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THE JOURNAL OF BOTANY
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KARL EBERHARD RITTER VON GOEBEL.

By F. E. Weiss, F.R.S., P.L.S.

GOEBEL was born in 1855 in Bietigheim in Baden, but, as his family came from Reutlingen in Württemberg, he was sent to the neighbouring university of Tübingen, where as a student he came under the inspiring influence of Hofmeister, for whom he preserved a lasting admiration. To this he was able to give memorable expression at the centenary of Hofmeister's birth in 1894, when as last surviving pupil he published an admirable biography of his great master, a translation of which was issued by the Ray Society in 1926. Like other German students, he did not confine his studies to one university, but proceeded to Strassburg, where, under De Bary's tuition, he took his Ph.D. degree, presenting a thesis on the development of the prothallus of Gymnogramme leptophylla. Subsequently Goebel became Sachs's assistant and privatdozent in Würzburg, and after brief periods of teaching in Leipzig and Strassburg was appointed Professor in the University of Rostock in 1882. A further move to Marburg preceded his appointment in 1891 to the Professorship in Munich, where he remained for the rest of his fruitful scientific career, responsible for considerable developments in his department and particularly for the laying out of the new and extensive botanical gardens at Nymphenburg on the outskirts of Munich.

Travels to India, Brazil, Venezuela, Australia, and New Zealand brought him into close contact with many different types of vegetation, and greatly extended his knowledge of the living plant in its natural surroundings. The experience thus gained coloured the whole of his later work and he became the foremost exponent of the modifications of structure exhibited by plants in their adaptation to their surroundings and also in the course of their individual development. This attitude
of mind is well illustrated by the two volumes of 'Pflanzen-
biologische Schilderungen' (1889–1893), which contain many
and varied biological and morphological studies based largely
upon observations made and material collected in various
parts of the world. Goebel's interest in Morphology had shown
itself already when he was invited in 1882 to collaborate in
a new edition of Sachs's 'Textbook of Botany,' of which four
editions had appeared between 1868 and 1882. The Physi-
ological section was continued by Sachs, but Goebel contributed
the second part under the title of 'Outlines of Classification
and Special Morphology.' He also contributed in 1884 in
Schenk's 'Handbuch der Botanik' a volume entitled 'Ver-
gleichende Entwicklungsgeschichte der Pflanzenorgane.' This
may be considered the forerunner of his magnum opus 'Die
Organographie der Pflanzen,' the various parts appearing
between 1898 and 1903, and of which an English translation
was published by the Oxford University Press (1900–1905).

The importance and value of this work is attested by the
fact that three editions of the German edition have been called
for, each one embodying much new matter on which Goebel
was inessantially at work. The morphological considerations
in this monumental book are never formal, but are always dealt
with in a vivid and living manner and related to the ontogeny
of the organism described. Many of the problems which
troubled the older morphologists disappeared when Goebel
put forward the view now generally adopted that the sporangium
is an organ 'sui generis,' which may originate on either leaf
or stem. He was also ready to consider some organs as of
an indeterminate nature like the rhizophores of Selaginella,
which may bear either roots or leaves, and the curious lateral
organs of some Utricularias which may become leaves or roots.
The Organography is entirely free from dogmatic assertions,
and shows a most balanced judgment of observations and
experiment.

'Developmental and causal morphology led Goebel to
experimental methods, and the results of some of these were
embodied in his 'Experimentelle Morphologie der Pflanzen'
(1907). As indicated in the extended title and also emphasized
in the preface, this book is to be considered as an introduction
to experimental Morphology, 'a more or less new country,' as he
says, 'in which the path has to be found, and in which unexpected
discoveries are to be made with simple experimental methods.'
In this new field of research Goebel became a pioneer and without
doubt many vexed questions will be solved by those who follow
after him.

It is interesting to note that in all his morphological books
Goebel deals neither with the relationship of plants nor with
their evolution. He seems reluctant to deal with phylogenic
considerations, leaving these matters to the systematists and
the paleobotanists. Fossil plants are not used for comparison.
He is, par excellence, the student and exponent of the living
plant. Confining himself to the latter, especially to the Archeg-
niatae and Spermatophyta, he has worked diligently through-
out a long and busy life without finishing his quest. Even
the voluminous 'Organography' could not contain all he
had to tell us, and two Supplementary Volumes were published,
one in 1904 dealing with the Movements of Unfolding in Plants
and their teleological explanation and a second volume in 1931
dealing with the Formation of Flowers and Inflorescences.

Goebel's eminence as a botanist was early recognized in
England, and he was invited in 1884 to contribute the article
on Musciaceae to the IXth edition of the 'Encyclopedia Britannica.'
In 1892 he was elected a Foreign Member of the Linnean Society
and in 1926 of the Royal Society. In 1930 he was awarded the
Linnean Gold Medal. In his own country he received many
honours and occupied the Presidency of the Bavarian Academy
of Sciences.

Tall and well built von Goebel had a charm of personality
and manner which ensured him of an ever-ready welcome on
his not infrequent visits to this country, the last of which was
on the occasion of the International Botanical Congress at
Cambridge. He had a kindly nature, and many friends in this
country will cherish his memory, as they mourn the loss of one
of the most distinguished of botanists. His death on October 9,
at the age of 77, removes a still active worker and a leading
figure in the botanical world.

REMARKS ON TYPE-SPECIMENS, AND ON A NEW
SPECIES OF GRASS FROM HAWAII.

By A. S. Hitchcock, D.Sc.

Under the present system of botanical nomenclature it is
required by one rule that the earliest specific name for a species
be used if the resulting binomial is not invalidated by some
other rule. Many early names have been ignored, because the
original description could not definitely be co-ordinated with
a known species. It is now coming to be regarded as obligatory
to identify such early descriptions by a study of the type-speci-
mens, when these can be found. I will here call attention to
three cases in which an examination of the type has resulted
in reducing to synonymy a well established name and validating
a poorly or erroneously described species. A fourth case involves
the shift of a name and the description of a new species.
Glyceria melicaria.

A grass of the eastern United States was known commonly for most of the last century by the name Glyceria elongata Trin. For nomenclatural reasons this name was changed at different times to Paniculata elongata, Glyceria Torreyana, and Paniculata Torreyana. In 1807 I visited the herbarium of the Museum d'Histoire Nattielle in Paris to study the types of American grasses, among them those described by Michaux in his 'Flora Bororí-Americana' (1803). One of these was that from which the description of Panicum melicarium was drawn. This species had been ignored, because the description did not seem to apply to any known species of Panicum. The part of the description that made the identification difficult was (translating the Latin) "a minute rudimentary floret empty and stipitate from the base of the perfect flower." No species of Panicum is known to have such a rudiment. In some genera, such as Calamagrostis, there is a rudiment of this kind which is a prolongation of the rachilla. Michaux's type-specimen was at once recognized as the species commonly called Glyceria elongata. The description could now be interpreted. The spikelet of Glyceria has several florets which separate at maturity by the disarticulation of the rachilla. In Michaux's specimen the spikelets, being over-mature, had lost all the florets except the lowest. The rachilla-joint remaining behind the floret was the "rudiment" of the description. Michaux erred in placing this species in the genus Panicum, even on the supposition that there was one floret with a rudiment behind, since there were only two glumes, whereas Panicum has two glumes and a sterile lemma which looks like a glume. Because of this identification it was now necessary to take up the specific name melicarium and the species accordingly became, under the American Code, Paniculata melicaria (Michx.) Hitchc. But since Glyceria is a conserved name, under the International Rules, the accepted name is Glyceria melicaria (Michx.) Hubbard. Michaux's species would have remained unidentifiable if the type-specimen had not been available for consultation.

Trisetum irazuense.

A few years ago I published a new species of Trisetum from Columbia*. I had good specimens and wrote a complete description. The species is found from Costa Rica to Ecuador. After the publication of this species I had occasion to examine some of Kuntze's types at the New York Botanical Garden. I was then preparing an article on the Grasses of Central America, and was especially desirous of knowing the identity of Calamagrostis varia Kuntze (Rev. Gen. Pl. ii. 763, 1891) from Colombia. The detailed description did not appear to fit any known species of Calamagrostis from Costa Rica—nor, for that matter, from any other country. The specimen was found, and to my astonishment it proved to be the same species as my Trisetum scabriflorum. The name was therefore changed to Trisetum irazuense (Kuntze) Hitchc. (Proc. Biol. Soc. Washington, xl. 82, 1927). The type-specimen was over-mature and the spikelets had disarticulated, leaving only the glumes and lowest floret. The pilose rachilla-joint between the first (lowest) and second florets remained attached behind the floret as a little stem. The genus Calamagrostis, to which Kuntze referred the species, is characterized by one-flowered spikelets with (in the section Degeestria) a slender usually pilose prolongation of the rachilla behind the floret. The over-ripe spikelets of Kuntze's specimen show many characters of Calamagrostis. However, the pubescence of the lemmas was different from what is found in Calamagrostis, and Kuntze himself says his species differs in this respect from any known species of Calamagrostis mentioned by Fournier from Mexico and from any species of the genus from Central America to be found at Kew. A careful examination of the prolongation of the rachilla behind the floret of Kuntze's specimen shows the scar or disarticulating surface at the top, where this joined the base of the floret above. If Kuntze had been more familiar with grasses he would have detected this scar and would not have referred his plant to the wrong genus. As in the preceding case, Kuntze's species was unidentifiable without an examination of the type-specimen.

Poa laxiflora.

In 1927, while at Sol Duc Hot Springs, in the Olympic Mountains, Washington, I found a beautiful specimen of a Poa, which did not seem to belong to any species known to me. After a study of our representatives of the genus, I published the species as Poa remissa Hitchc. (Proc. Biol. Soc. Washington, xli. 158, 1928). At that time this collection was the only one known. Later the species was found in the Humboldt National Forest, Nevada.

In 1863 Buckley published a series of new species of plants, mostly from Oregon and Texas, one of which was Poa laxiflora (Proc. Acad. Phila. 1862, 96 (1863)). Gray, in his review of Buckley's plants, says of this species, "Poa laxiflora—the name appropriated from Nuttall, as usual,—whatever else it may be, accords with P. leptocoma Trin. from Sitcha. It is probably a woodland form of an old species." So for many years it rested as a probable synonym of Poa leptocoma.

In the early part of this century Piper examined the type-specimen in the herbarium of the Philadelphia Academy of Natural Sciences, and referred it to Poa leptocoma with a query, but doubted the locality (it was said to come from the Columbia Woods, Oregon). He was familiar with the states of Washington
and Oregon, and knew that \textit{Poa leptocoma} did not grow along the Columbia River. I saw a photograph of the type, which consists of a culm with a panicle and two leaves, but was doubtful as to its being \textit{Poa leptocoma}, although I could not place it elsewhere. This year I examined Buckley’s types and discovered to my chagrin that his \textit{Poa laxiflora} was the same as my \textit{P. remissa}. Since \textit{P. laxiflora} is valid it must displace \textit{P. remissa}, even though the description of the former is meagre and the type unsatisfactory. The difficulty here was that Buckley’s species is exceedingly rare, being known in 1928 only from his incomplete specimen and the Sol Duc Hot Springs material. Only an examination of the Buckley type by a specialist would show that this and my Sol Duc specimens belonged to the same species.

\textbf{Panicum Beecheyi.}

In 1922 I published an account of the grasses of the Hawaiian Islands*. Among other species in the genus \textit{Panicum} I included \textit{P. Beecheyi} Hook, & Arn. and \textit{P. kauaiense} Hitchc. (sp. nov.). At the time of my visit to Kew in 1930, I examined the type-specimen of \textit{P. Beecheyi}. This proved to be the plant I had called \textit{P. kauaiense} and not the one I had described as \textit{P. Beecheyi}. Hence the synonymy stands as follows:—


This leaves without a name the species I described (op. cit.) as \textit{Panicum Beecheyi}. I am therefore describing this as now.

\textbf{Panicum ramosus} Hitchc., sp. nov. \textit{Planta annua; culmi 20-30 cm. alti ramosi diffusi glabri vel puberulentis, nodis villosi; vagina glabra; laminæ glabrae vel scabereulæ 4-10 cm. longe 2–4 mm. latæ; paniècula numerosæ augustæ 5–10 cm. longæ pilis, axibus ramosis paulum villosis; spikelet acuminatum 4 mm. longum; glumae equales 5-nerveae acuminato longe villosae, pilis patulis 1–2 mm. longis, apice solum pubescentes; lemma sterile quam gluma paulo brevius 7-nerveus pubescens; lemma fertile 2 mm. longum.}

Type in the U.S. National Herbarium, no. 1,535,767, collected at Manili, island of Lanai, Hawaiian Islands, May 2, 1918, by George C. Munro.

Other specimens in the U.S. National Herbarium are: Lanai, Munro 301, 6, 64, 6 b; Molokai, Munro in 1903.

This species was described as \textit{P. Beecheyi} (“Grasses of Hawaii,” Mem. Bishop Mus. viii. 184, f. 75, 1922).

The above examples illustrate the difficulties encountered in applying the type-method, and show the necessity of consulting types if nomenclature is to be placed on a stable basis.


\textbf{Type-specimens from Hawaii}

I have been asked by beginners in taxonomy, How do you know where to look for a type-specimen? I have replied that the answer to this question involves the whole subject of herbaria and their contents, and that this subject is a part of his research problem. There is no one book which gives the location of all types, though there are books that aid one to find them. The student must acquire knowledge concerning the location of types as he does that of other branches of taxonomy,—by the gradual accumulation of evidence. Another question the beginner asks is, How do you know a type when you see it? The revised edition of the International Rules, now in preparation, will probably contain a definition of a type-specimen. My own definition is,—A type-specimen of a species is the specimen or one of the specimens which the author had chiefly in mind when preparing the original description. The student must learn to use discretion in the interpretation of type-data, especially when dealing with the types of the early authors. Sometimes an author has misinterpreted his specimen and has written an erroneous description. The type-specimen may explain such discrepancies. If a supposed type-specimen does not agree with the description, at least within explainable limits, it is not the actual type. The description takes precedence over the specimen when there is a conflict of evidence. In this Journal (xxi. 166, 1924) I published an example illustrating the conflicting evidence occasionally shown between the specimen cited and the description. Ordinarily, the single cited specimen would be accepted as the type. But it was shown by an examination of Beal’s herbarium that the type of \textit{Arundinella Palmeri} Vasey, Beal, was not the specimen erroneously cited, which belonged to a different species, but an unmentioned specimen in his herbarium which bore the name in Beal’s script and which answered to the description.

U.S. Department of Agriculture.

\textbf{Note on Chenopodium Glaucescens L.}

\textbf{By Eric Drabble, D.Sc.}

Examination of the material of \textit{Chenopodium glaucescens} in my own herbarium and in that at the British Museum has failed to discover any seeds—whether upright or horizontal—with acutely keeled edge, although they are thus described in most Floras. Mr. J. E. Little (in \textit{litt.}) reports a similar experience with his own specimens, and in Rep. B. E. C. 1931 (1932) 830, he writes in reference to certain plants from Lurgashall, Sussex, “The keel mentioned by Coste is not evident in the fresh fruit; and comparing it with a sheet of \textit{C. glaucescens}, Isle of Wight, 1915, J. W. Long, the latter also has no acute keel, but is rounded off or only obscurely keeled.”
Not one of my specimens shows any keel; the margin is rounded. The many specimens examined in Herb. Mus. Brit. are exactly similar. An attempt has therefore been made to find the source of the error so generally repeated in the Floras, both British and Continental. In this search Mr. Wilmott has given me invaluable aid, and to him I tender my sincere thanks.

No reference to a keel is made in any of the following works:—Pollich, Hist. Plant. in Palat. nasc. incoperta, i. (1776); Leers, Fl. Herborn. (1789); Lamarck, Fl. Fr. ed. 2, i. (1785); Withering, Brit. Plants, ii. (1801); De Candolle, Fl. Fr. ed. 3, iii. (1815); Smith, Fl. Brit. ed. 2, i. (1804); Smith, E. B. ed. 1, xxi. and plate 1198 (1805) (the seed in this plate is not keeled); E. B. ed. 2, ii. and plate 362 (1855), with the same figure as in ed. 1.

Turning to Moquin-Tandon's 'Chenopodium Monographia,' 31 (1842), we read "Semina margine acute." Koch, Syn. Fl. Germ. ed. 2 (1843), does not embody this, ignoring the margin of the seed altogether, nor do Boero, Fl. Centre, ed. 3, ii. (1857), nor Bentham, Handb. Brit. Fl. ed. 1 (1858), but from 1842 onwards this erroneous description appears in slightly varying form in most Floras. Babington, who is known to have worked with Moquin-Tandon's Monograph, writes in Bab. Man. ed. 1 (1843) "acutely keeled at the margin"; in ed. 4 and onwards to ed. 8 it appears as "acutely keeled at the edge," and this is continued into the re-edited edition of 1904 (ed. 9). Similar descriptions are found in many other Floras, e.g., De Candolle, Prodr. 13, part 2 (1849), "semina margine acuto"; Grenier et Godron, Fl. Fr. 3 (1853-56), "à bord aigu"; B. E. ed. 3, viii. (1868), "bluntly keeled"; Hooker, Stud. Fl. ed. 3 (1884), "acutely keeled"; Coste, Fl. Fr. iii. (1908), "à bord caréné-aigu"; Rouy, Fl. Fr. xii. (1910), "à bords carénés.

A remarkable result of this general error seems to be shown in E. B. ed. 3, viii. 23 (1868), where Syme writes "the vertical ones bluntly keeled . . . . the horizontal ones larger but in other respects similar," though the same figure is used as in ed. 2, which correctly shows a seed with no trace of keel. Seeds actually detached by Syme himself and enclosed in packets on his own sheets now in Herb. Mus. Brit. are keless. It would seem that Syme was influenced by the description given by Moquin-Tandon and his followers, and tried to combine the keel, which according to them ought to be present, with the keless condition as he saw it, giving as a compromise "seeds . . . . bluntly keeled"

A similar explanation may perhaps account for Hegi's description (Illust. Fl. Mitteleuropa, iii. 1909-12), "am Rande schwach gekielt." A still more remarkable comment is that by Fraser in Rep. B. E. C. 1931, 839 (1932), "the tiny seeds have a very narrow keel, but not all botanists are agreed about this."

It must be stated plainly that the seeds of Ch. glaucum are not keeled; the margin in both horizontal and vertical seeds is rounded. When the seed is looked at in surface view the position of the embryo, coiled round in the perisperm, can occasionally be seen, but there is no keel whatever.

It was at first suspected that two plants, one with keeled, the other with keelless seeds, had been confused under the name Ch. glaucum, but examination of plants from many parts of Europe has failed to find any with keeled seeds, and it seems certain that the seeds are characteristically keelless.

The seeds in all my specimens are dark brown or almost black; Smith, E. B., describes them as "blackish"; Grenier and Godron as "brunes"; Rouy as "brunes"; Hegi as "schwarzbrun"; Babington says they are "reddish," but this applies only to the unripe seeds.

Ch. glaucum is described in Hooker's "Student's Flora" as "6-18 in. prostrate . . . . usually spreading, widely branched"; in Babington's 'Manual' as "spreading, often prostrate." I have grown the plant from seed, and find that the stem may be upright or slightly decumbent at the base, and have seen plants at Newport, Isle of Wight, with branches 15-17 in. in length more distinctly prostrate at the base, then ascending. Mr. J. W. Long has found at Newport an entirely prostrate and widely spreading form which seems to be a distinct variety, var. prostratulum Beck, Fl. Nied. Oester. 331 (1890).

The form of the leaf varies; Hooker calls it "oblung or ovate-oblung sinuate-lobed, obtuse or rounded, base cuneate"; Babington, "oblung sinuate-dentate"; Hayward "oblung-toothed"; Moss (Cambridge Brit. Fl.) "oblung, margin sinuous, obtuse." All these forms are to be met with, while also the leaves may be not obtuse, but distinctly acute; indeed, Hegi (loc. cit.) describes the leaves of var. typicum Beck as "spitz oder zugespitzt." Further, the margin may be very slightly sinuate or almost entire, as in H. C. Watson's specimen from St. Sampson's, Guernsey, Aug. 1865, in Herb. Drabble. Usually the leaves on the flowering branches are much smaller and narrower than those on the main stems; they may even be sublinear, entire, and very long-stalked, as in a specimen in my herbarium from Newport, Isle of Wight, J. W. Long, 1929. There is an apparently distinct variety with all the leaves small, narrow, and acute, with sharply toothed margin; this plant, which was found by Mr. J. W. Long at Newport, seems to come under var. microphyllum Murr. Hegi (loc. cit.) mentions many varieties, but the descriptions seem to suggest that some of them are still in our species and not distinct varieties. It may be wise to defer a consideration of these until more of them have been tested in cultivation.
NOTES ON LATHYRUS APHACA L.

By B. Barnes, Ph.D., F.L.S.

Lathyrus Aphaca is a well-known morphological curiosity, notable because of its large stipules and because of its leaves, normally represented on mature plants by filiform petioles, devoid of leaflets, and running out into unbranched tendrils. A small patch of this plant was found in the summer of 1918 on calcareous soil near Bruay, Pas-de-Calais, France. Ripe pods were collected, and in 1920 plants were raised from some of the seeds. Seeds were saved from one of these plants, and since 1921 plants have been grown each year, usually from seeds ripened in the previous season.

The seeds germinate readily, and the manner of development has been the same in the hundreds of seedlings which have been looked over. The germination and seedling development of Lathyrus Aphaca has been described by a number of authors (16, 20, 21, 25, 31, 36, 37)*, all of whom agree in their main details. The cotyledons are hypogeous, and the first two or three leaves on the aerial stems are scale-like, usually trifid. These leaves are followed by two or three compound leaves, each bearing one pair of broadly lanceolate leaflets, placed one on each side of the rachis; the stipules of these juvenile leaves are small and asymmetrical. At each of the three or four nodes next above the uppermost juvenile leaf, the stem bears a pair of stipules, the rest of the leaf being reduced to a very short petiole with a pointed tip. The members of each pair are larger and more symmetrical than those of the pair next below. A pair of normal symmetrical stipules and a petiole ending in an ordinary tendril develop at the eighth to tenth node. The internodes of this primary stem are short, and almost always the whole stem has a somewhat wilted aspect. The primary stem seldom lasts long, and in my plants has never flowered. By the time that normal stipules begin to form on the primary stem lateral branches have arisen from buds in the axils of the scale-leaves; these branches, and their branches, develop pairs of large stipules from the first, and soon flower. The primary stem and the juvenile leaves wither before the first flower opens, so that a mature plant is quite without leaflets.

The degeneration of the primary stem is a characteristic and puzzling feature of Lathyrus Aphaca. The plant is probably a native of the Levant and Western Asia. A specimen in the Kew Herbarium, collected by John Stuart Mill in Greece in March 1862, bears juvenile leaves and flowers. The early flowering suggests that the plant had developed very rapidly, and, maybe, in a warm climate, with conditions favouring rapid growth from the start, the primary stem may often survive and form part of the permanent shoot-system of the plant. In the south of France, according to Lombard (26), the primary stem normally disappears, as it does in this country. It is well known that the seedlings of many plants, checked in early growth, often fail to give strong plants. In Lathyrus Aphaca the loss of the primary stem, weakened by the checks caused by the low average temperature of a northern spring, is probably hastened by the competition of the lateral branches, formed a little later, when conditions favour their rapid growth. Comparable phenomena may be seen in plants of Antirrhinum majus overwintered out of doors; the stems which have passed the winter, and which, from their crowded and often malformed leaves heavily charged with anthocyanin, seem to be unhealthy, are often crowded out and replaced in May by young and vigorous shoots arising from the base of the plant.

My stock of Lathyrus Aphaca started from one seed ripened in 1920. The plants have shown much divergence in the dimensions of their parts; some have been distinguished by the production of particularly large or particularly small stipules, and some have developed branches bearing large stipules and others bearing small ones. Mature stipules ranging in breadth from 1 cm. to 2.5 cm. have been noted. The flowers have varied in length within rather narrow limits; the range is 0.8 cm. to 1.3 cm. The corollas have varied in depth of colour from cream to a full yellow, and there has been much minor variation in the extent of development of faint purple streaks in the standard. Purple-black seeds, brown-purple seeds variagated with yellow stripes, and seeds of intermediate character have been obtained. These diversifications have been shown by plants growing side by side under identical conditions, and therefore are not due merely to accidents of the environment.

The plants have been frequently and closely examined during growth. Only one marked variation has been seen. This occurred in 1928, on a plant belonging to a line started from a black seed. The plant was strong, with six long stems each bearing about a dozen petioles ending in tendrils. One petiole inserted on the upper half of a stem bore a single lateral leaflet a trifle over 1 cm. long. The leaflet was linear-lanceolate, with a stout and somewhat hollowed base, in texture and colour it agreed with the stipules. The petiole was of normal size and ended in a functional tendril; its basal part, below the insertion of the leaflet was about twice as thick as the stoutest part of the tendril (fig. 1, p. 12).

The plant was watched until it withered in August 1928. It did not produce any more leaflets. Only eight seeds ripened, six black and two black with a few light flecks. These were germinated, but the seedlings were killed by severe weather in the spring of 1929.

