

Caulis brevis, erectus. *Folia* disticha, recurva, oblonga, oblique bidentata. *Scapi* penduli, circa 30 cm. longi; racemi circa 15 cm. longi, multiflori. *Bracteae* patentes, triangulati-ovatae, acuminatae, 2-3 mm. longae, basi concavae. *Pedicelli* patentes vel reflexi, graciles, 1-5 cm. longi. *Flores* gilvi, brunneo-punctati. *Sepala* subpatentia, unguiculata, 1.2-1.5 cm. longa, limbus late ellipticus, obtusus. *Petala* subpatentia, unguiculata, sepalis paullo minora. *Labellum* unguiculatum, trilobum, circa 6 mm. longum; ungue lineari angustissimo, lobis lateralibus patentibus falcato-oblongis obtusis, lobo intermedio minuto, disco tuberculo minuto instructo, calcari erecto oblongo obtuso. *Columna* oblonga, circa 2 mm. longa.

SOLOMON ISLANDS. Tulagi, C. M. Woodford.

Described from an inflorescence and from a photograph of the whole plant. It is said to be common throughout the Solomon Islands.

XII.—THE APPEARANCE OF COLPOMENIA SINUOSA IN BRITAIN.

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Colpomenia sinuosa, Derbes & Sol., a Brown Alga of the family *Encoeliaceae*, is a plant that is found throughout the warmer seas, being known both from the tropics and from temperate regions. It occurs abundantly in the Mediterranean, but until recently has not been recorded in Europe farther north than Cadiz. In 1906 two French observers drew attention to the appearance of *Colpomenia sinuosa* on the S.W. coast of Brittany, and during 1907 further notes were published on its occurrence at various localities in the neighbourhood of Cherbourg. Its presence may now be chronicled on the coasts of Britain, specimens having been collected by Mr. E. M. Holmes at Torquay in September, 1907, and by the writer at Swanage in the previous April. The appearance in these regions of an alga not previously known nearer than the south of Spain is of considerable interest, especially when it is not a question of isolated individuals, but of the apparent establishment of the plant in several widely separated localities. *Colpomenia sinuosa* is moreover of importance from an economic standpoint, in that it may occasion considerable damage to the oyster industry.

Though frequent in the Mediterranean, and well known from other parts of the world, a complete account of *Colpomenia sinuosa* has never been published. For this reason it was not without some hesitation that the British plants were referred to that species, especially as they did not altogether agree with such descriptions as had previously appeared. Specimens were therefore submitted to M. Bornet who has been kind enough to examine them and to confirm the identification. The Torquay specimens agree in a general way with the account furnished

by Miss Mitchell (1), which is the fullest hitherto published; there are however several variations from the description given by that writer. These variations may possibly be explained by differences in age and in the season of collecting. It is hoped that, when the investigation of the structure and development is complete, it will be possible to publish a full account elsewhere.

