwynii amicitia debeo.

- a. *F. punctatus*, magn. nat.
- b. frondis pars, cum seminibus nudis, magn. auct. 5.
- c. ejusdem portio - - - - - 3.
- d. semen - - - - - 2.
- e. semina diffracta - - - - - 1.
- f. fructificationis icon a Dillwynio communicata.

\* Hæc tubercula eorum *F. lacerati* et *F. ulvoidis* omninò sunt similia, sed nulla nunc sunt ad manus quæ hic delineata exhibere possum.

† Non semper sunt enormitèr sparsa, sed in quibusdam exemplaribus, præsertim angustioribus, lineis duabus sub-parallelis, sicut Stackhousius descripsit, disponuntur.



*Fucus punctatus*, frond membranaceous, very tender, flat, nerveless, mostly dichotomous; branches nearly linear, bifid and obtuse at their apices, at their margins flat and entire; hemispherical immersed tubercles, scattered all over the frond, and naked seeds collected into oblong spots.

*Fucus punctatus*. WITH. IV. p. 405. Eng. Bot. XXII. t. 1573.

*F. ocellatus*. LAMOUROUX, Diss. Fuc. p. 65. t. 32.

*Ulva punctata*. STACKHOUSE, in Linn. Trans. III. p. 236.

*Ulva ocellata*. Fl. Fr. Ed. 2da. II. p. 12.

Among the rejectamenta of the sea at Weymouth. Mr. Stackhouse.—Coast of Cornwall. Mrs. Griffiths.—Swansea.—Mr. Dillwyn. Larne, near Belfast. Mr. Drummond.—Bantry Bay. Miss Hutchins.—Shores of France, Spain, and Corsica. Lamouroux.

Annual. In the summer months.

Root, a small, blackish, callous disk.

FRONDS, either solitary, or numerous from the same base, flat, quite destitute of midrib or veins, varying in length from a quarter to half a foot, and in width from half an inch to three inches; the mode of growth is also different in different individuals, in some the frond is regularly dichotomous from base to summit, the segments being all nearly linear, between erect and patent, and the divisions seven or eight times repeated at short intervals, in others, as in that here represented, the frond continues for half its height undivided, and is there cleft in a palmate or dichotomous manner into a few branches, which are themselves again once or twice divided in the same way, every succeeding series of branches being more narrow than that below it, and the apices of all being bifid, with short, sub-divaricated segments; the margins are constantly quite entire, and, though sometimes slightly undulated, are never curled.

FRUCTIFICATION, elliptical or hemispherical \* tubercles, as large as turnip-seed, † scattered plentifully over both sides of the frond from base to summit, always solitary, and composed of so delicate a membrane, that the dark-red roundish seeds which they contain are perfectly visible: besides these, and much more frequently, are seen upon the frond naked seeds, collected into clusters of the same form as the tubercles, and arranged in the same manner, so that scarcely any difference between them is discernible to the naked eye, appearing under a microscope composed of two or three parts:—whether the *Fucus* has a twofold fructification, or whether the seeds continue to adhere to the frond, after the membranous coat of the tubercle is destroyed, I have no means of determining, either as to this plant, or *F. laceratus*.

COLOR, a bright pink, tinged in some specimens with blood-red, transparent; glossy when dry; and, in a state of decay, turning to a pale greenish yellow.

SUBSTANCE, membranaceous, extremely thin and tender.

OBS. The frond is most beautifully and distinctly reticulated under a microscope, like *F. laceratus* and *F. ulvoides*:—in drying, it adheres so closely to paper, that it cannot be separated, even by subsequent immersion, without injury.

It is now sixteen years since Mr. Stackhouse first collected a specimen of this *Fucus* among other rejectamenta of the sea upon the beach at Weymouth, and communicated a description of it to the Linnæan Society, referring it, though not without hesitation, to the genus *Ulva*. The same would also unquestionably have been my opinion, had I, like him, seen only individuals with naked seeds; but, very fortunately, others have lately been detected bearing real tubercles, and altogether agreeing in point of fructification with *F. laceratus*, so that there can no longer be any necessity to do violence to natural affinities, by separating into different genera two plants so evidently intended by nature to be placed together, that Lamouroux, who has described the present under the very characteristic name of *F. ocellatus*, has even been led to doubt how far it is specifically different from the var.  $\gamma$  of *F. laceratus*, his *F. granatus*; and it appears from his work, that he would in all probability have united them, but that he never found the one except with scattered seeds, nor the other, except with closed tubercles. There is, however, no room for doubt upon this subject, for they differ in the brighter color of *F. punctatus*, in its frond being wholly destitute of veins, in its flat margins neither curled nor crenated, in its substance so much more thin as to equal in this respect almost any known membrane, and in the situation of its fruit, which, instead of being confined to the upper branches, is scattered indifferently over the whole frond. *F. punctatus* is still more closely allied to the following plant, as will there be mentioned. It has been found upon several parts of the British shores, but no where, I believe, except extremely sparingly. For the specimen here figured, which is both larger and more handsome than any other I ever saw, I am indebted to Miss Hutchins; it is as widely removed as possible from that copied by Lamouroux, the branches of which are long and narrow, but of very unequal width, and the frond divided without any regular order. There is however, no doubt attending the synonym. Mr. Dillwyn obligingly communicated the highly magnified drawing of the fruit at *f*, which was done from a recent specimen gathered by himself at Swansea.

- a. *F. punctatus*, natural size.
- b. part of the frond, with naked seeds, magnified - 5.
- c. portion of the same - - - - - 3.
- d. seed - - - - - 2.
- e. seeds broken into three parts - - - - 1.
- f. drawing of the fruit from Mr. Dillwyn.

\* These tubercles are precisely like those of *F. laceratus* and *F. ulvoides*, but I have no specimen of them now at hand to figure.

† They are not always irregularly scattered, but in some specimens, especially those which are most narrow, may be occasionally met with disposed in two nearly parallel rows, as described by Mr. Stackhouse.