* The figures in parentheses refer to the Bibliography, which will appear at the end of this article.
The casual production of a leaflet by one plant only, in a stock of which hundreds had been grown, suggested that the occurrence was worth further investigation. Reference to the well-known treatises on plant-teratology (38, 39, 47, 44, 57) did not yield anything relevant, but when the systematic books were consulted it was found that the condition, though rare, is not unknown. Specimens of L. Aphaca bearing one or more lateral leaflets have been examined in the herbaria at Kew, the British Museum, Edinburgh, Cambridge, and the Linnean Society.

During the search for records of leaflets in L. Aphaca, specimens and descriptions were found of foliate varieties of the plant, characterised by the development of terminal leaflets on all the petioles of adult plants. It soon became apparent that there is much confusion in the literature respecting the nature and nomenclature of these foliate plants. Fortunately, several specimens have been available for examination, and the results of this examination, together with the information gained from an extensive search in the books, make possible an attempt to clear up a small but complicated tangle. I have tried to see or to obtain trustworthy copies of all the published statements on this subject. It is possible that something has been overlooked, but I do not believe that anything essential has been missed.

The history of the foliate plants of L. Aphaca begins with Chauvin (17), who described to the Linnean Society of Normandy a peculiar form of the plant found by him at Mouen, near Caen, in 1843. His account of the plant does not seem to have been printed. Hardouin, Renou, and Leclère (20) give some details of Chauvin's plants. They also mention the discovery by Durand Duquesney at Lisieux, in 1845, of a few peculiar specimens, and record a further find, by de Brébisson, near St. Pierre-sur-Dive, in 1848. These authors relate that Chauvin found an abundance of specimens, and that, although he searched, he was unable to find a plant with both tendrils and leaflets; every abnormal plant had all its tendrils replaced by terminal leaflets. Their note gives all the information that seems to be available about the plants found by Durand Duquesney; these plants bore two lateral leaflets in addition to tendrils, and as Hardouin's account is accompanied by a reference to statements by de Candolle (15, 33), that L. Aphaca occasionally bears paired leaflets, it is probable that the specimens from Lisieux were plants with a few casual leaflets. They may, of course, have been young plants retaining their juvenile leaves. De Brébisson gives somewhat scanty details of his plants in the second and subsequent editions of his 'Flora de la Normandie' (12, 13, 14). Chauvin's plants are also mentioned. It is not clear from the information given by de Brébisson that he distinguished between the form found by Chauvin, with all the tendrils converted into terminal leaflets, and specimens bearing a few leaflets only. He nowhere uses a varietal name. Perrier (45), another member of the Linnean Society of Normandy, is unfortunately almost equally vague. He says that the most usual leafy form of L. Aphaca is one with the end of the tendril replaced by a leaflet, and that it is possible to find plants of this species showing all the kinds of compound leaves met with in the genus Lathyrus. An important piece of information is that abnormal forms of L. Aphaca have persisted for many years on clayey soils near Bayeux.

Specimens communicated by S. R. Lenormand to Babington, in 1846, now in the Cambridge Herbarium, yield more definite information about the Normandy variety. His specimens, labelled L. Aphaca L. (foliifer), came from Caen, and are almost certainly specimens of Chauvin's form, for they agree with the description given by Hardouin (20). The Cambridge Herbarium has a specimen of the plant distributed as no. 1474 bis of Billot's 'Flora Galliae et Germaniae exsiccata,' a plant to be discussed presently. Comparison of Lenormand's plants and Billot's no. 1474 bis shows that they differ only in size. The differences in size are no greater than I have seen in my plants, and they cannot be of systematic importance. The two plants undoubtedly belong to the same variety. Friedel (20), who examined numerous specimens of foliate plants of L. Aphaca in herbaria at Paris, including one collected near Bayeux, and others from Western France, the source of Billot's specimen, came to the same conclusion.

Lloyd (35) mentions, without a varietal name, a form of L. Aphaca bearing petioles ending in terminal leaflets; this plant had been found at Bougon by Sauzé, and near Port Louis by Thépault. Lloyd had seen the herbarium formed by Sauzé and Maillard, and therefore was personally acquainted with the variety. Sauzé and Maillard supplied specimens of the variety.
to Billot, which were distributed as no. 1474 bis of his 'Flora Galliae et Germaniae exsiccata,' with a label referring them to Lloyd's variety. Thépault seems to have published nothing about his plants, and I know of no specimen collected by him. Godron (24), in his comprehensive survey of the flora of the neighborhood of Port Louis, does not mention L. Aphaca. In this connection, however, a specimen preserved in the Edinburgh Herbarium is of interest. It belongs to the same variety as the plants from Caen and Bougon; the only information given with the specimen is the locality, Carnac. Possibly the plant was collected by J. Miln or one of his associates, when the excavations at Carnac were in progress. Be that as it may, Carnac is not far from Port Louis, and this specimen helps to bridge the geographical gap between Bougon in Western France and the localities in Normandy.

An important specimen in the British Museum Herbarium (ex Herb. B. Auereswald) was collected by Vetter at Scheltheim, near Schaffhausen, in June 1859, and passed through the collection of Julius Schleicher, an apothecary at Winnigen. The label bears the name Lathyrus Aphaca L. foliata, and states that the plant was found in company with the normal form. A note on the back of the label, in an unidentified handwriting, runs as follows: -"Es ist kein Cirrhus foliacens, denn ich besitze ein Exemplar, woran der Cirrhus neben dem Blatte, am Ende sich befindet." Neither Schleicher nor Auereswald seem to have published anything about this plant, but Vetter (55) described it with the name L. Aphaca var. foliata. Vetter says that he had sent about eighty specimens into Germany some twenty-five years previously, but that, so far as he knew, no one had published any account of the variety. He also says that a local botanist had recently obtained a few more specimens for him at some distance from the original locality. Vetter's plant has been compared with the specimen of Billot's no. 1474 bis in the British Museum Herbarium; both belong to the same variety, though Billot's plant is smaller than Vetter's specimen.

There are two specimens mentioned in the literature which I have been unable to see. Borbas (10) notes a foliate plant preserved in the Herbarium, Natural History Museum, Budapest, collected by Delacour at Avignon. Delacour does not seem to have described his specimen, and I have found no accounts of foliate plants of L. Aphaca in floras of Avignon. Friedel (20) examined specimens from that locality; he considered that they belonged to the same variety as the plants from Western France and from Normandy; in the absence of personal experience of the plants from Avignon, his opinion is accepted. Rouy (51) mentions a specimen (Exsic. Dauph. no. 2444) with the tendrils replaced by terminal leaflets. I have been unable to obtain any further information about this plant.

A number of varietal names have been applied to foliate plants of L. Aphaca; these names will now be discussed.

Nymy (43) applies the varietal name cirrhosa to Billot's specimen no. 1474 bis: the name is invalid, as it is not accompanied by a description, but we are left in no doubt about the plant to which it was given. Rouy (51) cites the name as cirrhosa Nym., refers to Billot no. 1464 bis, and describes the variety as having short petioles ending in a tendril reduced to a micro. These statements need comment. First, the identity of Billot's no. 1464 bis must be established. Billot distributed specimens of normal L. Aphaca in the fifteen century of his Fl. Gall. et Germ. exsic. In the list of the plants making up this century (6) nos. 1464 and 1464 bis are occupied by L. Aphaca; the succeeding numbers, consecutively to 1474, belong to various members of the Leguminoseae and Rosaceae, no. 1474 being Potentilla grandiflora L. In a later list (7) Billot indicates that no. 1464 was L. Aphaca from a French locality, no. 1464 bis from a Swiss one. Billot often distributed specimens of the same plant from different localities, distinguishing them by the addition of bis, ter, and so on, to the number first allocated to the plant. The Herbaria at the British Museum and at Cambridge contain specimens of normal L. Aphaca, distributed by Billot, and coming from French and Swiss localities. Both plants are numbered 1464—apparently Billot used no. 1464 bis in his lists, and not on his labels. A list dated May 1864, issued after Billot's death by Bavoux and others (3), shows that no. 1474 bis was distributed in the 34th and 35th centuries of the Fl. Gall. et Germ. exsic. Billot was preparing these centuries for distribution during his last illness (8), and his annotations to them, if made at all, were lost after his death (4). The number 1474 bis is probably a slip for 1464 ter, made under the stress of illness. There is no evidence that Billot's no. 1464 bis was a plant of abnormal character.

(To be continued.)

SHORT NOTES.

CORYNEPHORUS CANESCENS BEAVY, ON THE MORAY COAST.—In this country Corynephorus canescens is held to be native only in East Anglia. It has, however, been recorded from near Port Talbot in South Wales and from South Lancashire, both cases possibly being introductions resulting from shipping activities. In view of this very restricted distribution and of the fact that its native area extends only as far north as Norfolk on the East Coast, it is of interest to record the fact that it occurs in great abundance over extensive tracts of sandy shingle to the east of Lossiemouth. It is found chiefly in the "lows" between the east–west parallel ridges of sand; associated with it are Calituna,
Festuca rubra, many lichens, especially Cladonia, and mosses. The sand-ridges are mostly covered with gorse, broom, Psamma, and Urtica aronaria, but the Corynephorus is also found quite frequently on the barer parts of the sand.

It appears to extend over many square miles of land, and its normal density in the "lows" is 5-10 plants to the square yard, and such that it is a predominant factor in the landscape. Owing to its abundance, there can be no doubt that it has been in the district for many years, but it was first noticed by the writer in the summer of 1829.

The Rev. G. Birnie of Speymouth has informed the writer that some thirty-five years ago he saw a few plants of Corynephorus at Kingston-on-Spey and a solitary plant on the west side of Lossiemouth; it is probable that this was, in the first place, another instance of casual introduction at a port, but its occurrence in this district is now remarkable for the abundance and vigorous growth exhibited so far north of the natural limit of the species.—E. H. Chater.

Notes from Glamorgan.—Rumex rupestris Le Gall. In August 1932, the writer was directed to the habitat of a dock, growing in considerable profusion on the extensive sand dunes at Kenfig, by Miss E. Vachell, to whom it had been shown by Miss E. M. Thomas of Porthcawl. It proved to be Rumex rupestris Le Gall, a species new to the county.

The docks occurred in crescent-shaped communities in dry sand at the landward end of several of the dune-slacks which abound at Kenfig. Some of these communities consisted of pure R. rupestris, while others contained also R. crispus var. trigranulatus Syme, and plants, presumably hybrids, intermediate between the two species.

The Kenfig plants, in comparison with herbarium specimens from other localities, both British and Continental, are somewhat stouter and more bushy in habit, the tubercles are very large (usually covering the whole of each perianth-segment), and the leaves, which remain fresh and green into September, when plants of Cornish populations are withered (vide Miss Vachell), have a distinctly glaucous hue, a character not mentioned in any description of the species seen by the writer. Seeds of the Cornish and Kenfig plants (including the supposed hybrid) have been sown at Kew, to see if there is any genotypical difference between the two populations.

R. rupestris, a plant of rocky, stony, and sandy shores, has a Western European distribution, having been recorded from Spain, Portugal, western France, Channel Isles (Jersey), Cornwall (including the Scilly Isles), North and South Devon, and Dorset. The records from Sussex and Hampshire are almost certainly errors.

The fact that such a conspicuous community has not been previously recorded suggests the possibility that the plant may have been recently introduced, perhaps by birds, from its nearest habitat at Braunton Burrows, N. Devon. It is, however, thoroughly well established in at least half-a-dozen slacks, and it must, in the writer's opinion, have been there for at least five or six years.

Cirsium tuberosum All. × C. palustre Scop. Mr. J. L. Bruce showed the writer this hybrid growing with both parents in the well-known locality for C. tuberosum near Nash Point, where he has noticed it for some years. Though not previously recorded from Britain, this hybrid has been long known in France, Switzerland, and Germany, and numerous segregates from the cross have been described under different names, the earliest of which seems to be Cirsium semidecurrens Richter in Klett u. Richter, Flora von Leipzig," 673 (1839). The Glamorgan plant was apparently quite sterile.—J. S. L. Gilmore.

 Alleged Change of Colour in Primula vulgaris.—The following experiment has been carried out in order to test the accuracy of the statement often made that if a yellow-flowered plant of P. vulgaris is planted upside down the flowers produced the following year will be pink. Two plants of an F₁ generation were selected normal for colour, but heterozygous in that the cross was made between a normal and a plant with enations. No coloured plant appeared in the F₂, so it was known that for colour the plants were probably homozygous, but segregation for the eniating character took place.

The plants were divided and the divisions labelled A, B, C, D, A and C were planted in the normal way, their divisions B and D upside down, and in order that there should be no possible mistake the latter were planted in wire cages. All four plants flowered and all produced flowers of the normal colour. The flowers of the divisions B and D were examined to see if a chimeraical effect might have been produced and enations formed; this, however, did not occur.

It is suggested that in cases of reported change of colour care has not been taken to ensure accuracy of observation. The probable explanation is that a seedling or plant with coloured flowers growing near is mistaken for the inverted plant: in some cases plants so treated do not live. Unless very good evidence to the contrary is forthcoming it may be assumed that the alleged change of colour does not take place.—Eric M. Marsden-Jones.

Cirsium heterophyllum × palustre in Inverness.—A specimen of this rare hybrid, found in W. Inverness near Tomich, has been presented to the British Museum Herbarium by the collector (R. Knowling). It has sub-entire (not pinnatifid) Journal of Botany.—Vol. 71. [January, 1939.] 6
leaves. From the same district was also presented a peculiar form of C. palustris (L.) Scop., a slender plant 60 cm. tall, unbranched except for two small flowering shoots at the apex, with practically entire linear leaves about 12 by 13 cm. when fully developed, weakly spinose ciliate on the slightly sinuate, weakly toothed margin. I should be glad to receive information should similar plants have been noticed elsewhere.—A. J. WILMOTT.

REVIEWS.


The last year or two has seen several hastily compiled books aiming to deal with certain aspects of genetics. The present work is of wider scope. Its intention is to present the main developments in genetics during the last decade as they bear on evolution, and to indicate the present position as the author sees it. Dr. Hurst’s experience with the plant, the animal, and the human side has enabled him to produce a very readable and profusely illustrated work which is worthy in some respects to stand beside Bateson’s ‘Mendel’s Principles of Heredity,’ which marked the progress of an earlier decade. If there remain any sceptics concerning the part played by chromosomes in connection with hereditary processes they should read this book.

The author has not always shown the same reticence of statement as characterized Bateson’s work, and some of his views regarding the gene would not be acceptable to all geneticists. Nevertheless, he has produced a volume which records many important advances in simple terms clearly expressed. On many topics the statements are not as full as the geneticists could wish, but the aim was evidently rather to produce a work of more general character. In this the author has succeeded so well that every biologist who wishes a summary of recent genetical work should read his book.

Having said so much, a few criticisms will be in place. In discussing sex-chromosomes the letters WZ are retained for animals in which the female is the heterogametic sex. This is really an unnecessary complication, and there is no reason why the terms XY should not be retained in all animals and plants. Although the figures are nearly all well chosen, a few of them have either been too much reduced or have otherwise suffered in reproduction. This applies, for instance, to figs. 52 and 61. There are now more than seven types of trisomic mutations in Oenothera (p. 88), and this is to be expected since 12 of the 14 chromosomes in O. Lamarckiana are regarded as unlike. The aberrant chromosome-numbers of the speltoid wheats are mentioned

(p. 94), but there is no reference to the similar conditions found in fatuoid oats. A notable omission is the work of Punnett in showing that the number of linkage-groups in the sweet pea corresponds with the number of chromosome pairs. Certain other topics, such as sex in fungi, if mentioned at all, should have been more adequately treated.

The twenty chapters into which this work is divided include such topics as chromosomes and genes, translocations, polyploids, hybridization, and mutations, all in their relation to the production of new species. The chapter on “genes and genetics” includes a useful summary of the genetics of colour in rabbits and sweet peas, as well as the inheritance of musical temperament and general ability in man. The roses come in for considerable treatment, but Hurst’s conception of the genetic species requires further justification.

The last four chapters take on a more speculative and general character. The author takes the rather extreme view of the gene (p. 185) as “the organizer and the foundation of life,” later developing the conception that genes were the earliest living particles. Suffice it to say that this is only one of the possible conceptions of their origin.—R. RUGGELES GATES.


In this work we have a competent revision of the Pteridophyta of Madagascar. During the past three years Carl Christensen has made a careful study of all available material, has examined all the types of the endemic species, and has compared the non-endemics, so far as possible, with authentic specimens. He was thus able to supply, as requested, a revised enumeration of the whole group on a broad and safe basis for inclusion in Perrier de la Bathie’s ‘Catalogue des Plantes de Madagascar’ (Tana-narive, 1932). That, however, was little more than a list of names, and necessitated the preparation of a more detailed account containing descriptions of the new species, critical notes on specific delimitations, and on numerous changes of nomenclature. Such is the origin of the present work. It does not provide descriptions of species other than novelties: this lack, however, is largely compensated for by the provision of excellent species-keys, descriptive notes, and a liberal supply of illustrations. There are, in fact, figures of 267 species, mostly endemic, which have never been delineated before; the drawings have been made
by the author himself from type-specimens, and show the most important specific characters. Moreover, for most of the other species an easily accessible figure is cited, chiefly from Hooker's 'Species Filicum,' the 'Icones Plantarum,' and T. R. Sims's 'Ferns of South Africa.' Thus we have a straightforward and consistent account which will be of the greatest assistance to all students of Madagascar ferns.

The keys under the larger genera, such as Asplenium, Dryopteris, Polypodium, Elaphoglossum, Selaginella (by Mr. Alston), are of great value in facilitating the naming of species. And still more valuable is the author's treatment of the Cyatheaceae, a difficult group, the classification of which has hitherto been confusing and unsatisfactory, owing to the incompleteness of the material in herbaria and the instability of some of the characters employed for distinguishing the species, such as the degree of division of the pinnae, and the texture and pubescence of the frond. Christensen has been able to examine the actual types of all Cyatheaceae described from Madagascar as well as the very complete specimens of tree-ferns collected by Perrier de la Bâtie in every part of the island. From a study of these Christensen has concluded that the most trustworthy specific characters are the structure of the stipe-base as well as of the scales and hairs of the frond, the venation and sorus, the position of the sori, the indusium, the height and thickness of the trunk, the leaf-scars, and the adventitious roots. There were 43 species to be investigated; these he has now reduced to 29. Further, he has leagued himself with Copeland and Domin in abolishing the barriers between Cyathea, Hemithea, and Alsophila. He refers all but four of the Madagascar species to Cyathea, as the indusium has proved to be too variable and too misleading a character for generic delimitation. The residual four species, which form a distinct group, are left temporarily in Alsophila.

The distribution of the species within the island is reviewed in a separate chapter by Perrier de la Bâtie; and the affinities of the species are analysed by Christensen. There are 505 species in all, as many as 233 of these being endemic, and their geographical affinities are roughly as follows:—one-seventh are Mascarene, one-fifth African, one-third Asiatic, one-fifth American, one-tenth pan-tropical, and a few South African and cosmpolitan respectively.

A valuable feature of the book is the interesting account of the various collectors of Madagascar plants, their dates, their districts, and what became of their collections. Most of the ferns collected before 1800 were described by J. G. Baker, and the type-specimens are preserved in the Kew Herbarium. As to the extensive material which has been gathered subsequently, it was worked out by Prince Roland Bonaparte, whose herbarium, including that of Christ, is now in the Paris Museum.—A. Gepp.


Though primarily addressed to the cultivator this attractive brochure issued by the Royal Horticultural Society contains much botanical information. The publication inaugurates the work of a Committee appointed by the Society to encourage the cultivation and the study of Lilies, Fritillarias, and Nomocharias. A Lily Conference has also been arranged to be held in July 1933. Of the twenty-five short articles, some deal with cultivation of the plants at home and in America; the editor, F. J. Chittenden, writes on the lily disease (Botrytis), and there are articles dealing with individual species or groups of species—Cap. Kingdon Ward, for instance, writes on Lilium hycanthinum Wilson in its Burma-Tibet mountain home. A. Grove contributes an index to illustrations of species of Lilium, W. B. Turill a tentative list of species and synonyms of Fritillaria, and Sir Wm. Lawrence a general account of its species, many of which he has himself grown. There are also several pages of notes from correspondents at home and abroad. A portrait of the late Henry John Elwes—"the father of modern Lily cultivators"—forms an appropriate frontispiece; the text-figures are mainly habit illustrations of species growing in cultivation.


The Director of Agriculture, Madras, Mr. R. D. Anstead, who has taken an active interest in the preparation and publication of the book, supplies a Foreword indicating its aims. These are to place at the disposal of the farmer a knowledge of the nature and habits of the common weeds of cultivation, so that he may be able to control them or possibly turn them to his use. It should also serve as a useful textbook for teachers in the Presidency who are engaged in attempts to conduct school gardens and teach nature study. The authors are officials of the Agricultural College and Research Institute, Coimbatore.

There are six introductory chapters, in which are described in simple language the parts of a plant, the system of binary nomenclature and means of determination, the classification of weeds according to their period of life, habit, or habitat,
the loss caused by weeds and the uses to which they may be put, their means of spreading and methods of controlling them. The last chapter contains some useful enlarged drawings (the magnification is indicated) of more than a hundred common weed seeds, and also of a few of the seedlings.

In the descriptive portion (pp. 62-328) a concise description of each family precedes the account of the species. The latter includes a good botanical description, notes on occurrence, habitat, and method of propagation, an estimate of the number of seeds per plant, indication of means of control and of economic importance, if any. English and native names are cited. A clear full-page plate illustrates the habit of the plant and details of structure of the flower and fruit. There are a useful glossary and separate indexes of botanical, English, and native names.

Considerable care has evidently been given to the preparation of the work, which should fulfill the objects indicated in the Foreword.

BOOK-NOTES, NEWS, ETC.

Linnean Society of London.—At the General Meeting on November 24 Dr. A. B. Rendle gave an account of the Herbarium and Manuscripts bequeathed by John Gerhard Koenig to Sir Joseph Banks. Koenig, who went to India in 1768 as Surgeon and Naturalist in the Danish service at Tranquebar, was in 1774 appointed naturalist to the Madras establishment of the Hon. East India Company, which he served until his death in 1785. He was an indefatigable collector and an able botanist. During his life he sent specimens to Banks, Solander, and other European botanists, one of whom, Prof. Rotzian of Lund, published in his ‘Observationes Botanicae’ many novelties collected by Koenig. The herbarium is a rich collection of the flora of India and Ceylon. The Manuscripts, which were arranged and annotated by Dryander, Sir Joseph’s librarian, are in nineteen volumes, and contain elaborate descriptions of the genera and species represented in the herbarium, with notes on Koenig’s travels and his observations on natural history, medicine, &c.

The Discussion on Dr. Hamshaw Thomas’s paper on “The Old Morphology and the New” was continued. The Fellows are indebted to Dr. Thomas for an exposition of the newer points of view, which at first sight seem subversive of standard conceptions of flowering plant morphology, which postulate a uniform value for floral and foliage leaves. The newer conceptions are at present somewhat vague, but the divergence of views may ultimately prove not to be so great as now appears.

At the meeting on December 8 papers were read by Mr. W. J. C. Lawrence on “The Origin and Genetics of the Garden Dahlia” and by Dr. B. F. Barnes on “Variation in Antirrhinum.”

‘The Gardens’ Bulletin, Straits Settlements,’ vii. pt. 1 (Sept. 1932), contains a substantial contribution to our knowledge of Malayan Orchidology by Mr. C. E. Carr. The first paper contains descriptions of a new genus, Chelirorchis, of 25 new species and three new varieties from the Malay Peninsula, and 26 new records for the Peninsula of previously described species. The new genus contains five species, three are described for the first time and two are transferred from Sarcochilus and Dendrobium and nine new Bulbophyllums. Eight new combinations are published, and there are critical notes on previously known species. The new species and records are largely of Mr. Carr’s own collecting; others are based on specimens collected by officers of the Singapore gardens. The second paper is a taxonomic account of the genus Taeniophyllum in the Malay Peninsula. In Ridley’s ‘Flora of the Malay Peninsula’ four species of the genus are enumerated. Since the publication of that work thirteen additional species have been found, chiefly in Pahang, twelve of which are regarded as new. The new species are described and figured, references are given to those previously known, and a key is supplied to the subgenera, the sections, and the 17 species now known from the Peninsula.

The descriptions are very full, but the frequent absence of a collector’s name and number and the omission to indicate the type-specimen may lead to confusion in the future. Many of the novelties are described from living plants; this is a great advantage, and the author has doubtless at the same time prepared adequate herbarium material for future record.