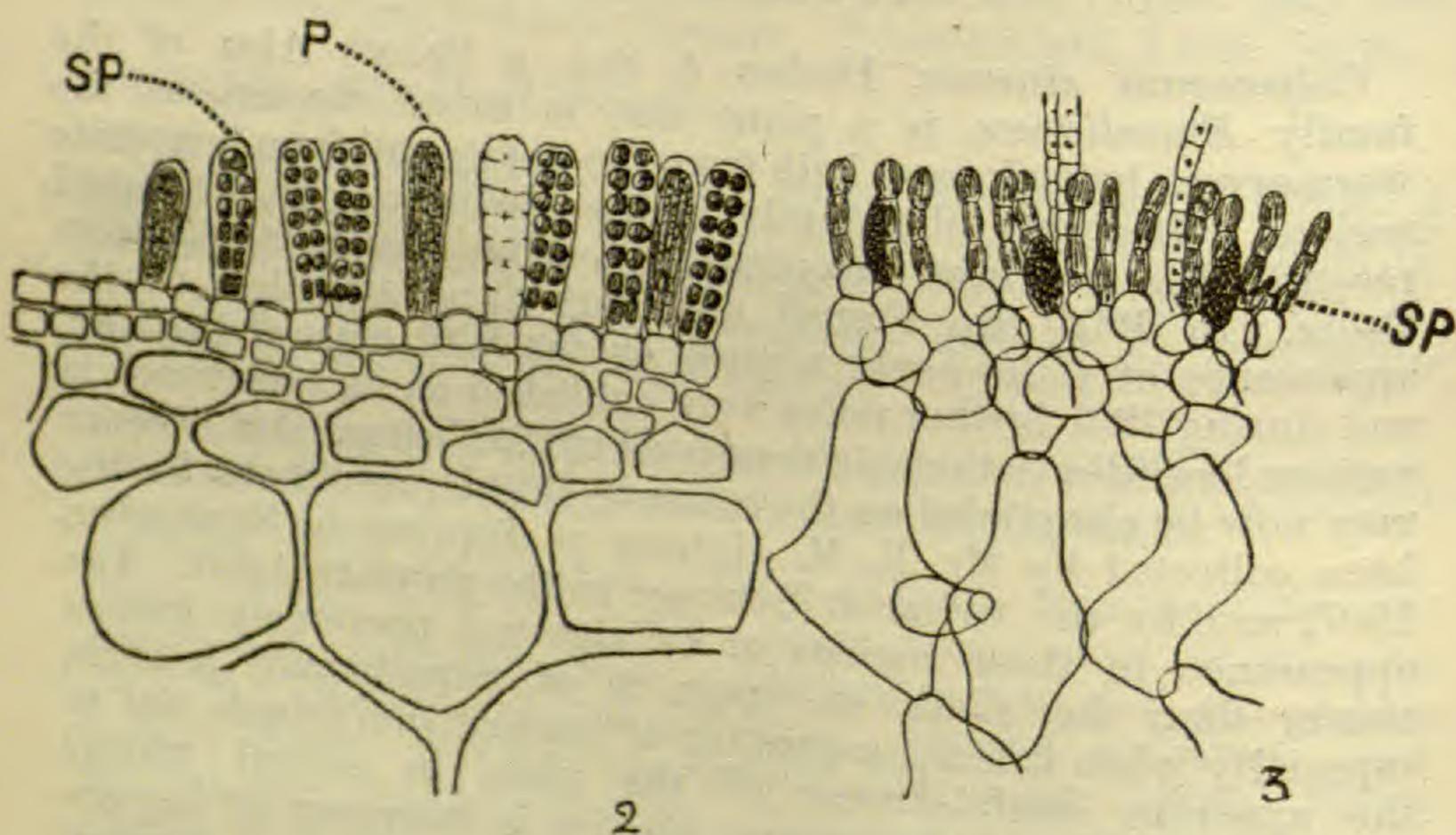