‘The Journal of the Royal Horticultural Society,’ lvii. pt. 2, contains several papers of special interest to botanists. C. V. B. Marquand enumerates, with a key and full descriptions, the thirty-five species of Gentiana known in cultivation from China and the Himalaya. There are some excellent photographs of Gentians by Mr. D. F. Merrett from the Camla Gardens, Sussex. Lt.-Col. Enever Todd continues his ‘Survey of the Genus Viola,’ dealing with the Chamaemelanium and Melanium sections. Contributions from the Wisley Laboratory comprise continuations of Dr. Tincker’s experiments on the response of plants to the daily period of light and D. E. Green describes a Smut disease, Entyloma Dahliae, which seriously affected the collection of Dahlias in the autumn of 1931. An interesting appreciation of the late George Forrest and his work of botanical exploration in South-West China, by Sir W. Wright Smith is reprinted from ‘The Rhododendron Society Notes.’
NOTES ON LATHYRUS APHACA L.

BY B. BARNES, PH.D., F.L.S.

(Concluded from p. 15.)

It is not at all clear why Rouy asserted that the variety circrora had the peculiar characters he assigned to it. The condition he described is a normal developmental phase of the plant, and needs no varietal name.

Beck von Mannagetta (48) has the name circrora Nyman with a reference to Billot no. 1474 bis; like Rouy, he says that the tendril is changed into a mucro. Ascherson and Graebner (2) have similar statements about the morphology, but Billot's plant is under var. phyllophorus Borbas. Friedel (20) repeats Rouy's name and description; he dismisses the variety with very little comment. Hegi (30) gives the name cerirhosa Nyman, the statement that the tendril is reduced to a point, and no reference to a specimen. Finally, Bonnier (9) lists the variety cerirhosa Nyman, a curious transformation of the name, since he alludes to the absence of tendrils.

All this confusion started from Billot's specimen no. 1474 bis, a plant whose tendrils are replaced by terminal leaflets. I have found no evidence of the existence of a variety of L. Aphaca, whose pedicels characteristically end in a tendril reduced to a short point. As comparison of specimens shows that Vetter's plant and Billot's plant belong to the same variety, both should bear the same name. Vetter's varietal name has preference over Nyman's name, because it was accompanied by a description. The subsequent applications of the name cerirhosa must be rejected, for they have been used to distinguish a variety which does not seem to exist.

A second varietal name, foliolaris, or some variant of the word, has been used by several authors. It seems to have been introduced, in the form foliolaris, by Gremli (26), who attributed it to de Brébisson. Gremli attached the name to Vetter's variety, but, probably influenced by the rather vague statements in de Brébisson's Flore de la Normandie, he described a plant with one or two leaflets at the tips of only some of the tendrils. Vetter (55) clearly describes a plant with the general conversion of the tendrils into terminal leaflets, and his specimen supports his description. Vetter (56), in his French translation of Gremli's book, adopted the name foliolaris without comment. Borbas (10) used the name foliolaris Bréb. to distinguish the foliate plant collected near Avignon by Delacour, and referred as authority to de Brébisson (14). De Brébisson does not use a varietal name in that edition — nor, indeed, in any edition of his flora. Hallier (32) seems to use the name foliolaris Bréb. for the ordinary juvenile

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condition of the plant, a curious use of the name. Rouy (57) distinguishes the variety foliolaris Bréb. from the variety eirroso, and mentions the specimen (Exsicc. Dauph. no. 2414) already alluded to: he too cites de Brébisson (14) as authority. Beck von Mannagetta (48) uses the name foliolaris, and gives the same information as does Rouy. Ascherson and Graebner (2) and Høeg (30) apply the varietal name to a plant with both leaflets and tendrils, and so, presumably, to a condition here regarded as a casual one, not of varietal rank.

Friedel (20), after examining many specimens, held that the variety foliaris Bréb. is the only definite variety of L. Aphae : he described it as having the upper leaves in the form of a short petiole ending in a well-developed terminal leaflet. Had Friedel examined a plant showing the characters he ascribed to the variety eirroso, he would hardly have stated that the variety foliaris is the only well-marked variety of L. Aphae. His brief allusion to var. eirroso indicates that he never saw a specimen of it: this is further evidence of the non-existence of that variety.

Corbière (28) gave the Norman localities already noted, and distinguished the plant by the varietal name foliaris. Bonnier (9) used this name in his text, ascribing it to de Brébisson, while, in the description of the corresponding plant he used the name foliaris; his figure would fit any of the foliate plants I have seen.

Reasons have already been given for regarding the Norman plant, as exemplified by Lenormand's specimen, as identical with Vetter's plant. Vetter's name antedates Gremin's name by two years, and therefore the name foliaris and its derivatives must give way to foliolaris. There is no evidence that any definite variety of L. Aphae exists with leaflets on some petioles and tendrils on others; if such a variety is shown to exist, the varietal name foliaris Gremin should be given to it.

There is, in southern Europe, a robust and large-flowered plant of somewhat doubtful status. It has been regarded as an independent species, with the name Lathyrus affinis Guss. (28), and it has been regarded as a form of L. Aphae. The status of this plant will not be discussed here; it seems best to regard it as a form of L. Aphae. Borbas (10) regarded var. foliaris as belonging to L. affinis, and, as the specimen on which he relied came from southern France, it may well have been a strong plant. He proposed the varietal name philophorus for Billet's no. 1474 bis. As this name was accompanied by a description, it would replace eirroso Nyman, but it is antedated by foliaris Vetter. Beck von Mannagetta (48) does not appear to accept the name philophorus; Ascherson and Graebner (2) and Høeg (30) accept it in the sense proposed by Borbas.

Two other varietal names need brief mention. The first, unifoliatus, occurs in Goebel's 'Organography' (25); I have not found it elsewhere. It appears to apply to the foliate plants, but it is antedated by names already discussed, and is therefore unnecessary.

The other, unifoliatus, is found in Penzig's 'Pflanzen-Teratologie' (44), and is repeated in the second edition. Both Vetter and Morière (42) are mentioned, and the plant is clearly indicated by these references. In this literatute list, Penzig cites Vetter's paper by its proper title (55), and yet has unifoliatus in his text: this name is presumably a transformation of his own. The same mixture occurs in Wordsell (57), unifoliates in the text, foliata in the literature list. The name appears to be without authority. Penzig has another statement of doubtful value. He says that Morière (42) described the foliate variety. The paper referred to is an obituary notice of A. Perrier: in it, Morière merely remarks that Perrier discovered the foliate variety at Mouen. This seems to be a faulty statement. Perrier (45) published a short paper on the foliation of L. Aphae, based on plants from around Bayeux, not from Mouen: he makes no claim to priority in that paper. According to Hardouin (29) and to de Brébisson (22), Chauvain first found the plant at Mouen: as their accounts were written soon after the event, they are more likely to be correct.

It appears, then, that there is in Western Europe, scattered over a wide area, a rare variety of Lathyrus Aphae, bearing terminal leaflets on all its pedicels, and therefore without tendrils. The oldest name for this plant, accompanied by a description, seems to be L. Aphae var. foliatus Vetter. This varietal name applies to all the foliate plants I have examined, and replaces the varietal names which have been discussed.

Two further points will be briefly dealt with—the colour of the ripe pods and the colour of the testa in L. Aphae.

Grenier and Godron (27), Godron (23), and Bonnier (9) describe the ripe pods as yellowish. After examination of many ripe pods of cultivated material in the Chelsea Physic Garden, in my own garden, of wild material from Torquay, Wimsham, and Bruay, and of much herbarium material, it seems that greenish brown, as stated by Høeg (30), is nearer to the truth for recently matured pods; later, the pods turn brown.

The testa varies greatly in colour. The original sample of seeds collected near Bruay consisted mainly of purple-black seeds; about one-third of the sample had purple-brown testes variegated with yellow, and a few were intermediate: one of the intermediates was black on one side, variegated on the other, the rest were purple-black with one or two small yellow flecks. It was hoped that it might be possible, by selection, to isolate strains producing black and variegated seeds respectively. So far, this has not been successful, though some hundreds of plants have been grown, and the seeds for the
next crop, taken from plants in which the tendency to give either black or yellow seeds, seemed to be most strongly expressed.

At first, attempts were made to obtain complete counts of the seeds from the individual plants, together with details of the position of each seed in the pods. The plants have not been difficult to grow, for germination has been good and flowering abundant, but the crop of ripe seeds has been poor, because many

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Fig. 2.—Diagram of a plant of *Lathyrus Aphaca L.* grown from a variegated seed in 1930. The positions of the pods on the plant and of the seeds in the pods are indicated.
of the pods have dried up before the seeds were fully formed. This has occurred on plants sown in autumn and on plants sown in spring; watering in dry weather has not improved the crop. Complete counts have therefore been obtained from only a few plants; two counts chosen at random from the records are represented in diagrammatic form in figs. 2 & 3.

Usually plants raised from black seeds give more black seeds than do plants raised from variegated seed; the latter generally give a fair number of variegated seeds. There are vague indications that variegated seeds may occur most freely on some branches or parts of branches, but, not infrequently, black and variegated seeds occur separately in pods on the same branch, and, less often, black and variegated seeds occur in the same pod. Rarely a seed is obtained with one half of the testa purple-black, the other variegated. Such a seed mixed with either black or variegated ones cannot be distinguished from the others if it lies undisturbed with the appropriate side turned uppermost. At present the mechanism which determines the distribution of testa colour on a plant of L. Aphaca is quite obscure. If somatic segregation occurs, it must sometimes be of a complicated character.

In a vague way, also, it seems that the tendency to produce black seeds is associated with a weakness in vegetative vigour; plants or branches with small stipules and short internodes usually give a preponderance of black seeds; plants or branches with stipules approaching or exceeding 2 cm. in breadth, and with long internodes, may give a good proportion of variegated seeds. The relation is not, however, a simple one, for efforts to influence the colour of the testa by encouraging or depressing the vegetative activity of the plant, by rich or by poor feeding, have not yielded consistent results. A strain of plants cultivated in the Chelsea Physic Garden produces very constantly light yellowish seeds faintly marked with purple streaks, and another strain grown there gives black seeds sometimes faintly flecked with yellow or grey; evidently there are strains of L. Aphaca which show much constancy in the sort of testa they produce.

Many of the authors who describe L. Aphaca do not mention the colour of the testa. The table has been compiled from twenty descriptions chosen in such a way that they give an account of material drawn from a wide area, and also indicate the historical aspect of the matter.

Probably some at least of the descriptions are taken from herbarium material, and this renders uncertain any generalisations from the table. Black seeds of my stock, ripened in 1920 and then dully purplish, now agree well with the description coal-black, applied by Koch. On the other hand, variegated seeds ripened in that year, and then showing yellow areas (Ridgway, XXX. 21°, k.), have changed in colour to reddish brown (Ridgway, II. 7. m.).

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**NOTES ON LATHYRUS APHACA L.**

**Testa colour in Lathyrus Aphaca L.**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Origin</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dodoens (Lyte)</td>
<td>1610</td>
<td>N. Europe (1)</td>
<td></td>
</tr>
<tr>
<td>Tournefort (Martyn)</td>
<td>1730</td>
<td>Europe and Asia Minor (1)</td>
<td>x x x</td>
</tr>
<tr>
<td>Gmelin</td>
<td>1808</td>
<td>W. Germany</td>
<td>x</td>
</tr>
<tr>
<td>Koch (Koch)</td>
<td>1828-39</td>
<td>Germany</td>
<td></td>
</tr>
<tr>
<td>Mérat (49)</td>
<td>1824</td>
<td>Paris</td>
<td>x</td>
</tr>
<tr>
<td>Lloyd (34)</td>
<td>1844</td>
<td>W. France</td>
<td>x</td>
</tr>
<tr>
<td>Bertoloni (5)</td>
<td>1847</td>
<td>Italy</td>
<td>x x</td>
</tr>
<tr>
<td>Grenier and Godron (branched)</td>
<td>1865</td>
<td>France</td>
<td></td>
</tr>
<tr>
<td>Philippe (46)</td>
<td>1859</td>
<td>Pyrenees</td>
<td>x</td>
</tr>
<tr>
<td>Akefeld</td>
<td>1861</td>
<td>Austria (1)</td>
<td>x</td>
</tr>
<tr>
<td>Godron</td>
<td>1861</td>
<td>Lorraine</td>
<td>x</td>
</tr>
<tr>
<td>Sowerby</td>
<td>1864</td>
<td>Britain</td>
<td></td>
</tr>
<tr>
<td>Sauzé et Mailhard</td>
<td>1872</td>
<td>W. France</td>
<td></td>
</tr>
<tr>
<td>Koch (Hallier)</td>
<td>1892</td>
<td>Germany</td>
<td>x x</td>
</tr>
<tr>
<td>Corbière</td>
<td>1894</td>
<td>Normandy</td>
<td>x x</td>
</tr>
<tr>
<td>Post</td>
<td>1896</td>
<td>Syria</td>
<td>x x</td>
</tr>
<tr>
<td>Rony</td>
<td>1899</td>
<td>France</td>
<td>x</td>
</tr>
<tr>
<td>Ascherson and Graebner</td>
<td>1906</td>
<td>France</td>
<td></td>
</tr>
<tr>
<td>Hegi</td>
<td>1924</td>
<td>Cent. Europe</td>
<td>x x</td>
</tr>
<tr>
<td>Borg (11)</td>
<td>1927</td>
<td>Malta</td>
<td>x</td>
</tr>
</tbody>
</table>

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| | | | 10 7 9 |

Seeds taken from green and half-ripe pods are reddish brown in colour (approximately Ridgway, II. 7. m.), and seeds which fail to ripen, in pods which dry up prematurely, are also of this colour. It appears, therefore, that as variegated seeds age the light areas approximate in colour to that characteristic of immature and aborted seeds. The descriptions given by Bertoloni (5), Post (47), and Borg (11) suggest that the seeds of plants from southerly habitats may, even when properly ripened, bear testas of a similar colour. Presumably the seeds ripen more rapidly in Syria and in Italy than they do, for example, in this country. Delayed ripening may favour the development of more and deeper pigmentation in the testas, and the changes noted in the light areas on stored seeds may be slower changes of a similar kind. These suggestions are provisional, and it is hoped that opportunity may be found to put them to experimental test.

I wish to express my gratitude to the Department of Botany, British Museum, Natural History, to the Herbaria at Kew and the Royal Botanic Gardens, Edinburgh, and to the Botany School, Cambridge, for the free access to specimens and books accorded to me. Professor A. C. Seward, F.R.S., Professor W. H. Weston of Harvard, and Professor E. Gáumann of Zurich have very kindly supplied me with information which could not be obtained in London.
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CONTRIBUTIONS TO OUR KNOWLEDGE OF BRITISH ALGAE. III, IV.*

BY M. B. GODWARD, B.Sc.

III. THE GENUS NAEGELIELLA IN BRITAIN. (Figs. 1, 2.)

The alga forming the subject of the present communication was first found in January of 1932 in two stagnant ponds near Loughton on the outskirts of Epping Forest. It occurred...
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EXPLANATION OF FIG. 1.

*Naegelicia britannica*, sp. nov. - *a*, single cell, night-condition (c.e., contractile vacuole); *b*, young colony, showing cell-contents; *c*, dividing cell; *d*, side view of two-celled colony; *e, f, g, h*, 2-celled, 4-celled, 8-celled, and 16-celled colonies respectively, with bases of hairs; *i*, old colony with cells in two layers in the centre; *j*, single cell with hair; *k*, colony in optical section, showing protoplasmic threads; *l*, 2-celled colony, showing forking protoplasmic thread. *a, x 1200; b-d, x 900; e-i, x 860; j, l, x 900; k, x 800.

frequently on glass slides that had been placed in these ponds for the purpose of examining the epiphytic growth. Subsequently it was also found occasionally upon Nitella and frequently upon the leaves of *Oenette fruticulosa*. The epiphytes *Mucococcus* and *Aprophyta*, which are mentioned as occurring together with *Naegelicia* and *Phaeothamnion* by Correns * and Scherffel †, were also present in this case. *Naegelicia* is a very rare alga, which, since its first description by Correns *, who found it near Tübingen in Württemberg, has only once been recorded, namely by Scherffel † from the neighbourhood of Iglos (Hungary). It is, however, highly probable that Correns’s and Scherffel’s forms belong to distinct species. *Naegelicia* is regarded by Scherffel (loc. cit. p. 354) and Pascher ‡ as a palmelloid member of the Chrysophyceae and placed in a special family, Naegeliciaceae of Chrysophacae. The majority of the observations detailed below were made on the fresh material within a few hours of its being taken out of the pond.

The colonies consist of few to many cells, the number ranging approximately between one and fifty. The cells, which are commonly elongated in one direction, are usually grouped to form a flat one-layered circular disc, firmly attached to the substratum (fig. 1, *h*); in larger colonies, however, the disc becomes two cells deep in the central portion (fig. 1, *i*).

The whole colony is enveloped in a covering of mucilage (figs. 1, *e, f, h*; 2, *a, c*), which appears to be of rather fluid consistency and which follows the contours of the cells beneath. One or more of the peculiar branched hairs (fig. 2) to be described below emerge from the outer surface of the colony. These hairs are often very inconspicuous until they have been stained and may readily be overlooked. Those on older colonies attain to great complexity and are of enormous length (fig. 2, *a, c*).

The individual cells have the following structure. There is usually a single parietal chromatophore, showing the typical golden-brown colour of Chrysophyceae and generally V-shaped

as seen from the surface (fig. 1, a, b); sometimes two such chromatophores are found in cells which are dividing (fig. 1, c). The cells always contain a number of large rounded whitish lumps (cf. fig. 1, b), which disappear overnight and presumably consist of leucosin. In addition, there were numerous shining spherical globules which have the appearance of fat globules, although staining with Sharlach R was indecisive. In the living cells 2–4 contractile vacuoles (fig. 1, a) could always be distinguished. These were confined to no special part of the protoplast. No stigma could be detected. Staining with haematoxylin or chlor-zinc-iodide revealed a rounded body in the centre of the cell, which was presumably the nucleus.

The cells are devoid of a wall, although the individual proplasts are surrounded by an envelope of denser mucilage (fig. 1, c, e, f), which did not stain with chlor-zinc-iodide or ruthenium red. Beyond the individual mucilage investments lies the envelope of less dense mucilage which is of considerable extent, and forms a common envelope to all the cells of the colony (figs. 1, e, f, h; 2, a). After staining with methylene-blue or iodine-green followed by dilute potash, a slight stratification was visible in this peripheral mucilage-envelope (fig. 1, d), but a marked stratification, like that described by Scherffel (loc. cit. p. 348, t. xv. figs. 37, 44), was never seen in fresh plants, although observed in material that had been grown for two months in a culture-vessel in the laboratory (fig. 2, e).

The colonies arise by successive division of the cells. Until late stages all the divisions take place perpendicular to the substratum. In the early stages of development there is often a certain regularity in the segmentation. Eight-celled stages commonly show four central and four peripheral (fig. 1, g), sixteen-celled stages four central and twelve peripheral cells (fig. 1, h), but the arrangement of the cells is often more irregular. As enlargement proceeds the cells appear to divide simultaneously, and in the larger colonies (figs. 1, i; 2, c) they are often conspicuously grouped in pairs. Division in a plane parallel to the substratum takes place only in the centre and only in older colonies (fig. 1, i). The mucilage-epitole of the individual protoplasts appear always to be in contact along their whole extent (figs. 1, h; 2, a), except at the margin of the colonies. In this respect the present form differs from that described by Scherffel (loc. cit. p. 348), where pairs of cells are stated to be connected only by the overlying mucilage.

The earliest stage of development that has been observed was that of a single round cell, already bearing a long hair (fig. 1, j). When stained with methylene-blue (or other stains) the hair appears as a simple hollow tube of mucilage tapering to a point.

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No clear indication of the sheath described by Correns (loc. cit. p. 633) was here obtained. A stage of division of the single cell is shown in fig. 1, c. Two-celled colonies invariably possess only one hair, arising from the line of separation of the two cells (fig. 1, e). The second division is at right-angles to the first, a single hair often arising from the centre of a group of four cells, as shown in fig. 1, f. From this stage onwards there is little constancy in the number and position of the hairs. While a colony of fifty cells may exceptionally have only one massive central hair (cf. fig. 2, a), a four-celled colony may already exhibit two. Colonies with about twenty cells usually bear from five to ten hairs, which are of diverse sizes and occupy different positions with reference to the underlying cells.

In the species described by Correns (loc. cit. p. 632) as Naegelia flagellifera the basal part of the older hairs consists, in transverse section, of a composite aggregate of hollow tubes of mucilage, the innermost of which lie side by side, while the outermost are arranged concentrically around the inner ones.

When the hair is viewed from the side, each of the inner tubes is seen to take its origin between two cells of the colony. When these inner tubes are followed upwards, they are found successively to emerge as branches from the outermost tubes. These branches, which may themselves comprise a number of mucilage-tubes, trail out for long distances into the water, and their inner components may emerge as branches from the outer ones at higher points in just the same way, the successive branches becoming thinner and thinner. In this way the older colonies of Correns's form bear elaborate and irregularly branched hairs. He was of the opinion that these arose by the protrusion of hollow mucilage-hairs from most of the cells, the hairs formed from the daughter-cells always growing into that of the parent, but at a higher level breaking out from it as a branch. The outermost sheath of all is quite short, since the first mucilage-hair formed never grows to any great length. Correns was unable to establish the presence of any protoplasm in these hairs (cf. loc. cit. p. 633).

The form, described by Scherffel as Naegelia natans, likewise bears mucilage-hairs. These are simple structures, which are usually, but not always, branched. They are traversed by delicate protoplasmic threads emerging from the protoplast of the cell bearing the hair. When the latter is unbranched it contains a single protoplasmic thread, whilst when branched there are a number of these threads arising each from one cell and occupying the main axis of the hair; usually the number of protoplasmic threads is equal to the number of branches, and one thread ultimately passes into each branch (cf. fig. 2, g). The protoplasmic threads themselves are never branched, but the hairs sometimes bear short branches that are devoid of the
central thread. In many cases these elaborate hairs are borne on a cone-shaped mass of stratified mucilage surmounting the cells from which the hair arises. As Scherffel (loc. cit. p. 353) points out, these hairs, except in their peculiar branched character, bear a close resemblance to the pseudocilia of Tetrasporaceae.

In the investigation of the hairs of the British alga the staining methods used by Scherffel (i.e., methylene-blue, or iodine-green followed by dilute potash) were employed. The elucidation of the structure of the hairs is rendered especially difficult owing to the fact that the various parts show a marked spiral twist in many cases. Young hairs of narrow width and no considerable length consist of a hollow tube of mucilage. Such hairs taper to a point, and in unicellular individuals (fig. 1, j) arise from the outer mucilage-covering above the centre of the cell. The cells at the margins of older discs sometimes bear similar simple hairs, while the more massive ones always arise from the inner parts of the disc.

Much more massive hairs (cf. fig. 2) than those figured by Scherffel were encountered. Such massive hairs branch abundantly and rather irregularly, while sometimes showing conspicuous forking in their upper portion (fig. 2, a); the branches become progressively thinner. Towards the base of the hair, the main axis likewise divides into a number of units (fig. 2, c, d), which diverge somewhat and are attached to the disc at points corresponding to the line of separation of two cells (cf. fig. 2, c). The structure of these hairs is, on the whole, consistent with the interpretation that they are aggregations of simple hairs which become progressively separated above and below into smaller and smaller aggregates and finally into simple tubes. At their upper ends they taper to a fine point (fig. 2, a), while at their base they enter the disc at a point between two of the cells (fig. 2, c). It has not, however, always been possible to find agreement between the number of ultimate branches above and the number of diverging units observed at the base. Often there seem to be fewer above than below, which would indicate a certain amount of fusion or non-separation of the tubes in passing upwards. Sometimes, too, the tubes appear to branch towards their upper extremities, but this has been less frequently observed. Only indefinite traces of a common sheath have been noticed at points of branching in fresh material, although plants that had been grown in the laboratory for two months showed it clearly (fig. 2, e, f); such cases agree substantially with the description given by Correns (loc. cit.).

After treatment with iodine-green and dilute potash (less clearly after staining with iodine in potassium iodide solution) delicate threads broken into short lengths, presumably as a result of the swelling produced by the potash, have nearly always been observed throughout most of the length of the hairs (fig. 2, e-e);
they appear just like the protoplasmic threads figured and described by Scherffel (loc. cit. p. 349). In the broader parts of the hairs there are a number of such threads, while in the ultimate branches, as well as in young hairs, only a single one can be discerned. The origin of such protoplasmic threads from the protoplasts of cells of the disc has been seen clearly only in a few cases, but it has sometimes been possible to trace them upwards into the hair (cf. fig. 1, b). In most of these cases it seemed as though the protoplasmic threads arising from two adjacent cells almost immediately fused before passing upwards (fig. 1, 1). This may be correlated with the fact that each ultimate branch at the base of the hair appeared to terminate at a point midway between two cells, and that in the growth of the colony all the cells divide simultaneously. The units constituting the ultimate branches at the base of the hair appear to pass through the outer mucilage-envelope of the colony and to be in connection with the denser mucilage-envelopes of the cells. This was clearly seen only in two cases.