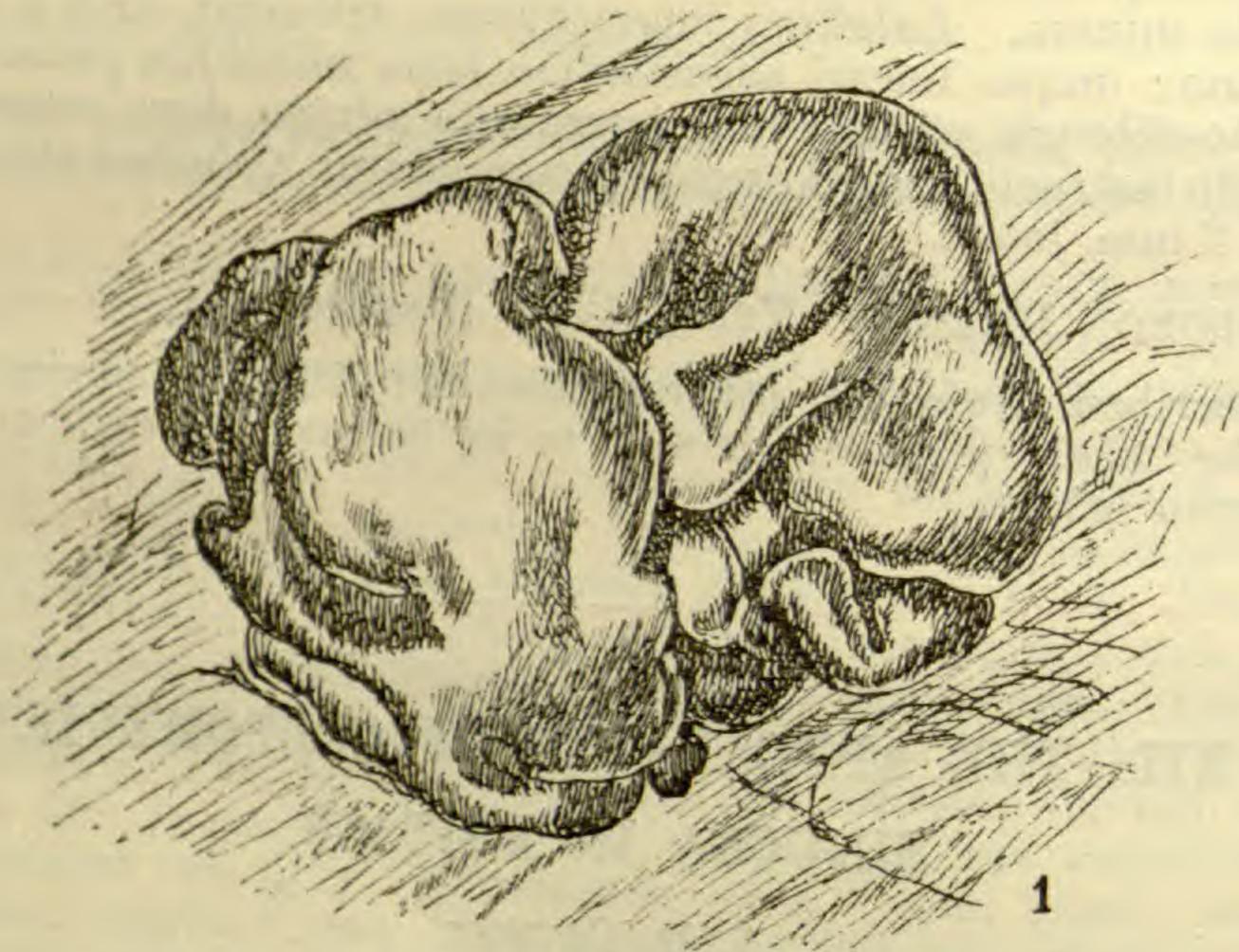