Few observations have been made which would elucidate the development of these hairs, but the following is an attempt to reconstruct the development on the basis of the ascertained facts. In the earliest stage there is a single cell with two mucilage-envelopes, a hollow mucilage-hair tapering to a point emerging from the top and containing a protoplasmic thread which arises from the protoplast but has only been traced a short distance into the hair. When the cell divides, the protoplasmic thread splits at its lower end into two, one half extending to each daughter-protoplast, while the two-celled colony still retains its simple hair consisting of a single tubo (fig. 1, c, e). On the division of these two cells, two new mucilage-tubes are formed, which appear to grow up side by side within the old hair and either remain enclosed or more rarely become separated as two simple hairs by the disorganisation of the wall of the one first formed. As a general rule it seems that this course of events may be repeated several times, so that a number of tubes become enclosed within that first formed. This explains the presence of several protoplasmic strands within the broad parts of the hair. It appears that the walls of the older tubes become somewhat diffused, so that their contours are often difficult to recognise. In the wider branches of the hairs, however, a series of more or less longitudinal, straight, or sometimes slightly spiral lines can be discerned (figs. 1, h; 2, d); these, at the base of the whole structure, can be followed into the walls of the individual units into which the hair separates. It is not clear whether the upper branches of these hairs always actually represent the individual units becoming free above, although the fact that the finer branches contain only a single protoplasmic thread would, by analogy with the form described by Scherffel, indicate that that is the case. In addition, in cultivated material the edges of the older tubes through which the younger ones emerge as branches have been clearly observed (fig. 2, e, f).

Empty cells, whose envelope seemed to be torn at the top, were occasionally observed in all parts of the disc. No zoospores clearly belonging to this alga were, however, found.

The British plant differs from that described by Scherffel in the presence of well-marked dense mucilage-investments around each cell, which are always in contact except at the margin of the disc; in the fact that, when a cell has just divided, the protoplasmic threads from each daughter-cell appear as branches of a single one found higher up in the hair; in the fact that within the larger branches of the hairs a number of mucilage-tubes can be more or less clearly recognised, and in the definitely epiphytic nature of the plant (cf. Scherffel, loc. cit. p. 347). It differs from the plant described by Correns in the presence of protoplasmic threads in the hairs. It is therefore proposed to describe it as a new species, to be named Naegeliella britannica with the following diagnosis:

Familie epiphytice, disoidoe, e stratu singulo cellularum, sed in parte centrali familiari venustarum & cellulis duabus superpositis composite; cellulis cum integumentis gelatinosis densis preditis, iis cellularum vicinarum præter in parte marginali disci contiguis; pilis in familialibus juvenilibus & tubo singulo mucoso, in familialis senioribus elaboratis valde ramosis, sepe furcatis, e tubis mucosis plurimis qui per axem principalem crescent et basin vel apicem versus progressive seae separat compositis; pilis protoplasmaticis in utroque tubo singulis, e cytoplasmate cellularum ortis, basin versus furcatis cum cellulis duabus conjunctis.

Dimensions.—Cell. 4 × 9–10 × 15 μ (smaller in cultivated plants, 3 × 4–6 × 9 μ). Long. pil. 150–400 μ; diam. ax. princip. pil. ad 10 μ.

IV. ON A FORM OF PHAEATHAMNION. (Fig. 3.)

The only British record of the occurrence of Phaeothamnion*, a filamentous alga now referred to the Chrysophyceae†, is that of P. conchilocatum Lagerh. by M. Köever ‡ from the Upper Elf Loch, Midlothian. A species of the same genus has been found commonly as an epiphyte in the same two ponds in Epping Forest as Naegeliella. In one of these it was very common among the mass of decaying vegetation near the banks, growing chiefly on the older leaves of Oenanthe floxyllis but also on dead submerged leaves from neighbouring trees; from these it spread on to the filaments of a species of Odogonium


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which was growing on the same substratum. It was first recorded on Nov. 1, 1931, and has persisted undiminished into the month of April.

The plants are relatively large and much branched (fig. 3, a). Commonly nearly every cell bears a branch, but many of the latter are short and consist of only one or two cells. Longer branches, which may themselves branch repeatedly, are found in the lower part of older plants. The branches arise from the upper ends of the parent cells. Even the basal cell may bear such branches. The branches in some plants stood off at an acute angle, subvertically (as in Pascher's *P. Borsianum*), in others they were spreading (cf. *P. confervicolum*); it may be doubted whether this difference is of specific value.

The chromatophore is either a single curved and very much lobed parietal structure or consists of a number of separate pieces (fig. 3, e, f). It has not been possible to determine exactly which of these two conditions obtains. The colour of the chromatophore varies between golden-brown and greenish, but the former colour was the more usual. Each cell is surrounded by its own membrane, which in older cells is thickened by a small and somewhat mucilaginous cap at either end, but this mucilage-cap is invariably more extensive at the lower end of the cell, where it is usually conspicuously stratified (fig. 3, d). As a result of this special method of thickening of the wall the protoplasts of the individual cells are always separated more or less markedly from one another (fig. 3, a, b, d). In addition, there appears to be in, a thin outer "cuticle" which is continuous over the whole surface of the plant (fig. 3, d). All parts of the membrane stain readily with methylene-blue, iodine-green, safranin, hematoxylin, and other stains, but not with chlor-zinc-iodide.

The exit of the zoospores was not observed, but the apertures through which they had emerged were conspicuous. In the terminal cells, the aperture is a little to one side of the tip, whilst in the others it is lateral (fig. 3, b) and occupies the same position as that in which a lateral branch is formed.

Young plants, consisting of two cells only, have been observed (fig. 3, c). The formation of lateral branches sometimes sets in at an early stage, though commonly an unbranched erect filament of about five cells is first produced. The ultimate product is a much-branched plant of a bushy appearance, about half of whose cells are usually empty, showing apertures through which zoospores have escaped. The remaining cells with contents are often completely isolated by such empty cells.

While the plant described agrees in its essential characters with *P. confervicolum*, its variable habit and the peculiar structure of its cell-wall, which has not previously been figured for *Phaeothamnion*, are points of difference. It is therefore

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*Pascher, Archiv f. Protistenk. 111. 1925, 498.
proposed to describe the British form as *P. confervicolum var. britanniae*, with the following diagnosis:—

Differentia typica membrana cellularum ad apicem et praezipice ad basin incassato mucosa; ramis aut divergentibus aut sub-verticillifer dispositis. Cellulae 3-6 (plerumque 5) μ lat., 10-20 (plerumque 15) μ long.; cell. basal 10 μ lat. 6 μ altit.

The author wishes to express his thanks to Prof. F. E. Frölich, F.R.S., who has directed the work and assisted in the preparation of the paper for press.

THE IDENTIFICATION OF *HYDROLIRION COREANUM* H. Lév.

BY J. E. DANDY, M.A., F.L.S.

The genus *Hydrolirion* H. Lév., referred by its author to the Hydrocharitaceae, was founded upon a single (new) species described by Léveillé (in Fedde, Repert. Sp. Nov. xi. 67 (1912)) in the following words:—

"929. *Hydrolirion coreanum* Lév., nov. gen. nov. spec.

"E græge Hydrocharitacearum. Habita Nanohirion refert. Planta inanginer bulbosa, bulbo tunicato; psylla 2-3 cm; foliis 1-3 cm × 2 mm; infloroscentia redacta. *Blyxa* (Blyxa bulbosa Lév. in herbario). Propter bulbum hanc plantam novo generi adscribimus."

As the basis of the species Léveillé cited material collected by Taquet (n. 3271) in June 1909 in rice-fields at Hannon, in the island of Quelpart, Korea.

By the kindness of Prof. Sir W. Wright Smith, of the Royal Botanic Garden, Edinburgh, I have been able to examine Léveillé's type-material, which, with the rest of his herbarium, is now preserved at Edinburgh. The material consists of a number of sterile young plants of *Sagittaria* L. (Alismataceae), most of them still attached to the water-tubers which are characteristic of the genus and which caused Léveillé to write "Planta insigniter bulbosa, bulbo tunicato..." and found a supposed new genus of Hydrocharitaceae. His "infloroscentia redacta *Blyxa*" is presumably purely imaginary, for the material is quite sterile. It is apparently referable to *S. pygmaea* Miq., a species of which flowering specimens were gathered from rice-fields in Quelpart by U. Faurie (n. 2105 in Herb. Brit. Mus.) in August 1907. The synonymy of this species is now as follows:—


*Sagittaria sagittifolia* var. *oligocarpa* M. Mich. in A. & C. DC., Monogr. Phan. iii. 68 (1881).


*Blyxa bulbosa* H. Lév. loc. cit., nomen synonymum.

THE IDENTIFICATION OF *DRIMYS OBLONGA* S. MOORE.

BY J. E. DANDY, M.A., F.L.S.

*Drimys oblonga* was originally described by S. Moore (in Journ. of Bot. iv. 302 (1917)) in a paper contributing to the phytogeography of Mt. Bellenden Ker, in north-eastern Queensland. The type-specimen, in the British Museum Herbarium, was collected in dense scrub on the summit of the mountain by Miss L. S. Gibbs (n. 6319) in March 1914. Moore's description of the species stated that the sepals were "4 inter se inequivalvis," the stamens "paucis," and the carpels "solitariis truncatis," and in a note following the description he remarked:—

"The mature flowers seen are but two in number and I have been able thoroughly to examine one only; this with its few and inconspicuous stamens may be functionally female. Only one carpel was discovered, but additional material may show this to be exceptional."

"Besides the two-edged branches the foliage affords an easy means of distinguishing this species."

This last sentence is very well justified if Miss Gibbs's plant is treated as a species of *Drimys*; the foliage, and also the flowers, in fact look so unlike those of any other known species of the genus that I was led to dissect an unopened flower-bud from the specimen. The bud proved to have five sepals (the outer two smaller than the inner three), five stamens (all fertile) inserted on a disk, and a syncarpous ovary with a single entire style. Such a structure, in conjunction with the general facies of the specimen, suggested Celastraceae, and a search in that family showed the plant to be identical with *Hypoophila Halleyana* F. Müell., a species which was originally described in 1887 from the highest region of Mt. Bellenden Ker. The synonymy of *H. Halleyana* is therefore now as follows:—

*Hypopophila Halleyana* F. Müell. in Victorian Naturalist, iii. 168 (1887).

*Drimys oblonga* S. Moore in Journ. of Bot. iv. 302 (1917).

POTAMOGETON MACVICARII AR. BENN.

BY W. H. PEARSE.

Among an interesting set of Scottish Pondweeds collected by Mr. G. Taylor of the British Museum (Nat. Hist.) during 1932, and recently submitted to me, were several sheets labelled *P. Macvicarii* Ar. Benn. Lochan-na-Creige, Dubhe, Argyll, June 23, 1932. This Loch was the station from which this hybrid was originally described:—*Potamogoton Macvicarii* miihi (*P. prae-longus×P. polygonifolius*), a New Hybrid, by Ar. Bennett,
Ann. Scott. Nat. Hist. 106, 1907. This hybrid was never distributed, and had not been seen by Dr. Hagström nor by Gräbner, who merely gives the foregoing reference. This is not surprising as the putative parents—praelongus and polygonifolius—require quite different ecological conditions, and a hybrid between them is inherently improbable. Mr. Taylor's specimens were unmounted, in excellent condition, and therefore easily examined under the microscope. I failed to find any evidence of P. polygonifolius, and although the specimens had a superficial resemblance to P. praelongus it disappeared upon examination. The plants appeared to me to be P. alpinus, and to that species I referred them, although they agreed with Bennett's scanty description of the presumed hybrid (l.c.). Subsequently I examined Macvicar's original examples in Bennett's collection in Hb. Mus. Brit. The material (two sheets) is poor, permanently pasted to its mounts, and in my judgment inadequate for the purpose of establishing a new hybrid. It is, however, quite sufficient to prove its identity with Mr. Taylor's more valuable gatherings, and to confirm my opinion that the species is P. alpinus Balbis. The following notes apply equally to the original as to the recent gatherings, except where otherwise stated:

1. No other British species but alpinus has the colour of these plants.

2. There are no coriaceous floating leaves, but in deep water P. alpinus, more often than not, fails to produce any. On one of the original sheets in Hb. Mus. Brit., however, several of the uppermost leaves—though not coriaceous—possess the distinctive shape of the floating leaves of P. alpinus, and would probably have become coriaceous later in the season.

3. The submerged leaves are absolutely devoid of serration or of any trace of marginal denticulation, even in the youngest leaves. (This eliminates lucens, perfoliatus, gramineus, crispus, or their combinations, almost entirely.)

4. The leaf-apex is in every case conspicuously blunt, broad, and rounded.

5. For leaves of this length and L/B ratio only two species can be admitted—praelongus and alpinus.

6. Bennett at first named his plants praelongus. These plants are not praelongus for the following reasons:—(a) The leaf-apex is not constantly and conspicuously hooded. (b) The midrib of fresh clean leaves is not (as seen from above) light-coloured. (c) The leaf-base is not semi-amplexicaul, broad, and rounded. (d) There are not a sufficient number of secondary longitudinal veins. (e) The leaf-colour is not that of praelongus.

7. This leaves us with P. alpinus:—(a) In this species the leaf-apex is frequently hooded, but much less so than in praelongus. Some of these leaves have exactly that character. (b) These leaves have the three principal veins and eight (eleven) secondary
mentioned by Bonnett (l. c.), but that, also, is a character of many forms of alpinus! (c) The leaves are gradually narrowed below (alpinus)—not usually broadest at the base as in praelongus. (d) The leaves are sub-petiolate or sessile (alpinus), not semi-amplexicaul. (e) The shape of the leaf is rather that of alpinus than of praelongus. (f) The colour is markedly that of alpinus; the leaves of praelongus are greener.

8. The venation of the actual apex is very conclusive. Only praelongus and alpinus—among species—have their two principal lateral veins following the leaf-margin in a parallel curve at the blunt apex and very suddenly turning inward to form an “arch” with the midrib (which often does not quite reach the actual tip). The apex is only now and then slightly split after drying (alpinus)—not generally and conspicuously, as is the rule in pra elongus.

9. Where is the evidence for P. polygonifolius? That would be inevitably shown in an acute leaf-apex, a sharply tapering base, and a long petiole—to some or all of the leaves. These characters are absent—cf. 4, 7 (c & d). The nervation, too, is not in the least that of polygonifolius, whose nerve-spaces (measured lengthwise, in the direction of the midrib) are narrow, but in the two species concerned are rectangular and long—often 4 or 5 times as long as broad, as are these. The principal lateral nerves of polygonifolius curve gradually into the midrib at the leaf-apex, but in the leaves of these Scottish plants—especially the youngest—they meet almost at right angles.

10. No flowers or fruits are present on the original specimens, but on one of Mr. Taylor’s plants there is a single immature flowering spike too young to be of diagnostic value.

The cumulative weight of the foregoing evidence seems conclusive that the plant is not a hybrid, but a species, P. alpinus Balf. bb.

OBITUARIES.

James Walter White
(1846–1932).

(With Portrait.)

By the death of Mr. J. W. White, F.L.S., Hon. M.Sc. (Bristol), on October 26, 1932, at the age of 86, Bristol and the West of England loses its leading phanerogamic botanist, and England one of the best of the old type of field-botanists; for White was never happier than when collecting and examining plants in the field, either in the British Isles or on the Continent and adjacent islands. He had been Special Lecturer in Systematic Botany at the University of Bristol, and in 1927 was awarded the Hon. M.Sc. degree. His very fine British and Continental herbaria are bequeathed to that University.
Born in London, August 8, 1846, he went to Dorchester in 1851, and was at school under William Barnes the Dorset poet. At about 14 he was apprenticed for five years to Mr. T. B. Groves, pharmaceutical chemist at Weymouth, where he came under the influence of the late W. B. Barrett the botanist. Thence he went as an assistant at Allen & Hanbury's, where Daniel Hanbury was encouraging and sometimes invited him to his house at Clapham Common. A few years later White started in business himself at Hampton-on-Thames, and on his 25th birthday was married to Miss Mary Naldrett, who, with their seven sons and four daughters, survives him. Mr. and Mrs. White celebrated their Diamond Wedding in 1931.

In 1874 he was invited by a fellow-student at Hanbury's to join him in taking over the important chemist's business at Clifton of Giles and Sons, afterwards well known as Giles, Schacht, and Co. In his student days White had won the Pharmaceutical Society's medal for the best herbarium. Many British and Continental botanists have appreciated his beautifully prepared specimens; and readers of the 'Pharmaceutical Journal' have often enjoyed his racy articles, particularly those descriptive of botanical tours to Spain, the Balsaeic Isles, etc. These tours were usually in the company of his old friend Cedric Bucknall, and once or twice with David Fry or C. E. Salmon. White joined the Bristol Naturalists' Society in 1878, and was President 1897-99. He wrote for the Jubilee Report "Fifty Years of Botany in Bristol." Reference is made there to the Botanical Club founded in 1903 by the late G. Brebner. For a number of years this little Club held its informal meetings at White's house in Woodland Road.

It was in the Bristol Nat. Soc. Proc. that his 'Flora of the Bristol Coal-field' originally appeared in six years parts from 1881; in 1886 it was published in book-form. In those 'Proceedings' for 1890 a résumé of the previous twenty years' work appeared under the title "Bristol Field-botany in 1891."

All this and much other preparation, including numerous short notes and papers in this Journal, culminated in his magnum opus, 'The Flora of Bristol,' 1912. In the opinion of not a few this is one of the best works of its kind. A very favourable review by E. S. Marshall appeared in Journ. Bot. 1912, with an additional page by the editor because it "is so admirable an example of how such things should be done." It excels particularly in its admirable introductory matter and the interesting notes under many of the species. We know no British or local Flora which gives habitats (as distinct from localities) so accurately.

Since 1912 copious supplemental notes and records have been published both in this Journal and the Bristol Nat. Soc. Proc. White's last paper on "The Botany of Bristol" was written for the Bristol Meeting of the British Association, 1930, but, owing to there being no 'Handbook' that year, it unfortunately was not published until later in Bristol Nat. Soc. Proc. 1931.

White's cautious nature and broad view, e.g., in the matter of species, were doubtless partly accountable for his having discovered and named two or three new plants. Rubus bucknalli was described by him in this Journal, 1899, though "detected as a new form by C. Bucknall." R. naldretti, which he found in Sussex, is now placed as a variety of R. mutabilis, in Journ. Bot. 19 (1914) in a short note on "Plants of Scilly," he brieﬁedly described a new and well-marked variety atlanticus of Juncus maritimus.

Among some 45 notes and articles he had published in this Journal from 1880 to 1929 one of the most interesting and novel is "Life-History of Lithospermum purpureo-coeruleum" (1884, 74). He pointed out important facts, apparently overlooked, about its development and propagation.

White was for many years an active and valued member of the British Exchange Clubs and a contributor to the Herb. Normale, managed at Vienna by Dörffer. He did not join the Watson Club until 1900, when he contributed a great many Rubi and other critical plants. On the morning that he died a parcel was found in his study addressed to the Distributor of that Club. From time to time he had been especially interested in Batrachian Ranunculi, Rubus, Sorbus, and Mentha, but his knowledge of very many genera was great. White was elected F.L.S. in 1889; he resigned his Fellowship in 1920, but was re-elected in the following year.

He was a prompt and admirable correspondent, and his caligraphy was clear and beautiful almost to the end. He was also a good draftsman, see, for instance, the careful drawing of Statace Girardiana illustrating "In Quest of Sea Lavenders" (Pharm. Journ., Feb. 27, 1904). This was after his journey with Bucknall and Salmon to Narbonne, Ile Ste Lucie and the Eastern Pyrenees. He was always helpful and kind to other taxonomic botanists, young and old, even if too honest a man to pretend to suffer fools gladly.

Mr. White was buried at Clifton Cemetery, after a service at Clifton Parish Church where he had worshipped for many years.

The portrait is from a photo, taken ten years ago, kindly lent by Mr. Dan. White.—H. S. THOMPSON.

RAYMOND NAVEAU.

The death of Dr. Raymond Naveau at the early age of 43 is a severe loss to the botanical world. He was born in January 1889, and died on the 14th of November last. A native of Antwerp he lived till his death in that city, where he was Director of the Botanical Garden, as well as of the Museum of Natural Sciences.
His special interest was in the Bryophytes, on which he published several papers, notably “Muscæ Bequaerti” in Bull. Soc. Bot. de Belgique, 1927, a valuable contribution to the bryology of Tropical Africa, based on the collections made by Prof. J. Bequaert in the Belgian Congo and the Ruwenzori district. Of late years, however, official duties prevented his following this up, though much further material remained for publication.

He attended the International Botanical Congress at Cambridge in 1930, and took an active part in, especially, the discussions on Nomenclature.

His genial manner and enthusiastic devotion to plant-life made him a delightful companion, and one who will be greatly missed by his colleagues.—H. N. Dixon.

ABSTRACTS OF PAPERS OF INTEREST TO STUDENTS OF THE BRITISH FLORA.

LINEAR-LEAVED NORTH AMERICAN SPECIES OF POTAMOGETON.—Professor Fernald has written an exhaustive monograph (Mem. Amer. Acad. Arts & Sci. xvii. pt. 1 (1932)) of a portion of the generic section Axillares Hagstr., comprising twenty-two North American species, which he places in seven subsections. There is an excellent preliminary chapter on diagnostic features in Potamogoton, and full descriptions of the species with italicised contrasting characters. The work is profusely illustrated from life-size photographs of herbarium specimens, with enlargements of the leaves, stipules, and fruits. These illustrations appear less attractive than the plates of Fryer & Bennett’s ‘Potamogetons of the British Isles,’ but they will probably be found more useful than those of the British work, which in this group (with one exception) were not drawn by Morgan, and are not comparable with the fine drawings of the broad-leaved species.

The new work will especially interest British botanists in that it deals with four of the eight species treated by Bennett under the section Chloephylly Koch. These four plants are now placed in subsection Pusillus (Graebn.) Hagstr.; two (P. Friesii Rupr. and P. panormitanus Biv.) in series Pusillus Commatis Hagstr., subspecies Panormitani Fern.; and two (P. obtusifolius M. & K. and P. pusillus L.) in series Pusillus Convoluti Hagstr., subsection Obtusi Hagstr. The series are differentiated by the form of the stipules, to which Prof. Fernald attaches much importance, and which seems to have received insufficient attention in this country. In ‘Potamogetons of the British Isles’ the stipules are not always mentioned in the specific descriptions of this group, and are seldom well shown in the plates. Prof. Fernald identifies the subspecies lacustris Pearsall of P. pusillus with var. mucronatus (Fieber) Graebner. It is noticed that in the present work the foliage of P. obtusifolius is given as fulvous or reddish green in colour, in contrast to the green leaves of P. pusillus, a distinction that does not appear to hold good in British specimens, for with us P. obtusifolius frequently has deep green foliage.

British botanists will read with regret the severe criticism that Prof. Fernald thinks it necessary to pass on the late Arthur Bennett’s work on this genus.—H. W. Pugsley.

REVIEWS.


Thomas Johnson, best known for his revised edition of Gerard’s ‘Herball,’ has suffered from the possession of a popular name and the lack of a reasoned biography. In trying to remedy the latter defect the authors of the present account of his life and work have been hampered by the former difficulty. During all the years of Johnson’s practice as a London Apothecary on Snow Hill, another Thomas Johnson, Apothecary, was practising within seven minutes’ walk in Friday Street. And in his own parish of St. Sepulchre there were homonyms in the guise of a butcher and a collector of taxes, and nine or more others in London included a barber surgeon, with whom, as with the Thomas Johnson who published tracts in 1630 and with the Apothecary of Friday Street, the botanist has been confused. Further, the Great Fire of London destroyed documents which might have been helpful. The short biographical notice by his contemporary, Thomas Fuller, in the ‘Worthies of England’ (1662), and personal notes gleaned from the ‘Herball’ and others of Johnson’s writings have supplied material for the delightful and interesting account now available.

Johnson was born, probably at Selby in Yorkshire, early in the seventeenth century. The first certain date is 1620, when, as the records of the Society of Apothecaries show, he was “bound to Mr. Wm. Bell for eight years.” In 1626 we gather from his writings that he was travelling in northern England, and evidently, giving close attention to the plants, and in August of the same year was in Kent. In 1628 he became a free brother of the Society of Apothecaries.

The authors give a detailed account of Johnson’s herborizings in Kent and the neighbourhood of Hampstead, the results of which he published in two pamphlets, in 1629 and 1632. The fact that he was selected to revise Gerard’s ‘Herball’ indicates the
position he had won as a botanist. The work was completed within a twelvemonth, as the publishers wished to anticipate a herbal which John Parkinson was known to have in hand (the 'Theatrum Botanicum' published in 1640). As our authors point out this was a remarkable performance when we bear in mind the size and numerous imperfections of the original edition, and that a different and larger collection of illustrations had to be fitted in and descriptions written for most of the additional ones. The amended 'Herball' (Gerard ed.) appeared in 1633, and the story of its production and an appreciation of Johnson's work in enlarging and amending is given in the volume under review.

Another great work, an English translation of Ambrose Parey's works on Surgery was published in 1634. Our authors adduce reasons from internal evidence for regarding the translator, Thomas Johnson, as identical with the botanist. Together these works comprise nearly 3000 pages folio with 3075 text-illustrations, and although the volume on Surgery is only a translation, Johnson must have been a very busy man during these few years.

In 1634, Johnson published his 'Mercurius Botanicus' (a small octavo of 78 pages), a description of a botanical journey in the south and west of England, with a list of the plants observed, and in 1641 his 'Mercurii Botanica pars altera' (37 pages), descriptive of a tour in Wales, with a catalogue which was intended to include those of our native plants which had not been enumerated in the earlier part; together about 900 plants are enumerated, 47 of which are first British records. These constitute, as the authors insist, the first British Flora, an honour unfairly attributed by Pulteney to Dr. How's 'Phytologia' published in 1650. The journey into Wales was the last of Johnson's herborizing excursions. In 1643 he was among the Royalists who followed the Court to Oxford, where the University bestowed on him the honorary degree of Doctor of Physic. He took an active part, as Lt.-Colonel, in the historic defence of Basing House (the story of which is told in some detail), was shot in the shoulder during a sally on September 14, 1644, and, contracting a fever, died a fortnight after. Thus was cut short in its prime a life full of promise for the development of British floristic botany.

The volume closes with an enumeration of the names of plant genera in which Johnson has been commemorated. With the exception of the Australian genus of LilIceae, named in his honour by Robert Brown, these are synonyms of previously published names. An excellent reduced photomechanical reproduction of Johnsonia typulina R. Br. from Ferdinand Bauer's 'Illustrationes Flora Nova Hollandiae,' forms the last plate in the book. The new Rule which rejects homonyms renders Johnsonia of Brown invalid, but we may hope that it will figure in the revised list of nomina conservanda.—A. B. R.


A melancholy interest attaches to this work, the epitome of many years of labour devoted to the study of the great Central area of the North American continent. Dr. Rydberg died after some months of ill-health on July 25, 1931. All the manuscript of the main text was in the printer's hands and he had seen the pages proofs of nearly half of the book. A few days before his death he asked his colleague at the New York Botanical Garden, Dr. Marshall Howe, to take over and complete the work. The scope of the book is explained by Dr. Howe in his Preface. Another colleague, Dr. J. H. Barnhart has contributed to the 'Journal of the New York Botanical Garden,' October 1931, an appreciation of Rydberg's work, which is accompanied by a good portrait. From this account we learn something of Rydberg's preparation for his 'Flora' by years of study in the herbarium and by exploration in the field.

The area covered includes the prairies and plains east of the Rocky Mountains, and therefore supplements the author's previous work published in 1917, 'The Flora of the Rocky Mountains and Adjacent Plains,' and comprises an area which has not hitherto been systematically treated. The aim is to supply a complete manual of the Spermatophyta and Pteridophyta of the States of Kansas, Nebraska, Iowa, Minnesota, South and North Dakota, and of southern Manitoba and southeastern Saskatchewan. There are also included most of the species occurring in the prairie regions of Illinois, Southern Wisconsin, and Northern Missouri, and on the plains of eastern Colorado, eastern Montana, and southern Saskatchewan. A paper in 'Brittonia' (1, 1931), "A short phytogeography of the Prairie and Great Plains of Central North America" by the author, serves as an introduction to the taxonomic text of the volume. A posthumous paper in the same journal (Oct. 1931) includes Latin diagnoses of the new species and the one new genus, Denslovia, a segregate from Habenaria (H. clavellata Spreng.), and discussions of changes in nomenclature incidental to conformity with the International Rules.

The flora differs widely in different parts of the area, owing to differences of soil and climate. Central Illinois has a precipitation of about 37 ins., while East Colorado has less than 15; the frost-free season in Saskatchewan is less than three months, that of the plains of Texas nearly seven months. It is almost impossible to give an account of the original vegetation, as it has disappeared under cultivation in about 75 per cent. of the prairie land, and in the uncultivated portion has been altered by over-grazing and the introduction of numerous weeds.
The form and arrangement of the text and the illustration by very small block figures are similar to those of the author's 'Flora of the Rocky Mountains.' Pteridophyta, Gymnosperms, Monocotyledons, and Dicotyledons are treated in succession, following the lines of Engler's 'System,' but with a much larger segregation into families, 168 of which are included in the flowering plants. For instance, the water lilies supply three families Nymphaeaceae, Nymphaonaceae, and Cabombaceae; and Engler's Liliaceae is distributed among seven families. A similar segregation is noticeable in the case of genera and species: _Ionazalis_ and _Xanthozalis_ are separated from _Oxalis_; the old genus _Oenothera_, as recognised by Gray now appears under eleven generic names. Dr. Rydberg is, of course, not the author of all the segregations, but he seems to have adopted them _con amore_. The result is the introduction of many unfamiliar names, for a fair proportion of which Dr. Rydberg is responsible. Some of the new combinations will become invalid by obvious additions that are pending to the list of nomina conservanda.—A. B. R.


These four parts are the first instalments of a descriptive 'Flora of Surinam.' In 1906 Dr. Pulle published 'An Enumeration of the Vascular Plants of Surinam' based on the material available up to that date. Since 1906 extensive collections have been made in the colony by collectors of the Department of Agriculture and of the Forestry Bureau, by Dr. Pulle himself and by Messrs. Gonggrijp, Siahel, and others. The material is all to be found in the Herbarium of the State University of Utrecht.

The Flora deals only with the Phanerogamae, and is planned in four volumes. Vol. i. will include Gymnospermae, Monocotyledonae, and Dicotyledonae-Dialypetalae; and vol. iv. Dicotyledonae-Sympetalae. Each family will be treated by a specialist, and the families will appear in irregular order as they are ready. The four instalments now issued comprise vol. i. Gnetaceae (by F. Markgraf), Lorantheaceae (by K. Krause), Amaranthaceae (by A. Scheygrond), Balanophoraceae (by J. Lantjouw), Ulmaceae (by S. J. van Ooststrooom); vol. ii. Euphorbiaceae and Rhamnaceae (by J. Lantjouw), Monimiaceae (by H. F. M. Petter); vol. iii. Malvacaeae, Bombylaceae, Sterculiaceae, Tiliaceae, and Elaeocarpaceae (by H. Uitten); and vol. iv. Apocynaceae (by F. Markgraf), Convolvulaceae (by S. J. van Ooststrooom), Loganiaceae (by M. H. van Raalte), and Pedaliaceae (by A. Pulle). As the text runs on in each part with no break between the families it will not be practicable to rearrange the families when the work has been completed. The whole work is estimated to contain about 1500 pages, about one-third of which will be published within the first year. More material is in the press, and the accounts of many other families are in preparation. The text is in English throughout.

Good descriptions are given for each family, genus, and species, and there are keys to the genera and species. Under each species are cited the synonymy, distribution, and the localities of the specimens examined, with collector's name and number of specimen; also vernacular names. The typography is very clear. The plan of the work does not apparently include description of novelties; these are dealt with elsewhere. The Flora should be a welcome addition to our knowledge of the botany of the northern portion of equatorial South America, a systematic treatment of which is much needed. The parts are priced at .65 Dutch Guilders per sheet as published. The price, it is stated, will be raised on completion of the work.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At the General Meeting on January 5, Mr. S. Savage, Assistant Secretary, gave an account, illustrated with lantern-slides, of the various homes of the Society since its foundation in 1788. Lt.-Col. Gage, who is preparing a history of the Society, added some comments. Mr. J. H. Turner read a paper on 'The Viability of Seeds': a _récupé_ was given of previously published evidence of the retention of viability for a number of years, and a definite example was shown. The Botanical Secretary referred to the well-known long duration of viability of the spores of certain fungi.

AMERICAN ELM DISEASES IN ILLINOIS.—The Illinois State Natural History Survey, Bulletin xx. 1–70, describes 'Initial Studies of American Elm Diseases' by Hubert A. Harris. The results show that, in Illinois, the so-called 'elm-wilt' represents several different diseases which manifest themselves in a number of forms such as twig-blights, cankers, diebacks, and true wilts. They are widely distributed, and have caused the destruction of thousands of trees in the past few years. The most important disease appears to be due to _Coniophyllum_; other important diseases are caused by _Phoma_, _Sphaeropsis_, _Vermicularia_, and _Verticillium_.

FLORA OF SURINAM (DUTCH GUYANA)
THE GENUS CREPIS IN GREAT BRITAIN.—II.

By E. Drabble, D.Sc., F.L.S.

In connection with his work on the genus Crepis the writer has been asked to give a short account of all the British species and varieties, together with those that are known to have occurred as aliens or established “escapes.” It is hoped that the following key and concise descriptions will furnish the required aid.

In examining specimens of Crepis it is entirely necessary that ripe fruiting-heads should be seen. The internal surface of the phyllaries, the nature of the receptacle, and the length of the fruits must all be examined for secure diagnosis. These heads should not be pressed with the specimen, but should be allowed to dry in the air, and then be kept in an envelope with the sheet.

Key to the Species.

1. Fruits not beaked. 2. Fruits beaked. 3. Pappus tawny, stiff, bristle; fruits very densely truncate above. 4. Pappus white, silky, not brittle, fruits ± attenuate above. 5. Fruits subtrigonal with 4 deep furrows; receptacle with verrucose papille; plant stoloniferous with tubercles. 6. Capitula few-flowered, involucres with triangular calicinal external scales, 4–5 times shorter than the linear inner ones; stem viscosa below. 7. Capitula many-flowered, involucres and stem not as above. 8. Fruits with 18–20 ribs, capitula few (c. 7), leaves oblong entire, cauleine leaves with small round auricles. 9. Fruits with 10–12 ribs (rarely 8 or 13); capitula many, eorymbose. 10. Capitula with revolute edges; fruits ± long-attenuate above. 11. Capitula leaves flat, fruits shortly attenuate above. 12. Inner phyllaries downy within. 13. Inner phyllaries glabrous within. 14. Stem shortly hairy, especially below; cauleine leaves auricled, terminal lobe of leaf broad. 15. Stem nearly glabrous, leaves not auricled, terminal lobe of leaf long, narrow, and parallel-sided. 16. Fruits in winged and strongly fringed alveoli; stem and leaves roughly hairy. 17. Receptacle glabrous, fruits not in winged and fringed alveoli; stem much less hairy, or glabrous; leaves often with mid-rib below. 18. Flowers pink. 19. Flowers yellow. 20. Outer scales of involucres short, scarious, broadly ovate, hooded, inner linear bristly. 21. C. alpina.
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11. Outer scales of involucres linear, green or with margin only scarious. ........................................... 12.
12. Peripheral fruits shortly beaked, disc-fruits long-beaked; inner involucral scales at length much hardening and embracing the outer fruits .................. 13. C. fusca.
12. All fruits long-beaked; outer involucral scales not hardening nor enclosing the outer fruits .......... 13.

CREPIS PALUDOSA (L.) Moench. Hieracium paludosum L.

Plates:---Reichb. 'Icones,' xix. t. 102; E. B. 1094.
Perennial, stem up to 2 ft., glabrous, slender, furrowed; lower leaves runcinate or dentate, attenuated to the base, caudine lanceolate acuminate, entire or dentate, amplexicaul, auricled; capitula few, usually 3-7; braets of peduncles minute subulate with toothed bases; peduncle and involucres with black glandular hairs; phyllaries glabrous within; receptacle glabrous; fruits not beaked, very definitely truncate above, with 6-8 (10) smooth ribs; pappus stiff, brittle, brownish or reddish white.

CREPIS BULBOSE (L.) Tausch.
Plate:---Reichb. 'Icones,' xix. t. 82. f. 1.
Perennial, stoloniferous, stolons ending in roundish tubers; stem up to c. 15 in., often shorter, naked or with one or two leaves, ±glandular and with black hairs towards the top; leaves chiefly basal, glabrous, oblong-lanceolate, obtuse, ±dentate; capitula 1-4, large; inner involucral scales broadly linear obtuse, narrowly scarious, outer short, all at length reflexed; receptacle verrucose; fruits not beaked, subtriangular with 4 well-marked ribs.


CREPIS PULCHRA L. Phaeacasis pulchrum Reichb.
Plate:---Reichb. 'Icones,' xix. t. 80.
Annual; leafy and glandular-viscous below, naked and glabrous above; lower leaves oblong-lanceolate or spatulate, dentate or runcinate, caudine-hairy, stem-leaves sessile, auricled, lanceolate to linear-lanceolate, entire or dentate; capitula few-flowered; involucre glabrous, oblong-cylindrical; outer phyllaries very short, triangular, caliculate, internal 4-5 times longer, linear acute, greatly hardened in fruit; receptacle naked; fruits not beaked, with 10-15 superficial ribs, outer fruits rough, inner smooth; pappus white, soon falling, generally wanting on the outer fruits.


Plates:---Reichb. 'Icones,' x. t. 100. f. 1; E. B. 2210.
Perennial; stem c. 8-20 in., variable in pubescence, usually glabrous or slightly hairy, branched; leaves glabrous or slightly hairy, lower stalked, oblong-spathanulate obtuse, margins entire or minutely dentate, caudine lanceolate acute, sessile with small rounded auricles; capitula few, up to c. 7; peduncles and involucres with glandular hairs; outer phyllaries short adpressed, inner acute, glabrous within; receptacle glabrous, areoles not fringed, fruits not beaked, with 18-20 smooth ribs.

Rouy (Fl. Fr. ix. 229) gives two varieties of this plant:—

a mollis Koch, with stem and leaves 'poilues ou rudes,' at least in the lower parts; some of our Braemar plants seem to come under this name; and b nuda G. & G., entirely glabrous; a central European specimen in Herb. Drabble is of this form, but no entirely glabrous British plants have been seen.

CREPIS TECTORUM L. (non Sm., E. B. 1111).

Plate:---Reichb. 'Icones,' xix. t. 91.
Annual; stem c. 1-2 ft., simple or branched; radical leaves oblong-lanceolate entire, dentate or runcinate, caudine sessile, sagittate, linear with revolute margins; capitula small, corymbose; outer phyllaries linear, inner acute with whitish pubescence, ±glandular, hairy within; receptacle almost glabrous, alveoli with finely serrate fringes; fruit not beaked, ±long-attenuate above (more so than in C. capillaris), with 10-11 rough ribs, spinulose near the tip.

The following specimens in Herb. Mus. Brit. are the only satisfactory British specimens that the writer has seen:— C. tectorum L., nr. Kelso, Roxburgh, Aug. 1874, and July 1875, A. Brotherston.

CREPIS BIENNIS L.

Plates:---Reichb. 'Icones,' xix. t. 88; E. B. 149.
Biennial; stem 1-4 ft., ribbed, roughly hairy or hispid, especially below; leaves densely hairy, lower usually runcinatespinifid with broad terminal lobe, occasionally deeply laciniate or more rarely merely deeply dentate, stalked; upper leaves often less deeply divided, rarely entire, sessile, with dentate non-sagittate auricles; capitula large, up to 4 cm., corymbose; peduncles often glandular-hairy; phyllaries broadly linear, outer spreading, internal sub-oblanceolate ±arachnoid and hairy, occasionally slightly glandular, hairy within, margins scarious; receptacle hairy, with fringed alveoli; fruits not beaked, 5-6 mm., with about 10-13 ribs (occasionally more), rough with short bristles or nearly smooth.
Rouy (Fl. Fr. ix. 230) gives three varieties based on leaf-form:—

a. runcinata Koch, Syn. ed. 2 (C. lodomiriensis Bess., Prim. fl. Gall, 2) with leaves almost regularly runcinate, entire above.

β bannatica Rochel (Fl. rar. Bar. f. 61) (var. laevo Koch. Syn. ed. 2) with leaves unequally runcinate-pinnatifid or lacinate.

g. dentata Koch, l. c., with leaves elongate linear-oblong, the lower dentate, the upper entire.

**CREPIS OPORTINOIDES** Boissier.

Plate:—Boissier, 'Voyage botanique dans le midi de l'Espagne,' ii. t. 117.

Biennial; stem up to 2 ft. 6 in. or more, deeply striate, nearly glabrous; leaves glabrous or slightly hairy, margins sometimes ciliate, deeply pinnatifid with long, narrow, mucronate, retorse lateral segments and very long (up to 6 cm.), narrow, (c. 0.5 cm.), parallel-sided terminal segment (basal leaves occasionally less deeply divided or coarsely sinuate-dentate); cauline leaves not auricled; inflorescence-system very open, with long slender peduncles; capitula large, up to 4.5 cm. in diameter; involucre and upper part of peduncle lightly tomentose; outer phyllaries narrow, linear, ± spreading, inner broader, subobtuse, downy within; corolla yellow; receptacle hairy, alveoli strongly fringed; fruit not beaked, 7–9 mm. in length, with 10–12 ribs, smooth, or rough above with short bristles.

I am strongly inclined to regard this as a variety of *C. biennis*.

**CREPIS NICAEENSIS** Balb.

Plate:—Reichb. 'Icones,' xix. t. 90.

Biennial, stem 1–2 ft., grooved, roughly hairy or hispid below, and often throughout; leaves usually densely hairy, lower stalked, deeply dentate or runcinate, caudine sessile with sagittate auricles; inflorescence corymbose, generally rather close, with upright, roughly hairy, somewhat tomentose peduncles; involucre ± tomentose, occasionally glandular; outer phyllaries spreading, inner glabrous within; receptacle with winged and strongly fringed alveoli; fruits not beaked, 3.5–4.25 mm., with c. 10 ribs, smooth except near the top, or rough throughout.

The eglandular plant is var. *eglandulosa* Crépin; Rouy (Fl. Fr. ix. 228) has a var. *β integrifolia* Lamotte, Prodr. plantae centr. 475, with leaves entire or feebly dentate below, and Reichenbach ('Icones,' xix. 44) a var. *b. adenantha,* "multo magis glandulosa, isthmis foliorum profundioribus dentatis. Crepis adenantha Visc.* Bot. Zeit. Ergbl. 1896, 53, Dalm. ii. 119 et tab. v. f. 1."

The following specimens in Herb. Mus. Brit. are correctly named:—*C. nicaeensis* Balb., Penrose Cross, Cornwall, June 1878, T. R. Archer Briggs; Chalk Downs, Reigate, C. E. Salmon, July 2, 1909; Pontrillas, Hereford, June 2, 1882, Augustin Ley; Inworth, Essex, June 1880, E. G. Varenn; Rugby, July 1898, S.T. Dunn; Malvern Link, Worcs, June 21, 1886, R. F. Towndrow; Yeldersley, Derbys., June 24, 1889 (in W. R. Linton's writing); Harrogate, July 1876, J. J. Foggitt; Tweedsale, Springhall, June 1874, A. B.

The two following sheets in Herb. Mus. Brit. are also *nicaeensis*:—Tretire, Herefordshire, A. Ley, June 1878 (as taraxacifolia); Barnes Bridge, Aug. 11, 1871, J. Benbow (as taraxacifolia); also:—Warnham, Sussex, June 1882 (as *biennis*), E. Straker, in Herb. Drabble.

**CREPIS CAPILLARIS** (L.) Wallr. *C. virens* L.; *C. polymorpha* Wallr.; *C. tocerum* Sm. (non L.).

Plate:—Reichb. 'Icones,' xix. t. 90.

Annual; stem upright or diffuse, glabrous or slightly hairy below, not deeply striate (more densely hairy and more deeply striate in var. *anglica*); leaves usually glabrous except on the midrib below, lower leaves stalked, very variable, oblong, dentate, runcinate, deeply pinnatifid or lacinate, caudine less deeply divided, sessile, sagittate; involucre glabrous or hairy, sometimes glandular, outer phyllaries linear, outer glabrous within; receptacle glabrous, without fringed alveoli; fruits not beaked, 2.5–3.25 mm. with c. 8–10 usually smooth or slightly rough ribs.

Var. *anglica* Duke & Thellung:—Stem tall, 2 ft. or more, robust, hairy below and more deeply grooved; capitula large, involucr with blackish or blackish-green hairs, many or all of them glandular; f. *griseola* Thellung differs only in having copious greyish indumentum on the involucre.

The hairiness of the stem and the glandulosity of the involucr are subject to considerable variation. Excellent examples of *anglica* in Herb. Mus. Brit. are:—


Many varieties of *C. capillaris* founded on different leaf-forms have been described. The chief of these are (i.) *integrifolia* Coss. & Germ., with entire or only slightly sinuate leaves; (ii.) *dentata* Bisch., with leaves merely dentate (shown as a small plant in Reichb. 'Icones'); (iii.) *vulgatus* Reichb., with leaves very irregularly sinuate-runcinate; (iv.) *runcinata* Bisch., with
runcinate leaves; (v.) pinnatifida Willd. (pectinata Bisch.), with radical leaves like those of runcinata but with cauleine leaves pectinate-pinnatifid, the segments being narrowly linear and approximated and the upper part of the lamina undivided. Two other leaf-forms, perhaps hitherto undescribed, have been grown by the writer:—(vi.) laciniata, with leaves divided into very slender segments up to 5 cm. in length by 1.5-2.0 mm. in breadth; and (vii.) auriculata, with remarkably large, broad and widely spreading auricles on the cauline leaves. Extreme examples of these forms look distinct enough, but much more cultural evidence is necessary before their status can be determined.

Var. diffusa Wallr. in DC. Prodr. viii. 162, is described as "caule decumbente diffuso, pedicellis filiformibus, foliis inferioribus caulinaeque amplexicaulibus lanceolato-linearibus parce dentatis." This is a very common form on dry banks, sand-dunes, and other exposed places. Mr. Wilmott tells me that it is often produced by the attack of rabbits. It still remains to be determined whether there is a genetically distinct variety coming under diffusa, but there is strong presumptive evidence that it is a mere state or an ecad.

Crepis rubra L.

Annual; stem with few cauleine leaves and one or few capitula; lower leaves runcinate + deeply divided; phylarias urceolated, often hispid on the midrib, nearly glabrous within; receptacle with long hairs; corolla pink; fruits with c. 10 rough ribs, outerly shortly beaked, inner long beaked.

A native of Southern Europe.

Crepis alpina L. Anthchlyrum alpinum Reichb.

Plate:—Reichb. 'Icones,' xix. t. 81.

Annual; stem erect, +hairy, grooved; lower leaves stalked, lyrate-pinnatifid, with oblong, somewhat dentate terminal lobe; cauleine leaves sessile, oblong-lanceolate dentate, with sub-cordate clasping base; inflorescence corymbose, outer phyllaries short, scarious, ovate, hooded, glabrous, inner broadly linear, bristly, at length much thickened and hardened and enclosing the outer fruits, with a loose tomentum within, otherwise nearly glabrous; fruits with 15-16 very rough ribs, outer fruits tapering above, inner long beaked.

Crepis foetida L. Barkhauza foetida DC.

Plates:—Reichb. 'Icones,' xix. t. 83; E. B. 406.

Annual or biennial; stem 1-2 ft., upright or diffuse, branched from below, hairy or hispid; leaves runcinate-pinnatifid, the lower stalked, cauleine smaller and simpler, sessile, amplexicaul; capitula on very long stalks, nodding in bud; phyllaries hairy or setose and often glandular, generally with a white tomentum, outer linear short, inner broader acute, glabrous within, hardening and enclosing the outer fruits; receptacle hairy; fruits beaked, with 13-15 (Reichb. figures 17) ribs, rough or bristly, especially above, sometimes nearly smooth below, beats of the inner more than twice as long as those of the outer fruits.

Rouy, following Bischoff, Beitr. Fl. Deutschl. u. Schweiz, describes three varieties:—

a vulgaris Bischoff, with pericline whitish, subtomentose, peduncles softly hairy, non-glandular.

b glandulosa Bischoff, with similar pericline and peduncles but with glandular hairs, sometimes intermixed with blackish "asperites."

c hispida Bischoff, pericline and peduncles hispid with stiff whitish hairs.

Of these there are examples of a and c in Herb. Drabble.

Crepis taraxacifolia Thuill. Barkhauza taraxacifolia DC.

Plates:—Reichb. 'Icones,' xix. t. 86. f. 1; E. B. 2929.

Biennial; very polymorphic; stem 1-3 ft., hispid, furrowed, usually purple below, branched above or occasionally from the base; leaves hairy, varying much in form, typically lyrate-runcinate with large terminal lobe, sometimes deeply pinnatisect with the divisions again dissected, sometimes merely deeply dentate or almost entire; cauleine sessile, surrhed; auricles sometimes very large and dissected; peduncles and involucral hairy and with white tomentum, occasionally glandular; outer phyllaries spreading, lanceolate, inner hairy within, receptacle hairy with fringed alveoli; fruits all beaked, 6-7 mm., with about 10 very rough ribs.

The leaf-forms are extremely numerous and cannot be dealt with here, but mention may be made of var. subdivisa Druce, a striking form characterized by its entire, almost spatulate leaves, with margins shortly toothed.

Crepis setosa Haller f.

Plate:—E. B. 2945.

Annual; stem 1-2 ft. striate, +hispid; leaves hairy, radical runcinate-dentate or lyrate-runcinate, stalked, cauleine dentate or entire, amplexicaul with sagittate auricles; involucre not glandular, prickly with stiff hairs; outer phyllaries linear or subulate (not lanceolate as in Bab. Man. ed. ix.), much spreading, inner contracted in fruit (not hardening as stated in Hooker, Stud. Fl. ed. iii.), hairy within; receptacle glabrous, fruits 4-5 mm., beaked, with c. 10 very rough ribs.