Fig. 1. COLPOMENIA SINUOSA. Derbes & Sol. Natural size, (after Oltmanns).

Fig. 2. COLPOMENIA SINUOSA. Portion of section of fertile plant, showing pseudoparenchymatous structure. *Sp.* = plurilocular sporangia. *P.* = paraphyses. $\times 400$.

Fig. 3. LEATHESIA DIFFORMIS, Aresch. Section through portion of a fertile plant showing the structure, which is not pseudoparenchymatous but more or less filamentous. *Sp.* = Unilocular sporangia. \times about 200, (after Thuret).

In external form *Colpomenia sinuosa* resembles *Leathesia difformis*, a species with which it has often been confused. It may be distinguished from that plant by the thinner non-gelatinous

walls, and by the structure, which is cellular and not filamentous. *Leathesia* also is usually irregularly lobed even when quite young, and has a resiliency which is lacking in *Colpomenia*.

The history of the appearance of *Colpomenia sinuosa* on the West Coast of France and in the English Channel is as follows. In 1906, M. Fabre-Domergue, Inspector-General of Marine Fisheries, recorded (2) the appearance of a seaweed at Vannes, in the Gulf of Morbihan, which caused the oyster-cultivators considerable anxiety. The plant was determined by Bornet to be *Colpomenia*. Fabre-Domergue states that the cultivators gave the seaweed the name of "Ballons" from the fact of their becoming, after exposure to the atmosphere at the lowest tides, partially filled with air, and floating to the surface of the water at the return tide. Considerable damage was done to the oyster-beds by the "ballons" not infrequently bringing with them to the surface the young oysters amongst which they had been growing. The author quotes a communication from Bornet, stating that the alga was not positively known to occur north of Cadiz, and that records of its presence on the North Coast of Spain are unreliable, especially as *Leathesia*, which is found on that coast, is not cited in Lazaro's catalogue. Amongst methods employed by the oyster-cultivators to destroy *Colpomenia*, the only one which had been in any measure successful, was that of breaking the "ballons" by sweeping the oyster-beds with bundles of prickly branches ("fagots épineux"). Fabre-Domergue suggested that the special conditions of Vannes in the Gulf of Morbihan were favourable to the growth of this southern species, but that after the first severe winter it would probably disappear.

At the end of the same year Sauvageau (3) published a paper on the occurrence of *Colpomenia* on the oyster-beds of the river Vannes, and recorded it from Belle Isle and Quiberon, two new localities in the same neighbourhood. From its distribution and abundance, the author believed that it had been introduced several years previously and had already become acclimatised. The floating of the alga is explained by Sauvageau in the following manner. "Le *Colpomenia* très jeunes est massif ; il se creuse en augmentant de volume. Il a une base étroite qui est son point d'attache ; soit par désorganisation localisée, soit par suite de l'irrégularité du support, cette base présente des ouvertures par lesquelles l'eau s'écoule. Au retour du flot, l'eau pénètre dans l'Algue par dessous, emprisonne l'air et constitue le ballon, qui est capable de soulever un support non fixé. Normalement, le *Colpomenia* étant adhérent au rocher, ou à des Algues fixées, n'est pas transporté par le courant comme celui de la Rivière de Vannes." Sauvageau also remarks that the method of breaking the "ballons" though efficacious in preventing the tendency to float is neither curative nor preventive, in fact the reverse, since the sporangia-bearing fragments of the algae are borne away by the currents and dispersion promoted. The number of oysters carried away from the beds is considerable, at times so much so, that the cultivators take the trouble to recapture them with nets.

In the beginning of April, 1907, *Colpomenia* was collected by several botanists in the neighbourhood of Cherbourg. Corbière (4) published a note on the subject, and added in a postscript that

he had seen a dried specimen from the same locality collected in March of the previous year. Bornet confirmed Corbière's identification. Two further notes were published by Mangin (5 and 6), who recorded the plant from several additional stations (Gatteville, Tatihou, and Barfleur). His specimens were collected on March 31, and April 1, 1907. Mangin also states that M. Malard, Assistant Director of the Marine Laboratory of the Tatihou Museum, informed him that the alga was first observed in September, 1905. Fauvel (7) also noted the occurrence of the plant in the same neighbourhood.

In September, 1907, the writer received from Mr. E. M. Holmes some dried specimens of an alga like *Leathesia* collected at Torquay, with a request to examine its structure. Mr. Holmes stated that the plant was quite distinct from *Leathesia*, and suggested a *Colpomenia* affinity. The specimens were immature, and, except for a minute fragment, sterile. The plant occurred fairly plentifully at Torquay, being found as an epiphyte on *Corallina*, *Rhodymenia palmata*, etc., and later supplies afforded fertile material. The first of these was a fine specimen about the size of a tennis ball, the remainder, which have been sent at intervals during the autumn, have been smaller. The fertile material showed the general structure of *Colpomenia sinuosa*, though the sporangia differed somewhat in size and other details from those of published descriptions, and also from the slides in the British Museum prepared by Miss Mitchell and illustrative of her paper. Later consignments from Torquay being similar to the previous gatherings, specimens were sent to M. Bornet who agrees that the plant is the Mediterranean *C. sinuosa*, the alga which has invaded the coasts of Normandy and Brittany. The immature specimens sent by Mr. Holmes immediately recalled to the writer some small plants noted by him at Swanage on April 27th, 1907. The specimens, which fortunately had been preserved, prove on examination to be identical with Mr. Holmes's plant, and undoubtedly represent young plants of *C. sinuosa*. On gathering, they were doubtfully referred to young stages of *Leathesia*, with a note that the walls were very thin and non-gelatinous. At Swanage, as at Torquay, the plant occurred as an epiphyte.