It will be noticed in the above descriptions that the colour of the fruits has not been given. Much more work is required before this character can safely be used for diagnosis.

By J. T. Cunningham, M.A., F.L.S., and D. M. Reid, F.L.S.

On Jan. 5, 1931, when staying at the Fazenda Camburupyy in the island of Marajó, at the mouth of the Amazonas, we noticed numbers of curious gelatinous rods lying half submerged in shallow pools of water on the surface of the mud at the margin of the ponds dug out for the cattle to drink. The first rain after about five months of the dry season had fallen on Dec. 27, and it had rained heavily at night several times since then. The gelatinous rods were transparent, 2-2-2.5 cm. in length, and attached at one end to small, black, opaque capsules, from which they had apparently grown. The surface of the capsules was rough. They were almost perfectly spherical, with a diameter of 3 mm. At intervals along the cord were five opaque granules (fig. 1, A). The measurements given were made on specimens preserved in weak alcohol. Under the low power of a microscope, magnified about eight times, they appeared as shown in fig. 1, B. The granules were seen to be the opaque spores contained in hollow capsules attached by short peduncles to the cylindrical rod or cord. The cord and peduncles consisted of polygonal transparent cells. The cavity of each capsule contained two oval spores, each with a rounded projection at one end, and in addition a few opaque granules. Some of the spores were kept in small shallow vessels in the house and the stages of germination observed.

The spores were afterwards identified as belonging to Marsilia polycarpa Hook. & Grev., and we are indebted for aid in their identification to Dr. Ethel Thomas and to Mr. J. Ramsbottom, and Mr. A. G. H. Alston of the Natural History Museum. The history and synonymy of the species are indicated in the following references:


A. Braun states (1870, 698) that M. polycarpa is the only species of the genus in which the sporocarp is almost spherical as in Pilularia. He states that there are three sorii on each side, but we observed only five altogether. The number may vary in different specimens, but Braun only examined the unburst sporocarps. He counted 12 to 14 megaspores in a single fruit or sporocarp in six sorii; we saw two in each sorus. In Martius (Flor. Bras.) it is stated that there are 12 to 14 megaspores in each sorus, "in singulo soro," but this is obviously a mistake in translating from Braun, 1870, who writes: 12 to 14 macrospores "in einer Frucht."

According to Braun there are five species of Marsilia in the continent of South America, two of which, M. polycarpa and M. deflexa, occur in Brazil. M. deflexa has been found in the province of Piauí, but only M. polycarpa in the basin of the

![Fig. 1. - A. Sporocarps of Marsilia polycarpa after dehiscence. B. Part of one of the same, ×4. C. Single megaspore more highly magnified. D. A single "spore capsule" and megaspore burst by compression. a, wall of sporocarp; b, carrier of mucilaginous cellular tissue; c, megaspores; d, prothallium; e, starch grains; f, wall of capsule; g, microspores.](image)

Amazons, the locality given being Pará. The species occurs also in Guiana and on the islands of St. Thomas and Cuba in the West Indies. Braun recognises five varieties, two of which occur in Mexico. M. deflexa differs from M. polycarpa in having much elongated sporocarps with 6 to 8 sorii on each
side, and 2 or 3 megaspores in each sorus. *M. saltatrix*,
mentioned below, one of the commonest Australian species,
has 8 to 10 sori on each side, and 7 or 8 megaspores in each
sorus.

In the spores shown in Fig. 1, C & D, it may be presumed
that the wall of the megasporangium, as well as the mucilaginous
epispor, has been thrown off and has disappeared. Fig. 2, A,
is a drawing of an earlier stage found in some preserved material.
The wall of the sporangium is absent, but the spore is enclosed
by the mucilaginous non-cellular epispor, which, at the end
where the prothallium is situated, is much enlarged to form an
open funnel through which the antherozoids pass to fertilise the
oospor.

The dehiscence of the sporocarp (in *M. quadrifolia* L.) was
first described by Alexander Braun in *Flora*, 1839, whose figures
showing the mucilaginous carrier with the sori attached in
*M. pubescens* were published in the *'Exploration Scientifique
d'Algérie,'* Botanique, 1849, pl. 38. Hanstein, in 1862, gave
a more detailed description with an account of the development
of the embryo. This research is remarkable from the fact that
it was made up on only six sporocarps sent to Ehrenberg, who
communicated Hanstein's paper to the Akademie der Wissen-
schaften of Berlin (Monatsber. K. Preuss. Akad. 1862), together
with a short summary by himself of the chief facts concerning
three recent expeditions for the exploration of the interior of
Australia, from one of which the specimens were obtained.
The advance party of this expedition, including the leaders Burke
and Wills, all perished, on the return journey, near Cooper's
Creek, lat. 27° 30' S., with the exception of one man named King,
who was rescued in an exhausted condition by a search party.
King had for some months lived with some compassionate natives,
who shared with him the scanty supplies of food which they
obtained by gathering the sporocarps of *Marsilia* from the beds
of watercourses. This food they called "nardoo," and it was
specimens of these sporocarps which were investigated by
Hanstein. Considering that each sporocarp contains a con-
siderable proportion of starch, as well as some protoplast, it is
not more surprising that they should serve as human food,
if in sufficient abundance, than that grains of wheat should
supply the staple food of civilised man. It is, however, extra-
ordinary that the primitive natives of Australia should have
learned to make use of the minute sporocarps of a cryptogam
which were specially adapted to survive during the dry season
of the Australian desert where little other food was available,
and that the rescue of one man of a party of explorers with all
their journals should have been due to these sporocarps.
The species to which the sporocarps belonged was named by Hanstein.
M. salviaria, as the characters were different from those of any known species, but doubtless the sporocarps of other species are also used as nardoo. Hanstein describes the cellular structure of the carrier and of the wall of the capsule, which he calls the indusium. Botanists are not all agreed that the wall of the capsule is homologous with an indusium. The sorus is properly not the capsule, but the group of sporangia which it contains, and the latter develop from the epidermis. It seems certain that the sorus is sunk within an invagination of the fertile pinnule or outgrowth which gives rise to the sporocarp, and the carrier is the mesophyll of that pinnule. If we regard the relations of the structures after dehiscence, it is obvious that the walls of the capsule are epidermic, and, as they are originally open to the exterior, they resemble closely the sori and open cup-like indusia of Hymenophyllaceae and some Cyathaceae among the Filicines.

Fig. 2, B, shows a stage of development in which the embryo consists of an early stage of the first leaf, with a pyriform swelling at its base which contains the growing-points of the stem and root. Surrounding the embryo is the prothallium, the base of which is throwing out rhizoids. The point of the leaf has broken through the apex of the prothallium. The stage of fig. 2, C, is considerably more advanced. It shows the first root with its root-cap, and the tip of the prothallium has grown out into a long strap-like projection on one side of the first leaf.

The development here described is in its general features typical of the genus Marsilia, differing from that of other species only in minor details, namely, the rounded shape of the sporocarp, the small number of spore-capsules, and the small number of megaspores in each capsule. The chief interest of the description and figures is that the dehiscence and spore-germination have not so far as we have been able to discover, been described before, although it is exactly a hundred years since the species was first defined and named. Hitherto, while the mode of dehiscence of the sporocarp was unknown, it was not certain that the development in this species would so closely conform to that of other species of the genus, because the spherical shape of the sporocarps suggested the possibility that the development might in some respects show an approximation to that of Pilularia, or might be in some degree aberrant.

**Literature.**


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**NOVITATES AFRICANÆ.**

(Continued from vol. lix. 1932, p. 341.)

**Leucospermum** (§ *Hypophyllidae*) _coreris_ R. H. Compton, sp. nov. _Frutex_ prostratus. _Caulis_ teretes, inter ramos ad 9 poll. long., _tomento crispatu et pilis longis nonnullis tecti._ _Folia_ numerosa, _in caulis horizontalis erecta, ovata, ad basim angustata, coriacea, dense persistentique tomentosa, venis distinctis, apiculo obtuso, _preplastif vel interdum tridentata, 8-12 lin. long., 3-5 lin. lat._ _Capitula_ terminalia solitaria vel 2-3, _resupina pedunculata globosa, cum stylis ad ⅛ poll. diam. _Pedunculus_ c. 6 lin. long., 2 lin. diam., _bracteis paucis latis apiculatis c. 2 lin. long., c. ⅓ lin. lat._ _Receptaculum_ ovatum, c. 3 lin. long. _Bracteae_ sterile appressa ovata apiculate, c. 4 lin. long. _Bracteae florales late obcuneate, 3 lin. long. et lat., in apiculo angusto breviter piloso ἴππ. long. terminantes, supra glabrae, dorsu marginibusque pilis longis sericos dense tectae. _Perianthii tubus_ 3 lin. long., _infrundibuliformis, basi glaber, aliose pilosus; limbo flavo, 5 lin. long., dense pilos; _anhoreae_ ἴpp. lin. long. _Squamae hypogyna_ linearæ, membranacea, ἴipp. lin. long. _Ovarium_ ἴipp. lin. long. _Stylus_ flavus, 12 lin. long., _sulcatus, parte quarta ultima recurvata angustiores. _Stigma_ ovoidale, leviter obliquum, obtusum, 1 lin. long. _Hab._ The exact locality for this plant is unknown, but is certainly in the Ceres Division, Cape Province. There are three gatherings of it in the Bosia Herbarium, all obtained from wild flower shows, viz., _Bosia Herbarium_ no. 10528, exhibited at the Cape Town Wild Flower Show, October 1910: _Compton_ no. 3824, exhibited at _Ceres Wild Flower Show_, Oct. 3, 1927: _Compton_ no. 3994, exhibited at _Ceres Wild Flower Show_, Oct. 4, 1930.

A very distinct species, most nearly related to _L. hypophyllum_ R. Br., but readily distinguished by the form and clothing of its leaves and by its floral characters.


*Hab.* Cape Province; Ceres Division, exact locality unknown. *Compton* no. 3988, exhibited at the Ceres Wild Flower Show, October 5, 1931. Mrs. C. van der Byl informs me that she had seen the plant growing near *The Baths*, Modderfontein, Clanwilliam Division.

Most nearly related to *L. grandiflorum* R. Br., from which it differs in the longer, narrower, less hairy, and somewhat glabrescent leaves, the glabrescent stems, the larger size of its inflorescences, the neck, the appressed bracts, the less hairy perianth, and the longer and stouter styles. The sterile apical region of the capitulum is conspicuous in the midst of the flowers. The styles are bent laterally at their ends, all of them being directed tangentially in the same sense, giving a wheel-like appearance to the inflorescence in apical view; the specific name is suggested by this feature.


*Hab.* Cape Province; Ladismith Division, Roodeberg, 4800 ft. altitude, November 1, 1931. *Compton* no. 3921. Similar in vegetative characters to *N. spathulata* R. Br. and *N. Muirii* Phillips & Hutchinson (which are probably synonomous), but the inflorescence is markedly different. The bracts are much broader and are only slightly pubescent when young, rapidly becoming glabrous. The perianth is persistently white-villous, so that the whole inflorescence presents a striking contrast between the bracts and flowers. There are also smaller differences in floral characters. The new species is an interesting addition to the small group of species of *Nivenia* in which the leaves are markedly dimorphic, the lower ones being for the most part finely dissected, while the upper ones are entire and flabellate (some leaves showing an intermediate form); this dimorphism not being a phenomenon of juvenility, but occurring as a regular event on the branches of the mature shrub.

*Ornithogalum distans* L. Bolus, sp. nov. (Beryliis) (Liliaceae-Scilleae). *Planta* 25–30 cm. alta, caule ad 3 mm. diam. *Folia* 3, distantis, vaginis per 1–4–2 cm. exsertis, viridi-maculatis vel superne viridi-nervatis, plus minusve setosis, setis patentibus, laminis subdiformibus, infima oblonga vel ovali, obtusa ad 2 cm. longa, 1–1 cm. lata, superioribus linearius linearibus superne attenuatis acutis vel subacutis utrinque pilosis, pilis patentibus minute glandulosis vel supra glabrescentibus, vix carnosis, 4–5–6 cm. longis, 0–8–1 cm. latis. *Racemus* 9–20-fl., 8–10 cm. longus vel demum elongatus. *Pedicelli* inferiores ad 2–5 cm. longi. *Bractea* e basi ovata longe attenuata, tenues, inferne pellucides, superne virides, nervis 5 viridibus, 3 ad apicem convergentibus. *Perianthii segmenta* nivea ad 1–6 cm. longa, 6–7 mm. lata, oblongo-ovata vel subobovata, obtusa, exteriore medio viridi-nervata, inferiore sepius coloralia basique breviter unguiculata. *Filamenta* alba inaequilonga, 5–6 mm. longa, longiora basi per 2 mm. dilatata, squama apice biloba; *antherae* luteae. *Stylus* cum stigmatibus 4 mm. longus. *Ovarium* luteum 4 mm. longum.


*Ornithogalum Leipoldtii* L. Bolus, sp. nov. (Cathissa). *Planta* glabra ad 40 cm. alta. *Folia* ad 6 lineariae parum supra medium attenuata subobtusa ad 13 cm. longa, ad 2–4 cm. lata. *Racemus* dense 13-fl. *Bractae* ere a primo membranae, e basi lata longe acuminatae, ad 2–2 cm. longae. *Pedicelli* adscendentes 2–2–1 cm. longi. *Perianthium* niveum, intus haud nitens nec politum, unquam late apertum, segmentis concavis apice rotundatis, exterioribus ad 1 mm., interioribus ad 1–5 mm. latis, pro germe laterinis. *Filamenta* a synecio conspicue divergentia, ad 6 mm. longa, exteriora basi leviter ampliata, interiora squama 3 mm. longa apice 2-loba onusta; *antherae* in alabastro 6 mm. longae pallide luteae. *Stylus* 4 mm. longus. *Ovarium* atro-viride globose ovale 5 mm. longum, 4 mm. diam.
Hab. Clanwilliam Div.; Oliphant’s River Valley, hills near the weir, April 1929, C. L. Leipoldt (Bolus Herbarium, no. 19941). Flowered in Mr. Ross Frames’s garden October—November 1930, 1931.

Ornithogalum strictum L. Bolus, sp. nov. (Caruelia). Planta glabra, sepe 50 cm. alta. Bulbus 1.7 cm. diam. Caulis ad 6 mm. diam. Folia 5 adscendentia ad 20 cm. longa, ad 3 cm. lata, vagina caulium spatheaco-inclusa, ad 12 cm. longa, lamina longe attenuata. Racemus strictus 30–40-fl., ob flores erectos demum 25 cm. longus. Bracteae membranaceae, e basi latae cuspideae, 1.8–0.8 cm. longae. Pedicelli in genere inter brevissimos, 5–7 mm. vel rarius ad 1 cm. longi. Perianthii segmenta nivea concoloria fere aquaria, externa obtusa, interna subacuta, ad 1.8 cm. longa, ad 0.8 cm. lata. Filamenta per totum anthesin stricte erecta fere aquilonga gracilima alba ad 9 mm. longa, stigmatiza leviter superantis, longicirrus basi ampliatis, squama 1.5 mm. longa, apex vix bilobulata; anthere luteae. Stylus cum stigmatibus 4 mm. longus ovario aequans.


Ornithogalum cerasiun Leighton, sp. nov. (Caruelia). Planta glabra, sepe ad 30 cm. alta vel demum ultra. Bulbus globoasus, 1.6–2 cm. diam. Folia 4 synanthia coriaceae subconventula linearia, superne gradatim attenuata, acuta 18–25 cm. longa, 1.5–3 cm. lata. Pedunculus 18 mm. longus. Racemus subpyramidalis multiflorus. Bracteae herbaceae, superiores membranaceo-marginate, e basi lata. pedicellum amplectente, longe cuspide 3–1.5 cm. longe ad 1.2 cm. latae. Pedicelli adscendentem, superiores fere patentes, ad 4–2 cm. longi. Perianthii segmenta obvovo-oblonga abrupte acuminata 2 cm. longa, externa 1.1 cm. longa, interna 1 cm. lata, subviridi-alba, pro parte tertia inferiori viridi-atriata. Filamenta basi stigmatum attingentia, a parte superiore ovarii leviter divergentia, omnia basi dilatata, "squama" ad 6 mm. longa, apice blaba; anthere virides 4 mm. longe, polline subluteo. Ovarium cylindricum orbiculare, apice fere truncatum, lobis obtusis, atrate viride nites demum 8 mm. longum 4 mm. diam. Stylus 2 mm. longus, stigmatibus decurrentibus 1 mm. longis.


Neobakeria Visseriae Barnes, sp. nov. (Liliaceae—Scilleae). Bulbus 1.5 cm. diam., tunicis membranaceis brunneis. Folia 2 humistrata, ovato-lanceolate mucronata coriacea, in basin vaginamentem 2–4 cm. longam angustata, lamina saturete viridi, supra impressa nervata putulataque, pustulis fasciculo pilorum crassorum alborum ornatis, infra glabra, 3–7 cm. longa medioque lata.

Pedunculus in vagina florium inclusus gracilis 1–2 cm. longus, 1.25 mm. diam. Corymbus quasi in folis sessilis. Bracteae pro genere maxime, inferiores 2–5 cm. longe 5 mm. late inferne angustate oblongo-lanceolate acuminato tenue membranae obscure ciliolata albae, apice brunneo-virides. Pedicelli albi graciles 8–10 mm. longi, vix 1 mm. diam. Perianthii album, tubo-cylindrico superne haud ampliato gracillimo 1 cm. longo, 1 mm. diam., segmentia subacutis 5 mm. longis, 1 mm. latis. Filamenta basi per 1.5 mm. connata, 1-seriata, in fave tubi inserta, segmenta superantia, circa 6 mm. longa; anthere atrate minute, 0.75 mm. longe. Stylus cylindricus, stamina haud attingentes, stigmatum minutum. Ovarium pallide viride 3 mm. longum, 1.25 mm. diam.

Hab. Clanwilliam Div.; Lambert’s Bay, "on Klip Koppe, about 5 miles from Bay," May 1931, Miss H. A. Visser (Bolus Herbarium, no. 19616).

(To be continued.)

OBITUARIES.
Basil Harrington Soulsby (1864–1933).

ALTHOUGH not a botanist, B. H. Soulsby was for many years associated with botanical and other workers at the British Museum of Natural History in his capacity as Librarian.

Of Northumbrian stock, he was born near Christchurch, New Zealand, November 3, 1864. On the death of his father, the family returned to England, and Basil was educated at Cheltenham College (1877–83) and Corpus Christi College, Oxford (1883–87), graduating B.A. (1887) in the school of Modern History. He next went to the Universities of Tubingen and Göttingen (1888), and after two years as a master at St. Edward’s School, Oxford, studied for a year in Paris.

He joined the British Museum as an Assistant in the Department of Printed Books in 1892, becoming, in turn, Superintendent of the Copyright Office, Superintendent of the Map-Room, and Deputy-Superintendent of the great reading-room. In 1909 he was transferred to the Director’s office of the Natural History Museum. I first met him on my arrival at the Museum in October 1919, and soon learned that a somewhat gruff exterior concealed a sympathetic nature and a desire to help young and inexperienced colleagues.

In January 1921 he was placed in charge of the General Library, and our official connections were strengthened by our mutual interests in antiquarian lore and literary traditions. Soulsby’s visits to Sweden engendered a keen interest in Linnaeus and his writings, which caused him to form the most extensive
collection of books on Linnaeus, outside Upsala University, supplementing the large collection already at the Museum, mostly at his own expense; these formed the materials for his *magnum opus*, the second edition of the 'Catalogue of the Works of Linnaeus,' three times as large as the first edition issued by the Trustees of the British Museum in 1907; fortunately this is all printed except the corrigenda and addenda, and will appear shortly. It has been a pleasure to help in its preparation.

Soulby's retirement on January 20, 1930, gave leisure for devotion to his special interests. He was keen on everything relating to the business of a librarian—the Halkhyt (of which he was at one time secretary), Antiquaries, and Linnean Societies, Library Association, Museums' Association, and Friends of the National Libraries will much regret his loss. He was elected F.L.S. in 1930.

He died at Reading on January 14, 1933, after a short illness. — J. Ardagh.

**Henry Ogg Forbes**

(1851–1932).

Dr. H. O. Forbes, who died at Selsey on October 27, 1932, was not strictly a botanist, but rather a naturalist-collector. The results of his pioneer botanical work in New Guinea and Malaya have been recorded in this Journal.

He was born on January 30, 1851, and was educated at Aberdeen Grammar School and the Universities of Aberdeen and Edinburgh. He was intended for the medical profession, but the loss of an eye by an accident prevented this, and he turned his attention to exploration.

He travelled in Portugal (1875–77), the East (1878–84), and led expeditions to Mount Owen Stanley in 1885–86 and 1888. His exploration of the Eastern Archipelago, which he has described in his book 'A Naturalist's Wanderings in the Eastern Archipelago' (1885) was, perhaps, from a botanical view-point, his most important work, and one regrets that, apart from the lists at the end of that work and identifications of the *Vacciniaceae* and Monocotyledons (Journ. Bot. 1886), the bulk of the botanical results of his New Guinea explorations were not published until 1923–24, and of his Malayan in 1924–25 when they appeared as Supplements to this Journal.

He was Director of the Canterbury, N.Z., Museum 1890–93, exploring the Chatham Islands in the latter year, Director of the Liverpool Museums 1894–1911. He visited the Island of Socotra in 1898–99, and also reported on the Guano Islands of the Peruvian Government, 1911–13.

He was elected an A.L.S. in 1879, withdrawing in 1898. — J. Ardagh.

[The delay in publishing the results of the eastern collections was largely due to a misunderstanding between Dr. Forbes and Mr. Carruthers, then Keeper of Botany, and to Forbes's refusal to part with the notes bearing on the specimens, which were indicated in the herbarium by the collector's numbers and a general locality.—A. B. R.]

**GEORGE RAMAGE.**

We regret to hear of the death of Mr. George Ramage at Rose Hill Estate, Dominica, on January 11. He was a graduate of Edinburgh University, and joined the expedition to Fernando de Noronha under Mr. H. N. Ridley in 1887. After remaining in Brazil for a short time he went to Dominica, where he collected for the West Indian Commission. Later he settled down as a planter in the island, till his death at the age of 68. His name is associated with *Aspilia Ramagei* Ridl. (Compositea). — H. N. R.

**SHORT NOTES.**

**ROCKS GROOVED BY FICUS ROOTS.** — In the "Botanical Results of a Trip to the Anambas and Natuna Islands" by Dr. van Steenis (Bull. Jard. Bot. Buitenzorg, iii. vol. xii. 2, 155) is an account, with a photograph, of a grooved rock seen by him on Gunong Ranai in the island Bunguran, Natunas. He writes: "The rock is very smooth and the 20 cm. broad vertical grooves are rounded and originate near the top of the rock" (which is 3 to 4 metres high); "the phenomenon may be observed frequently also in the hilly country, as on the beach in Natuna and Siantan. However, the exposed granite peaks of G. Ranai do not show it distinctly. The origin of the grooves must be ascribed to the erosion of water." Similarly, channelled rocks are to be found in the granite mountains of the Malay Peninsula, and the first observer to call attention to them was Dr. J. R. Logan in a paper, "On the Rocks of Pulau Ubin" (an island lying in the Johor Strait), published in Verhandel. van het Genootsch. van Kunsten en Wetenschappen, xxii. (Batavia, 1846), and reprinted in Miscell. Papers relating to Indochina, ser. 2, i. 23. Such grooved rocks have naturally attracted the attention of geologists rather than botanists, and van Steenis refers to the observations of M. Bauer in Beitr. zur Geologie der Seychellen, Neues Jahrh. für Mineralogie, etc. 1898, 163, Brauner, Bull. Geol. Soc. Amer. vii. (1896), 255, and Molengraff, Geol. Verkenningstochten in Central Borneo, 1893, 139, with plates; and Hallier found them in Bukit Ketam (Natuurw. den ensch. xi. 10). Of these papers I have seen only the last.

Bauer describes the grooves from perpendicular walls of granite, and according to him they may attain a length of 35 metres;
at the top they are not deep and narrow, but towards the base may broaden up to nearly 50 cm. Connections between the different grooves were observed, and he refers to their occurrence in crystalline rocks in Brazil (Brauner).

So here we have this rock-channelling recorded from the Seychelles, Malay Peninsula, Borneo, Natunas, and Brazil.

The explanation is very simple. Where this channelling occurs it will be noticed that the top of the granite mass is broad and rounded, and the grooves (usually in the Malay Peninsula 3 cm. or more deep) are widest at the top of the rock and run more or less straight to the bottom, where they are narrower and shallower. They are caused by the growth of a fig-tree on the summit of the rock, the roots of which run over the face of it to the ground and conduct the heavy rainfall along the sides and between the rock and the root, excavating the channels in which the roots lie. Eventually the tree dies or is felled in forest-clearing, leaving the curiously channelled rock. Naturally these fig-trees, usually found in dense wet jungle, do not occur on exposed peaks of granite. In my first year in Singapore (1889), after reading Logan’s paper on the local geology and attempting to follow out his observations, I found in the fern valley of Bukit-Timalo not only examples of these rocks bare of vegetation, but alongside of them where the fig-tree (in this case Ficus polysioc Ridd. and F. Miquelii Hook. fil.) were still growing on the top of the boulders, with the roots in the forming grooves, showing clearly how they were produced. Whether there is also any chemical action produced by the roots on the granite I could not say, but the constant stream of water running along the roots for many years is probably enough to account for the remarkable channelling. The only Ficus I see recorded in Baker’s ‘Flora of the Seychelles’ sufficiently large to produce the phenomenon is F. naeviflorum Bak., a tree much in request for boat-building and probably often cut away from the rocks, leaving them bare with the root-grooves conspicuous.—H. N. RIDLEY.

CAREX FACUIFLORA Lightf. in LAKE DISTRICT.—This species was found growing in plenty in a bog near Stonethwaite, Cumberland, in July 1931. This is the first record for the county and for the Lake District. Specimens have been placed in the British Museum Herbarium.—W. R. PHILLIPS.

ARTEMISIA STELLEHIANA Besser.—I saw a single plant of this Artemisia on the shore at Weston Mouth, South Devon, on August 25, 1932. This appears to be a new county record, the plant not having been seen hitherto, I believe, in England, except in Cornwall.—F. DRUCE.
The paper is well illustrated by two distribution-maps, twelve plates (50 photographs) of herbarium and living specimens, and fourteen of leaf-outlines. The photographic reproductions are exceedingly clear and valuable for showing the habits of the species figured. Much more detail could have been shown with advantage in the leaf-drawings. There is, for example, no indication of venation or indumentum.—W. B. Turrill.


The kingdom of Albania remains botanically one of the lesser-known parts of the Balkan Peninsula. Apart from the travels of Baldacci, good sets of whose plants are at Kew and the British Museum (Natural History), most of the investigations have been made in the northern Albanian Alps on the borders of Yugoslavia (Montenegro). The extensive journeys of Dr. Markgraf, described in his book *In Albanien’s Bergen* (Stuttgart, 1930), resulted in considerable collections of plants and, equally important, in the recording of data on the vegetation and distribution of many species. In addition to the book just mentioned, Dr. Markgraf has published a number of papers on the taxonomy of Albanian plants, and we now have the volume which is the subject of the present notice.

The general format of the work is excellent, as one expects of papers published in the *Bibliotheca Botanica*. It is divided into three main parts, dealing respectively with the vegetation, the flora, and the development of the flora. The first, and much the longest, part is based largely on Dr. Markgraf’s own observations. The peculiar interest of Albania lies in the meeting within the country of two distinct botanical regions. In the north, at least in the highlands, the Central European vegetation is characteristically represented, with a large number of Alpine species and communities. In the south Mediterranean communities reach even to the tops of the mountains. The essential differences are explained with the aid of diagrams. For the higher zones, Dr. Markgraf makes the southern boundary of the “Wolkenwaldstufe,” with the Fagetum as the chief constituent, the southern parts of the mountain masses Galicica—Gur i Topit—Mal i Jprranishit. The “Trockenwalde-Stufe” is acknowledged to be a transitional community, more allied to Mediterranean than to Central European vegetation, a matter requiring further investigation. Nearly all western Albania and also most of the valleys of the Drins and of the Shkumin are placed in the Macchie-Shibljak belt. One suspects too much generalization in this scheme, and it is also opportune here to criticize the beautified reproduced coloured map (scale 1:400,000) at the end of the paper. A comparison of this map with the map of Dr. Markgraf’s routes published in his book (p. 246) will show how much surface which he has not visited is fully plotted for a definite “Stufe” and even for definite communities. Data have no doubt been taken from other authors, but the map, as a whole, gives a misleading impression that our knowledge of the vegetation of Albania is much more complete than it really is. In dealing with endemicism in the Albanian flora the number of “endemics” is swollen to 157 “Arten” by enlarging the boundaries of Albania, by including taxonomic units below the grade of species, and, especially, by including species which are considered to have their centre or main area of distribution in Albania, but which are not really endemic. Not more than one of the six plants whose distribution is mapped on p. 104 is a true Albanian endemic species.

The richness and diversity of the Albanian flora is indicated by the numerous species-lists (a detailed criticism of which would occupy far too much space) and by the interesting discussion on the “genetic” elements of the Albanian flora. A considerable number of the species and genera found in Albania must certainly be considered of relict nature, as is indicated by the occurrence of the species or genera most closely resembling them in countries far distant from the bounds not only of Albania but of the Balkan Peninsula.—W. B. Turrill.

Heft 106. Geographisch-morphologische Studien über Aster alpinus L. und verwandte Arten. By Max Onno. 4to, pp. ix, 83, 6 pls., 4 text-figs., and 6 maps. Price 38 R.M.

Dr. Onno presents the results of a systematic study of the forms included in the Section *Alpinus* of the genus *Aster*. The original species, *A. alpinus* L. is widely spread in the North Temperate zone and the author’s main object has been to study its distribution over its area on the basis of the late Prof. Wettstein’s geographic-morphological method. Thirty-one pages of the text are devoted to this species, of which three subspecies and eleven forms are recognized. Here, as generally in the volume, full details are given of the localities of the specimens examined, arranged under geographical headings. The remaining thirty species constituting the North American and Asiatic groups have been less intensively studied. The author acknowledges the assistance derived from a number of important European and North American herbaria. The Royal Botanic Gardens at Kew and Edinburgh appear in his list, but two notable
omissions are the British Museum and Paris Herbaria—the invaluable Chinese collections in the latter would have added materially to the information.

Dr. Onno recognises two Subsections, Homochaeta Onno (species 1-24) and Heterochaeta Benth. & Hook. (de Candolle pro genere) (species 25-33), distinguished by a simple or double pappus respectively. These are each subdivided into two series based on the length of the pappus and the presence or absence of a membranous margin on the involucral scales. Subsection I. includes all the American species, A. alpina, and some Asiatic species; Subsection II. is entirely Asiatic. Owing to inadequate spacing it is difficult to follow the various subdivisions in the text.

The author does not adopt the segregation of the genera Xylorrhiza Nuttall and Oreasterum Greene adopted by some American taxonomists, and this necessitates the forming of a new combination, A. Gooddingii for Xylorrhiza scopolorum Nelson from the Rocky Mts. of Nevada. It is to be regretted that the term “nova stirps” should be used to indicate new species, three of which are distinguished from China and Tibet. Several Chinese species are included only “e diagnosis” as the originals of the work of Delavay and Franchet have not been examined. A key for the determination of species follows the taxonomic account.

The phytology of the groups of species is briefly discussed. A central group Alpini is recognised, from which five smaller groups radiate. Geographical distribution is clearly indicated in six maps. The plates are reduced photographic reproductions of herbarium species selected to illustrate species, subspecies, or varieties, and give merely a general impression of the plant. A list of the relevant literature includes 110 titles.


In recent years strong tendencies have directed art toward a “conscious return to the primitive.” Gardening has not escaped, and the interest now manifested in Cacti indicates an increasing preference of the strong, rugged, and simple to the graceful and delicate. Such is the author’s apology for his little book, which has been prepared with the aim of answering some of the many questions provoked by familiarity with Cacti, either wild or in cultivation. The arid and semi-arid areas, the homes of the Cacti, are, moreover, of special interest as the last retreats of unspoiled nature.

The author, who writes from the Desert Laboratory at Tucson, is eminently fitted for his task, and his book will interest the botanist as well as the cactus-grower. The titles of the five chapters—“What the Cactus is,” “How the Cactus is built,” “What the Cactus is named,” “The Cactus in its Home,” and “How to cultivate the Cactus”—indicate the scope of the volume. In an easy non-technical style the author describes the general structure and life-history of a Cactus, and gives some account of the great diversity of forms represented by a review of the generally recognised tribes. “The Cactus in its Home” deals briefly with its general distribution, which extends from Alberta to Patagonia, but mainly with the Cactus-regions of the United States, and illustrates the considerable variety of soil and climate conditions in which Cacti will flourish. Methods of indoor and outdoor cultivation are described and propagation by cuttings and by seed, and the process of grafting. The excellent illustrations, many of which show the plants in their natural habitat, are a notable feature. The typography and general production of the volume are a credit to the publishers, who adopt as their motto the phrase “Sans tache.” It is therefore the more to be regretted that their London agents should see fit to disfigure the title-page with a couple of unsightly violet ink impressions from a rubber stamp.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At the General Meeting on January 19, Professor F. E. Fritsch gave an account of a paper by Professor M. O. P. Iyengar, entitled “Contributions to our Knowledge of the Colonial Volvocales of South India.” The paper deals with a large number of different forms, and contains numerous valuable observations. Thus Eudorina illinoiensis (Kofoid) Pascher is given greater precision in noting the fact that the four anterior cells of the cenobium always behave differently from the rest in remaining vegetative. New species of Eudorina, Pleodorina, and Volvox are described; several species of the last previously known only from Africa are recorded for India.

Miss E. Rich read a paper by Miss M. A. Pocock and herself on “Some Observations on Volvox in Africa.” Numerous excellent lantern-slides illustrated many new facts in the life-histories of the two South African species, especially the mode of development of the zygote.

Mr. A. J. Wilmott explained Mr. A. E. Igg’s paper “On the Synonymy of Conocygniophora aloepecuroides.” A species, sent to Linneaus by Arduini, was considered to be a variety or monstrosity of Aloepecuris utriculatus by J. E. Smith, who, JOURNAL OF BOTANY.—Vol. 71. [MARCH, 1933.]
like Linnaeus, assumed that the specimen came from Italy. It is now clearly established that the grass is common in Palestine and Syria, and is a well-marked species.

Miss E. D. Brain in her paper, "A Comparative Study of Geotropism in Three Species of Lupinus," traced the course of graviperception as measured by presentation time through the life-cycle of L. albus, L. polyphyllus, and L. arboresus. Ontogeny of graviperception has been studied in detail in the seedling of L. albus and in the inflorescences of L. albus and L. arboresus. Specific differences of behaviour are marked in the inflorescence stages, and it is suggested that these may be correlated with specific differences of life-habit.

At the meeting on February 2, Mr. J. Ramsbottom gave a paper on "The Rust of Wheat and Barberry." After an account of the position at the beginning of last century and the "barberry war," references were made to A. Young's circular to agriculturists and Sir Joseph Banks's "Short Account of... the Blight, the Mildew, and the Rust." Several letters to Banks from the horticulturist T. A. Knight were read, and attention was called to L. G. Windt's "Der Berberitzenstrauch, ein Feind des Wintergetreides," of which a translation, formerly in Banks's possession, is in the Department of Botany, British Museum.

"Weeds of the Pineapple Fields of the Hawaiian Islands" (University of Hawaii Research Publication, no. 6, Sept. 1932).—A handy and useful guide by Harold St. John and E. Y. Hosaka to the more important weeds of the Pineapple fields. Three ferns (one is our Bracken) and 80 flowering plants are briefly described in non-technical language, and illustrated by full-page line drawings showing the general appearance of the plant and details of flower and fruit. Notes are also included on the duration of the weed, its distribution in the islands and relative abundance, its means of dispersal, importance (i.e., its seriousness as based on observation and experience), and, finally, means of control are suggested. English and Japanese names are also quoted. A key is included for purpose of identification, and there are short general accounts of means of dispersal and of methods of mechanical and chemical control. Many of the weeds are old friends and readily recognisable from the very clear drawings, but the Dandelion is not a good representation of our familiar weed. Perhaps it is a new species!

Note to Contributors.—The Editor begs to remind contributors to the Journal of the following recommendation in the Rules of Nomenclature:—"The metric system only is used in botany for reckoning weights and measures. The foot, inch, line, pound, ounce, etc., should be rigorously excluded from scientific language."

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NOTES ON BRITISH EUPHRASIAS.—III.

By H. W. Pugsley, B.A., F.L.S.

(Continued from Journ. Bot. 1922, 5.)

Since the publication of my "Revision of the British Euphrasia" in Journ. Linn. Soc. (Bot.) xlvii. 467 seq. (1930) the herbaria of the late A. Bennett and C. E. Salmon have been incorporated with the British Museum Herbarium, and afford a few new vice-county records and other points of interest. I have also been enabled to examine the whole of Col. H. H. Johnston's Orkney Eyebright (with some from Shetland), comprising nearly 200 sheets, as well as copious material collected in 1831 at Melville by Mr. G. Taylor and on St. Kilda by Mr. C. P. Petch.

Col. Johnston's collection, which almost entirely consists of good sets of well-dried specimens, suffices to show with some accuracy the composition of the very rich Eyebright-Flora of Orkney. Its predominant feature is the prevalence of purple or violet flowers in place of white—a character noticeable in less degree in Cornwall,—and this suggests that the peculiarity may be due to the Old Red Sandstone soil that is general in both districts. Two species are clearly dominant in Orkney, viz. E. micrantha and E. borealis, and the latter of these is eminently variable. As might be expected, there is no glaucular species of the Hirtellae group present; and E. brevifila, which seems to be scarce, is always glaucular or nearly so, and sometimes not readily separable from E. borealis. E. scotica, with var. purpurascens, is decidedly rare or local, which is not surprising in the case of a species that is more or less a mountain plant on the mainland. E. frigida Pugel. (E. latifolia) is wanting, as might be expected, while E. fowlcensis is fairly common. Of the Series Nemoraeae the most general species is E. confusa, which is frequent and varies from the ordinary white or purple-flowered form of Southern England to the local variety atrovilacea; E. occidentalis occurs rarely; and rather remarkably the variety subulicola of E. nemorosa grows in one spot, where it has perhaps been introduced. E. curta appears to be entirely absent, as is also E. rotundifolia; and E. Marshallii is known in its typical form from one station and from a few others as var. gymmaea. Col. Johnston's material indicates that between these species, especially the commoner ones, intermediate strains that are presumably of hybrid origin are prevalent. E. micrantha f. simplex, E. Marshallii, and the rare E. fowlcensis var. turbinata grow on Fair Isle, midway between the Orkneys and Shetlands.

Mr. Petch's set of Euphrasias from St. Kilda is naturally of great interest, and comprises the five species E. micrantha, E. fowlcensis, E. occidentalis, E. borealis, and E. brevifila.

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Mr. Taylor made a large collection of forms of *E. Marshallii* at Melvich, with abundance of *E. micrantha f. simplex* and a little *E. rotundifolia* growing in its vicinity. A few individuals seem to be crosses between the two former, and one or two look like *E. Marshallii × rotundifolia*. Plants were also found that have the aspect of *E. Marshallii × brevipila* and *E. rotundifolia × brevipila*; the former of these has been previously found in the district.

The following experiment seems worthy of record in connexion with the general semi-parasitism of the genus. In the summer of 1892, while in Perthshire, I gathered a few roots of *Hieracium* for cultivation in the garden, and for some days they remained in my vasculum packed with fruiting plants of *Euphrasia brevipila var. notata*. On my return home the *Hieracium* were planted in pots, and in the following spring (1930) I was surprised to find three or four seedlings of *Euphrasia* springing up in one of these pots containing a plant of *Hieracium lingulatum*. Two of those seedlings grew vigorously, although there was no grass in the pot. One was transplanted to the rockery, where it sickened and died, but the other continued vigorous and proved to be *E. brevipila var. notata*. It had evidently sprung from a seed that had become attached to the Hawkweed in my vasculum. This plant produced a number of normal flowers, and fruited and seeded freely. When it was withering late in the season I shook out the seeds from the capsules on to the soil of the pot, and in the following spring (1931) thirty-four fresh seedlings appeared. These grew well without any grass until they became overcrowded, when I pulled out the majority. Of the remainder, several flowered, and at the end of the season I again scattered their seeds over the pot-soil to see whether a third generation would germinate. Last spring (1932) over sixty seedlings sprang up and some of these reached the flowering stage. It is thus evident that some *Euphrasias* can maintain their existence without the help of a host-plant, for there was certainly no connexion between the roots of my seedlings and those of the Hawkweed, which was the only other plant at any time in the pot. Step ('Wayside and Woodland Blossoms,' ii. 60) relates a somewhat similar experience.

The succeeding notes follow the taxonomic arrangement of my Revision.

**Subsection Ciliatæ.**

**Series I. Latifoliate.**

1. *Euphrasia micrantha* Rehb.—Col. Johnston has a number of sheets of the plant referred by Bucknall to *E. caerulea* Tausch, which is briefly dealt with at page 482 of the 'Revision.' It was first collected by Col. Johnston in 1912 in a damp pasture on Wart Hill, in Hoy, where it has been refound in subsequent years. Marshall, however, had obtained a similar plant (no. 2401, as *E. curta*) at Stenness, in Mainland, in 1900, and he remarked on his labels that the form was common both in Mainland and in Hoy. A plant closely resembling these specimens (now in Herb. Mus. Brit.) was collected by Townsend in 1881 (as *E. gracilis*) on the moors at Foyers, Inverness-shire; and the National Herbarium contains another kindred form found at Bergen, in Norway, in 1900 by L. V. Lester.

All of these examples have the aspect of a coarse *E. micrantha* with large flowers, and it was suggested in the 'Revision' that they might be the result of *E. micrantha* crossing with *E. borealis*. This may well be the case from the geographical distribution of the two species, but the plant in question is much nearer morphologically to *E. micrantha*, and, in view of its uniformity, its occurrence in several places in Orkney and elsewhere, and its apparent permanence in Hoy, it is thought worthy of distinction as a variety of *E. micrantha* Rehb. thus:—


*E. caerulea* Tausch differs from this plant by its more distinctly aestival habit, with longer internodes and fewer leaves; and also by its short inflorescence. Its leaves are more spreading, broader, and more ovate and setulose; and its corolla is typically of a much deeper violet.

The form *simpliceflora* Pusl. of *E. micrantha* has been collected in Orkney by Col. Johnston (nos. 3489 etc.), but the typical species, sometimes with very small flowers, is much more general.


2. *Euphrasia scotica* Wettst.—None of the specimens collected by Col. Johnston in Orkney is quite typical; one
(no. 1907) appears closely to resemble f. *estriata* Pugsl. There are several sheets of var. *purpurascens* Pugsl., but one of those cited in the 'Revision' (no. 1963) is probably *E. micrantha × foulaensis* rather than a form of *E. scotica*.


3. **Euphrasia frigida** Pugsl. (*E. latifolia* Pursh ex Wettst.)—In connexion with the substitution of the new name *E. frigida* Pugsl. in place of the homonym *E. latifolia* Pursh ex Wettst. (*Revision*, page 490), my attention has been drawn to the omission to cite a type. No type was cited because no new group was proposed, and *E. frigida* was merely a new name for the species described by Wettstein, whose account was founded on material which he presumed was identical with Pursh's plant, which came from Labrador. Pursh's plant cannot be traced, and, as more than one *Euphrasia* is now known to grow in Labrador, it appears desirable to typify *E. frigida*, and to select as a type one of the Labrador specimens referred to under *E. latifolia* by Wettstein in his Monograph. The Natural History Museum at Vienna have kindly lent for inspection their material of *E. latifolia* from Labrador, but the only specimen mentioned by Wettstein that is included (coll. Barth) is very immature, and it is therefore thought best to leave *E. frigida* untypified for the present. The other Labrador examples, apparently named *E. latifolia* by Wettstein at a later date, are poor specimens, but seem homogeneous and conspecific with the form generally named *E. latifolia* by recent Scandinavian botanists; and the plant occurring in Scotland is very similar.

The chief difference lies in the Labrador material being more uniformly hirsute and having less deeply emarginate capsules. The leaf-cutting of the European forms also tends to be less acute. The Scottish plant that most closely matches that seen from Labrador is *Marshall, no. 2071, Cairngorm* (as *E. foulaensis*), the hirsute nature of which was noted by the collector.

Among some specimens sent for naming by Mr. T. J. Foggitt is a set from Brandon Mt., Co. Kerry, that apparently belongs to this species. The plants were gathered (29. 6. 31) too young to show the characteristic fruit, but there seems little doubt as to their identity. This, if correct, is a new and unsuspected record for Ireland.

Shetland should be deleted from the vice-comital distribution of this species. The exsiccate, Beeby no. 1124, which is labelled "*E. nemorosa," is more probably a hybrid of *E. micrantha*, perhaps with *E. borealis*.

4. **Euphrasia foulaensis** Towns.—This is well represented in Col. Johnston's collection. The typical plant appears in a few gatherings (e.g., no. 2629), but the majority of the specimens are intermediate between this and the *f. condensata*. The variety *maritima* Pugsl. is absent.

Series II. **Nemoroseae**.

6. **Euphrasia Marshallii** Pugsl.—In Herb. A. Bennett there is an example of this species labelled "Coast of Aberdeen, Traill. 1890"—a great extension of its geographical range, if correct.

Col. Johnston's own material of his no. 1843, cited in the 'Revision,' is much more robust than the specimens of the set previously seen, and is nearly identical with the Melvich type.

The exsiccate no. 529 has been erroneously shown as the type of var. *pygmaea* Pugsl. instead of Burdon's Scaloway plant (in Herb. Pugsley). Col. Johnston possesses a good series of the plant represented in his no. 529, which was collected at Black Crag, Stromness, Mainland, first in 1912, and subsequently in 1919 (nos. 488 and 529), and in 1922 (nos. 1939 and 2142). Although a few individual plants among these gatherings have the appearance of a large-flowered form of var. *pygmaea*, they are clearly shown by the remaining specimens to be only dwarf examples of a plant much more like typical *E. Marshallii*, from which they differ mainly in their large purplish corollas. Some of the specimens recall *E. borealis* var. *zelandica* in their leaf-cutting, and this resemblance is especially noticeable among the plants of the year 1922. It therefore seems probable that the large coloured flowers have been derived from a crossing of *E. Marshallii* with *E. borealis* var. *zelandica*.

Another gathering from Sandwick, Mainland (Johnston, no. 1387), is intermediate between typical *E. Marshallii* and var. *pygmaea*, while one from Birsay (Johnston, no. 2429) is clearly the variety, which was previously found in the same locality by Traill in 1888 (as *E. officinalis*, in Hb. A. Bennett).

7. **Euphrasia curta** Fr.—An additional vice-county record is:—62, N.E. Yorks.: Goathland (Miss Roper).

9. **Euphrasia occidentalis** Wettst.—The typical species usually begins to flower in May like its three varieties, and it is evidently the first Eyebright to bloom in this country. The earliest flowers are often produced from the fifth pair of leaves, and owing to the shortness of the lowest internodes these leaves at times form almost a rosette and the branches thus appear quite basal. *E. occidentalis* is probably the commonest species on the sea-cliffs of the south-west of England and of South Wales. The variety *calvescens* Pugsl. was seen in abundance in 1931 on the coast of Dorset and about St. David's, Pembrokeshire.
Additional vice-counties noted are:—46, Cardigan: Ynyslas (Salter). 110, Outer Hebrides: St. Kilda (Petch). 111, Orkney: Rousay (Johnston, no. 1338); Swoone—v. calvosa (Johnston, no. 309).

10. Euphrasia nemorosa Löhrl.—A number of sheets of this species collected in Notts by Prof. Carr belong to var. collina Pugs., which appears to be the prevalent form in the county. Some of the plants have flowers nearly as large as those of E. Pseudo-Kerneri.

Col. Johnston collected the variety sabulicola Pugs, in 1920 in an artificial pasture at Stromness, Mainland (no. 830).

Additional vice-counties for the species are:—29, Cambridge; Chippenham (Gilmour). 56, Nottingham: Gotham, etc.—v. collina (Carr). 61, S.E. Yorks: Bridlington (Miss Escritt). 65, N.W. Yorks: Outershaw—v. collina! 111, Orkney: Mainland—v. sabulicola (Johnston).

11. Euphrasia confusa Pugs.—Col. Johnston has a number of Orkney gatherings of this species from different islands of the group, some resembling the usual f. albidæ of Southern Britain (nos. 407 A, 904, 1391, 1410, 1432, 2014, 2028, 2670, 3453, 4371, and 4444), others with much larger flowers but apparently otherwise identical. These latter seem to merit distinction as a form:—

grandiflora, form. nov.

Exsicc. Johnston, no. 1409, Eynhallow, Orkney, 1921 (typus); no. 1910, Birsay, 1922; no. 2773, Cava, 1924; no. 3323, Papa Westray, 1926; no. 4375, Grimbister, 1931.

Corolla maior (7–8 mm. longa) labii superioris lobis sepsitis retusis reflexis, inferioris medio lobo longissimo a typo differt.

The large corolla of this form may be due to crossing with E. borealis or E. brevipila, but the specimens show no other indications of hybridity. Other sets in Col. Johnston’s collection are clearly intermediate between E. confusa and E. borealis or E. brevipila, and may be presumed to be of hybrid origin.

There are also in the collection specimens of var. atroviolacea from several different localities in the islands (nos. 950, 995, 2395, 2399, 2823, 2842, 3103, 3104, 3300, 3368 A, 3485, and 3486), which have been variously named. Some of these are finer examples in better condition than the plants collected at Birsay, the locus classicus.


Series III. Brevipilae.

13. Euphrasia borealis Towns.—The majority of Col. Johnston’s specimens belong to the variety zelandica Pugs., but var. speciosa Pugs. and some intermediate forms are also included. The typical species appears to be scarcer than these varieties.