From the above account, it will be seen that *Colpomenia sinuosa* appears to have thoroughly established itself in the waters of the English Channel. On the British shores, as on the coast of France, it has appeared at localities widely separated from each other, and that in considerable quantity. The localities from which it has been recorded are well-known hunting grounds for algae, and therefore frequently visited, and were other intervening places to be searched, it is possible that it would be found in them also. As to the manner and date of its arrival on the shores of Britain, definite evidence is not yet forthcoming. The writer spent a week at Swanage studying and collecting algae in April, 1906 without any trace of *Colpomenia* being observed. If the invader, as suggested by Sauvageau, were introduced to the coasts of Brittany some years ago and has since been spreading in an easterly direction, it is possible that it may have first established itself at Swanage during the winter of 1906-7. Currents may have played an important part in its advance. On the other hand,

it may have been directly introduced to our shores by vessels; or conceivably with the consignments of young oysters that are imported from France to be "fattened" on the British culture-grounds, from whence it may have travelled along the coast.

The naturalisation of a marine alga on foreign shores is interesting and uncommon. Cases are known in which algae have been introduced and may now be found settling down and slowly spreading in the immediate vicinity. The Japanese *Bonnemaisonia hamifera* is a case in point. This alga is confined to certain spots on the south coast of England, and is found in very small quantity only. With *Colpomenia* it is otherwise. For over a century it has been recognised from the Mediterranean region, but, as far as known, has not during that period spread in a northerly direction. By some means it has now appeared in various localities in France and England, where it thrives and spreads rapidly, the external conditions appearing to be perfectly suitable to vigorous growth. The presence of warm currents due to the Gulf Stream would probably account for a southern alga being able to flourish in the English Channel, though it is not easy to see why *Colpomenia* should not have spread previously along the coasts of Spain and Portugal, which receive the full benefit of the Gulf Stream. M. Bornet, in a letter to Mr. Holmes, suggests that *Colpomenia* has been brought to Vannes by the vessels that convey living lobsters from Portugal to be cultivated in the Gulf of Morbihan. This explanation is possible enough, although as noted above there is no certain record that the plant occurs on the Portuguese coast.

Literature.

1. MITCHELL, M. O. On the structure of *Hydroclathrus*, Bory. Murray's Phycological Memoirs, Part ii. 1903, pp. 53-57. Plates XIV. and XV.
 2. FABRE-DOMERGUE. Une invasion d'Algues méridionales (*Colpomenia sinuosa*) sur les huîtres de la rivière de Vannes. Comptes Rendus, CXLII. 1907, pp. 1223-1225.
 3. SAUVAGEAU, C. A propos du *Colpomenia sinuosa* signalé dans les huîtres de la rivière de Vannes. Bulletin scientifique d'Arcachon, IX. 1906, pp. 35-48.
 4. CORBIÈRE, L. Sur l'apparition à Cherbourg du *Colpomenia sinuosa*. Bull. de la Soc. Bot. de France, LIV. 1907, pp. 280-283.
 5. MANGIN, L. A propos du *Colpomenia sinuosa*, (Roth) Derb. et Sol. Bull. de la Soc. Bot. de France, LIV. 1907, pp. 283-284.
 6. MANGIN, L. Sur l'existence du *Colpomenia sinuosa* dans la Manche. Comptes Rendus Soc. Biol. Paris, LXII. 1907, pp. 793-795.
 7. FAUVEL, P. Sur la présence du *Colpomenia sinuosa* à Cherbourg. La feuille des Jeunes Naturalistes, 1907, p. 146.
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