The variety atropurpurea Pearse in Johnston’s ‘Additions to the Flora of Shetland,’ iv. 2 (1929), as represented by its type (Johnston, no. 334, Fetlar, Shetland, 1929), is a compact form, with the calyx and capsules of var. zelandica, but the teeth of the floral leaves more obtuse and more like those of the typical form. The flowers are of an unusually deep purple for a large-flowered Euphrasia, and may owe their colour to crossing with E. foliacea.


Series IV. Hirtellae.

15. Euphrasia Rostkoviana Hayne.—An additional record for this species (v. obscura Pugs.) is:—44, Carmarthen (Barker).

18. Euphrasia anglica Pugs.—In Herb. C. E. Salmon there is a fine set of E. anglica × Pseudo-Kerneri, collected near Friday Street, in Surrey, in Sept. 1899. The plants are clearly intermediate between the two species, having the flexuous habit and glandular clothing of E. anglica with the neat foliage of E. Pseudo-Kerneri, combined with the large flowers of the latter coloured as in the former. The specimens recall Standen’s Pit捻down Common plant, mentioned on p. 329 of the ‘Revision.’

Additional vice-counties noted for E. anglica are:—56, Nottingham: Thoresby (Carr). 57, Derby: Clee Dale (H. Fisher).

19. Euphrasia hirtella Jord.—The plant collected by C. E. Salmon near the Lavers Burn, Loch Tay, Perthshire, as E. Rostkoviana, which is referred to at p. 531 of the ‘Revision’ under E. hirtella, appears from the better material in his own herbarium to differ from the E. hirtella v. polyadenæ which I collected near Killin. Its strict, almost unbranched habit and numerous narrow leaves are very characteristic, and I now think that it is of hybrid origin between E. brevipilæ v. notata and E. micrantha, both of which are abundant in the station where it was found.
Subsection Angustifoliae.

20. Euphrasia salisburgensis Funkh. — In the recently published ‘Comital Flora of the British Isles’ (p. 221) this species is recorded for South Devon. I have seen the specimens forming the basis of this record, which were collected at Slapton. The gathering consists of thirteen well-preserved plants, which, though young, obviously belong to the Series Nemoroae and appear to be drawn-up examples of E. confusa Pugs. (f. albida). The presence of stiff marginal hairs on the capsules, which are clearly visible on the specimens, should have prevented confusion with the species of the Subsection Angustifoliae.

BRITISH POLYGONA, SECTION PERSICARIA.

BY C. E. BRITON.

The British species of Polygonum included in the section Persicaria Meisner comprise Amphibium, lapathifolium, nodosum, Persicaria, Hydropiper, mite, and minus. Together they form a very natural group, the most divergent species being P. amphibium, owing to its perennial duration and usual aquatic habitat, whilst the remaining species are of annual duration, and are plants of watery places and of waste or cultivated ground.

The hydrophilous species, P. Hydropiper, P. mite, and P. minus, are not remarkable for variability, but the species—P. lapathifolium, P. nodosum, and P. Persicaria—that are more often seen in waste and cultivated places are indeed polymorphous, and, in consequence, have frequently received attention from collectors, as may be seen in past reports of the Exchange Clubs.

The varying forms presented within the limits of the species are by some botanists regarded as chiefly induced by the influence of the environment. To the writer, however, it seems probable that, at least in P. nodosum and in P. lapathifolium, forms occur that have more claim to notice, as they appear to be genetic in origin. Such are P. nodosum vars. ovatum and erectum, and P. lapathifolium vars. genuinum and tomentosum, and these probably do not exhaust the list of forms which appear to breed true. Hybridity is a not infrequent feature of the group and has been put forward by some botanists as one explanation of the variability encountered. Several hybrid combinations are known and, no doubt, others await identification, particularly in the Persicaria—nodosum—lapathifolium series.

In the following account of the species, synonymy has been reduced to a minimum, and figures cited only where necessary. The writer is under obligations to the officials of the Department of Botany, British Museum (Nat. Hist.), for placing at his service herbarium material and literature, and is also similarly indebted to Mr. W. R. Sherrin of the South London Botanical Institute. To Mr. W. C. Barton thanks are due for literary aid.

It is intended to place in the British Museum Herbarium examples of the esixicata mentioned.

Polygonum Amphibium L. Sp. Pl. 361. Perennial. Rootstock elongated, branched, stems simple or branched; ochrea elongated truncate, ciliate or not, leaves petioled, lamina oblong or oblong-lanceolate, rounded or slightly cordate at base; peduncle sulcate, hairy or glabrous, eglandular, more rarely glandular; racemes terminal, rarely also axillary; flowers dioecious-polygamous, rarely bisexual, rose-red, perianth eglandular; stamens five, exserted, style bifid; fruits oval, compressed, shining, included.

Var. natans Moench, Enum. pl. Hass. 28 (1777); E. B. t. 436. Stem glabrous, submersed, upper leaves floating, long-petioled, glabrous; racemes borne above the surface of the water.—Ponds, lakes, etc. An ornamental plant.

Var. terrestre Leers, Fl. Herb. 69 (1775); E. B. ed. iii t. 1241. Stems erect or ascending, pubescent; lamina elongated, narrower and more elongated than in the preceding, at times narrowly oblong-lanceolate, acuminate, shortly-petioled, subcordate, or attenuate at base, hispidulous-strigose, ochrea pubescent; raceme narrow, peduncle clothed with stiff appressed or spreading hairs, or glandular-hairy—Way-sides, ditches, waste ground. Seldom flowering.

These two varieties represent the most frequent aspects of the characters exhibited are probably the direct outcome of the influence of the environment.

Related to var. natans is var. decumbens Klett. & Richt. Fl. Lips. 351 (1830) (v. coenorum Koch, Syn. i. 617 (1837)) with stems ascending, prostrate and rooting at the base; leaves usually lanceolate, shortly petioled, appressed hispid, as are also the shortly ciliated ochrea.—On the muddy borders of ponds etc.

Var. maritimum Dethard. Comp. fl. Megol. 38 (1828), marked by the widely prostrate stems and narrow undulate hispid leaves.—Sandy places by the sea; has not yet been noticed in Britain, but probably occurs.

Var. glandulosum Schönh. Flora, 340 (1832), has the stems, ochreae and leaf-surfaces clothed with spreading glandular hairs.—In Britain known only for Denbigh, Lincoln, and Hants.

P. Persicaria L. Sp. Pl. 361. Stem erect, ascending, decumbent, or prostrate, more or less swollen above the nodes; ochreae close, surface with appressed hairs, marginal cilia stout elongated; leaves petioled, oval-elliptic or lanceolate, acute or
acuminate, usually blotched, surfaces with scattered hairs, the lower leaves often arachnoid or tomentose beneath; peduncles glabrous or with appressed hairs, racemes oblong-obtuse, ½-dense; perianth red, pink, or white, glabrous or with inconspicuous glands, styles biform; fruits black, shining, lenticular orbicular or ovate, or trigonous.

Var. agrose Meisner, DC. Prodr. xiv. 168 (1856). Stem short (15–45 cm.), erect or ascending, branches few; leaves 2·5–5 cm., glabrous; racemes usually solitary, terminal and axillary, oblong, obtuse; flowers generally pale.—Dry cultivated fields.

Var. elatum G. G. Fr. iii. 48 (1855) (var. elatus Meisn. l. c.). Stem erect (30–90 cm.), little branched; leaves 10–15 cm., glabrous; racemes panicularly arranged, elongated (2·5–3·75 cm.), slender, attenuate at the apex.—Damp fertile situations.

Var. ruderale Meisn. l. c. Stem prostrate, branched from the base, branches spreading; leaves small, lanceolate or linear (2·5–3·75 cm.) often pubescent on both surfaces; racemes solitary or subracemose, ovate, or oblong, obtuse (1·25–2·5 cm.), often interrupted at the base; flowers generally pinkish.—Dry barren and stony situations.

The preceding descriptions are translations of those given by Meisner. So far as native plants are concerned, it is only exceptionally that plants are met with that fully display the character of Meisner's varieties. Plants labelled var. elatum frequently do not show the slender racemes that should characterise that variety, and in the case of the low-growing var. ruderale, the leaves, although smaller than in the other vars., are usually furnished with scattered strigose hairs only. The forma anugustifolium K. Bechhau, Fl. Westf. 773 (1863), is described as having narrow lanceolate leaves attenuate at each extremity, and is alluded to by Achscheron and Gnaepler as a very peculiar and characteristic form. What appears to be this forma occurs near Mortlake, Surrey, C. E. Britton, no. 3902.

Var. prostratum Bréb. Fl. Norm. ed. iv. 271 (1869). Stems prostrate; leaves lanceolate, blotched with black on upper surface, tomentose beneath; racemes short.—By ponds etc.

P. lapathifolium L. Sp. Pl. 360. Stem usually erect, slightly branched, 30–60 cm., seldom prostrate and much-branched, green or purplish, spotted or not, glabrous or glabrescent, nodes often enlarged; leaves petiolate, lamina oblanceolate-cuneate, rhomboid-lanceolate or ovate, attenuate at base and apex, usually broadest at about ¾ from base, blotched or not above, glabrous beneath, the lower leaves often arachnoid or felted; petiole, edge of lamina, and nerves with short appressed acute hairs; ochreae close, glabrous, glabrous or arachnoid, truncate, not or only shortly ciliate; peduncle and inner leaves of perianth

± glandular-warted, bracts glandular; racemes oblong-cylindrical, erect or slightly drooping; flowers greenish white, pinkish, or dingy red; perianth in fruit with principal veins elevated, forking, branches recurved (anchor-like); fruits usually roundish, lenticular, biconvex, smooth, shining, dark brown, obtusely beaked, and mucronate, 3×2·5 mm.

It is very seldom indeed that amongst the abundantly produced flattened fruits, a few fruits are to be found of a triangular form. When such occur they are characterised by being deeply trilobed, with compressed obtuse lobes, and possess three styles. This occasional dimorphism of the fruits appears to be little known to modern authors, although it was described long ago by W. Curtis in the 'Flora Londinensis,' and the fruits figured on t. 24 of that fine work.

Very variable, and capable of being divided into a number of easily recognisable forms.


Var. angustifolium Peterm. Fl. Lips. 292 (1858); Beck in Reichenbach's 'Icones,' xxiv. t. 215 (var. lanceolatum Beck, l. c., non P. lapathifolium L. var. lanceolatum A. Br. Flora, vii. 362 (1824), the description of which indicates var. genuinum).—Stem erect, slightly branched, or prostrate and with many spreading branches; leaves narrowly lanceolate or oblong-lanceolate, usually broadest at the middle or somewhat below the middle.—Not common.

Var. ruderale Schuster, Mitt. Bayr. Bot. Ges. ii. 50 (1907). Decumbent, branches divaricate, green, purple-spotted or wholly purple; lamina of lower leaves elliptical-lanceolate or broadly lanceolate-acuminate, marked with a darker blotch; racemes oblong or sometimes elongated, flexuose, and less stout than in preceding vars.; perianths greenish-red, dingy red, or vinous; fruits usually smaller than in var. genuinum and covered by perianth segments.—A plant of waysides, field-borders, and waste places.

Recalls at times P. nodosum Pers. when the racemes are slender and flexuose, but distinguished by its greater glabrous development and roundish fruit. Occurs in herbata labelled P. mucutatum Trim. & Dyer etc.

Easiccc. C. E. Britton, nos. 3584, 3586.

Var. tomentosum Beck, Fl. v. N. Ö. i. 323 (1890). (P. Persicaria tomentosa Schrank, Baier, Fl. i. 669 (1789); P. nodosum Pers. f. salicifolium Moss in Camb. Brit. Fl. ii. 117 (1914); Beck in Reichenh. Icon. t. 217, figs. 1–3.) Stem ascending or erect;

BRITISH POLYGONA
leaves elongated lanceolate, all, or at least the lower and middle leaves, closely tomentose or arachnoid below and also on the upper surfaces; perianth greenish white, more rarely purple.—In localities where water has stagnated, or in fallow and cultivated fields.


Var. **punctatum** Gremli, Excurs. Sw. ed. 5, 367 (1888). Leaves not marked with deeper blotches, the lower surfaces and perianths furnished with numerous yellowish glands.—Cultivated fields.

The characters given are those of Gremli. German authors attribute additional features, such as racemes closer together, only 1–4, very shortly stalked, and never distinctly paniculate. Flowers dingy white to green.

**P. nodosum** Pers. Syn. i. 440 (1805). **P. maculatum** Auct. Angl.; **P. petecitale** Druce, Fl. Bucks. 287 (1826); **P. pensylvanicum** var. petecitale Stokes in With. Nat. Arr. Br. Pl. i. 412 (1787). Stem erect, taller than in *P. lapathifolium*, or prostrate and decumbent, usually purplish and spotted; nodes distinctly swollen, the lowest at times buried in the soil and rooting; oochore loose, slightly fringed or ciliate; leaves petiolate, lamina, the lower ovate, the upper lanceolate, attenuate at the base and undulate, glandular beneath; racemes paniculate, slender, acute, or obtuse, erect or drooping; peduncle and perianth glabrous or with few glands; fruit compressed, biconvex, orbicular-ovate, obtusely beaked and mucronate, covered by the strongly veined perianth.

All forms of this may be known from *P. lapathifolium* by the fruits being smaller on the whole, less roundish, with a more ovate outline, and by the smaller glands of the peduncles and perianth which are also less numerous and at times almost absent. Other characters alleged to separate *P. nodosum* and *P. lapathifolium* are not reliable.

As in *P. lapathifolium*, there are several well-marked forms.

Var. **incrassatum** Rouy, Fl. Fr. xii. 100 (1910); Beck in Reichenb. Ic. t. 216, figs. 1 & 2. Stem branched, divaricate, much swollen above the nodes; leaves broad, shortly acuminate, racemes clustered, ± divergent; lower leaves ovate-elliptical, succeeding leaves elliptical-lanceolate, uppermost lanceolate; racemes elongated, slender.

f. **stenophyllum**, forma nov. Different a varietate.—Folliis oblongae-lanceolatis vel linear-lanceolatis ± parallae-marginatis. Leaves oblong-lanceolate to linear-lanceolate, more or less parallel-sided.—Surrey; C. E. Britton, nos. 3852, 3861, 3899.

**BRITISH POLYGONA**


The description given by Beck agrees very well with Surrey plants, and is here quoted: “Nodes cylindrical or somewhat thickened, leaves orbicular-ovate or lanceolate, usually abruptly narrowed towards the base, broadest below the middle, the lowest leaves almost obtuse; racemes usually elongated-cylindrical; perianth usually pink.”


Var. **inundatum**, var. nov. Caulis ascendentis simplex vel parum ramosus, vel ramosus multius pilulis prostratus vel decumbens, nodis ± tumulis. Folia parva lanceolata (4–8 x 1 cm.) subitus pilis sparse vel lanato-tomentosa. Inflorescencia tenuis; flores suberubentes; fructus parvus inclusus, ovatus rostratus. Stem ascending, pink, spotted, simple or with few branches, or prostrate or decumbent with many spreading branches, nodes more or less swollen; leaves lanceolate, 4–6 x 1 cm., blotched above or not, stipitate or arachnoid or tomentose beneath; racemes slender, flowers pinkish, fruits small (2–0 x 1–5 mm.), oval, beaked, included.

This plant is often seen in abundance on the sandy margins of ponds, situations that are usually flooded in winter or in wet summers (as in 1931). I cannot trace a distinctive name under *P. nodosum* Pers. It is true that narrow-leaved prostrate forms of *P. lapathifolium* are known, but the descriptions of these do not indicate that they belong to *P. nodosum* Pers.


Var. **Brittingeri**, comb. nov. **P. Brittingeri** Opiz. Naturalient: 74 (1824); *P. lapathifolium* L. var. **Brittingeri** Beck, l. c.; *P. lapathifolium* L. B. damneale Kern. (as sp.), Fiek, Fl. Schles. 382 (1881); Beck in Reichenb. Ic. t. 217, figs. 4 & 5.

The following is a transcript of the original description: “Polygonum floribus hexandri, semidyginis, stigmatibus reflexis; foliis ovatis, subitus cano-pubescentibus; pedicellis scabris; floribus paniculatis; pedunculis laevibus; seminibus utrinque
impressis. Differ a P. lapathifolium L. pedunculis laevibus non scabris; folis subtus cano-pubescentibus; a P. incano Schmidt; folios ovatis; floribus paniculatis rubris; a P. Persicaria L.: folios ovatis, subtus cano-pubescentibus." With this description may be compared the amplified account given by Beck, i. e.:' Stem prostrate, ascending, or almost erect, copiously branched, nodes not or only slightly enlarged, ochreae usually arachnoïd. Leaves short, elliptic or ovate-orbicular, often almost orbicular, usually ac., or, the lower sub-obtuse, gradually or abruptly narrowed into the petiole, green above, and white or grey beneath, arachnoïd-felted, except the upper leaves, the lower usually also arachnoïd on the upper surfaces. A bright red, brown, or almost black marking usually present on the upper surfaces of the leaves.'

I have hesitated whether to accord specific rank to this form. Continental botanists who mention it place it with P. lapathifolium as a var., and, this, no doubt, is its correct position when P. nodosum Pers. is placed in the same category, but if we regard the latter as a species, then Brittingeri is best placed as a var. of this.

Var. Brittingeri appears to be a rare plant in western Europe, and the name has not previously been applied to any British plant, so far as I am aware. It is however, included here on the evidence afforded by examples of two gatherings contained in the herbarium of the South London Botanical Institute. Both specimens exhibit the habit, leaves, and inflorescence of var. Brittingeri, and, one at least, is in close agreement with the figure cited. The plants were gathered by G. Nicholson at Kew, Surrey, and by A. Bennett near Sandwich, E. Kent.

P. lapathifolium \times Persicaria. Stem tall, erect, branched, ochreae with appressed hairs and numerous sessile glands on the surface, marginal cilia from 3 mm. to 1 mm. in length; leaves lanceolate, often blotched. Peduncles glabrous or with scattered sessile and pedicelled glands; racemes oblong or cylindrical, erect, crowded as in P. lapathifolium or less crowded as in P. Persicaria, perianth rosy, or green and vinous, glandular, especially below; fruits compressed, orbicular-ovate, convex and gibbous at the base on one side, plane or concave on the other, or fruits trigonous; perianth in fruit with prominent elevated veins.

Varies in aspect from P. lapathifolium to P. Persicaria. Known from the former by the reduced glandular clothing of the peduncles and perianths, and by the convex and trigonous fruits, and known from P. Persicaria by the glandular peduncles and perianths, the broader fruits, the more prominently veined fruiting perianths, and the shorter ciliated ochree.

Probably not infrequent, but overlooked. Surrey: Wissley, and between New Malden and Surbiton, etc.


P. Hydropiper L. Sp. Pl. 361. Stem ascending or sub-erect, rooting at the lower nodes, 30-60 cm., branched, often swollen above the nodes; ochreae inflated, glabrous or glabrescent, marginal cilia elongated, the floral ochrea ciliare or ecalce; laminae shortly petioled or subsessile, oblong-lanceolate, narrowed at each end, undulate, asperose at the margin, occasionally blotched. Racemes lax, elongated, subflumine, interrupted curved or erect; perianth usually 4-partite, but occasionally 3-partite, greenish or reddish, glandular, transparently dotted, stamens 6, styles 2-3, fruits trigonous or lenticular, tuberculare, mat, 2-5\times2-0 mm. An acrid property is present in all parts of the plant.

In Britain varies only within narrow limits, the most notable form being var. densiflorum A. Br. in Flora, viii. 356 (1824): racemes shorter, stouter, almost cylindrical, dense-flowered, pedicels longer; stem stouter, much branched, leaves broader. Surrey: Brox, exsic. C. E. Britton, no. 2988; Rept. B. E. C. 1926, 275.

P. Hydropiper appears more readily to form hybrid combinations than any other species of the genus, and the following have been noted in Britain:

1. P. Hydropiper \times minus. Distinguished from P. Hydropiper by the leaves suddenly attenuate at the base, by the slightly hairy ochree with longer cilia, and by the flowers being mostly 5-merous. Known from P. minus by the more robust habit, by the leaves abruptly narrowed at the base, and by the slightly glandular outer perianth segments.—Berkshire, Worcestershire.

2. P. Hydropiper \times mite. To be recognised from P. Hydropiper by the shortly hairy ochree with longer marginal cilia, and the usually 5-merous weakly glandular perianth, and known from P. mite by the characters of the less hairy and shorter-ciliated glandular ochree.

3. P. Hydropiper \times nodosum. Known from the first-named species by the ochre not (or only lightly) ciliare, lax, peduncles glandular, racemes compact, perianth almost eglandular, leaves eglandular beneath, dotted, blotched above.—Cambs, Hunts.

4. P. Hydropiper \times Persicaria. Leaves sessile blotched, ochree with cilia elongated as in P. Persicaria and intermixed with shorter cilia characteristic of P. Hydropiper, racemes elongated, lax, peduncle eglandular, perianth prominently nerve, faintly glandular. Closely resembles P. mite Schr., but distinguished by that by the less shining fruits, the racemes less interrupted, the flowers closer together.—Surrey, Berk, Oxon, etc.

P. mite Schr., Fl. Baier. i. 668 (1780). P. laxiflorum Weihe in Flora, ix. 746 (1826). Stem erect from a decumbent rooting base, 30-60 cm., often much branched; ochrea lax,
hairs appressed, eglandular, strongly fringed. Lamina lanceolate subacute, slightly undulate, ciliate, eglandular. Raceme erect filiform, interrupted, perianth usually 5-partite, eglandular, white or pink, faintly nervèd, fruit black, shining, compressed, ovate acute, plano-convex or trigonous, as long as the perianth. Acid properties absent.

Hybridises with *P. Hydropiper* and with *P. minus* (see under those species) and with *P. Persicaria*.

*P. mite × Persicaria*. Stem usually erect, branched; ochrea appressed, pubescent, cilia elongated; lamina lanceolate or obovate-lanceolate, base cuneate, apex acute, surface with scattered hairs, faintly blotched; peduncles eglandular, racemes numerous, erect, narrowly cylindrical, not interrupted; perianth rather large, pink, eglandular.—Berkx, Oxon.

*P. minus* Hud. *Fl. Angl.* i. 148 (1762). Stem slender, prostrate, ascending, or erect, much branched from the base; ochrea appressed, eglandular, hairs appressed, cilia elongated, lamina subacute, lanceolate-linear or linear, rounded below and narrowed from base to apex, eglandular; racemes erect, subfiliform or narrowly cylindrical, more or less interrupted below; perianth usually 5-partite, glandular at the base, stamens usually 5, styles 2–3 connected below, fruit ovate, acute, plano-convex or trigonous, shining, 2×1–3 mm.


The more usual form of the species.


Stem stout than in the preceding var., usually ascending, branched above; leaves lanceolate, broadest towards the base; racemes slender, elongated.

*P. minus × mite*. Stem erect or ascending, ochrea with appressed hairs, cilia elongated; leaves scarcely narrowed at the base, resembling those of *P. minus*, but broader; racemes drooping, flowers red or bright pink, bracts ciliate, fruit small, produced.—Berkx, Oxon.

*P. minus × Persicaria*. Stem ascending with spreading branches, ochrea closely appressed, hairs appressed, cilia elongated; lamina usually blotched, linear-lanceolate, acute, subglabrous, abruptly narrowed at the base. Racemes erect, very slender, usually numerous, cylindrical, interrupted at the base; perianth usually large, purple, red, or white; stamens 6, styles 2–3. Usually sterile.—Sussex, Hants, Berks, Oxon.

NOTES FROM THE UNIVERSITY HERBARIUM, CAMBRIDGE.

**ON ILLEX PERADO AIT. AND NOTELAEA EXCELSA.**

**By T. G. Tutin.**

In 1768 Banks and Solander collected two species of *Illex* in Madeira when accompanying Captain Cook on his first voyage round the world. These were both described by Solander (MS. in Banksian Herbarium), and one, *Illex Perado*, was published by Aiton in 'Hortus Kewensis,' i. 169, 1789. The other, *Illex Azvinho*, was overlooked until it was published by Lowe in his 'Flora of Madeira,' ii. 12, 1872, and it has since been shown (Loesener, Mon. Aquif. in Nov. Act. Abhandl. Leop. deuts. Akad. Naturf. 135, 1901) to be synonymous with *Illex canariensis* Poir., which is an earlier name.

Lamarck (Encycl. 146, 1801) applied the name *I. maderensis* to *I. Perado* Ait. and Meerbeck (Pl. Sel. Ic. Pict. tab. 4) had described it as *I. crassifolia* in 1798. *Illex Perado* was also recorded from the Azores in Seubert’s ‘Flora Azorica,’ 46.

Webb and Bertholot described a species from the Canaries under the name of *Illex platyphylla* (Hist. Nat. Ies Canar. ii. 135). Loesener (loc. cit. 244) reduced this to *Illex Perado* Ait., of which he describes the following four varieties based on the size and shape of the leaves:

2. *I. Perado* var. *m. canariensis* Loesener.

An examination of the flower and fruit characters of a large number of specimens shows that there are constant differences between the plants from the different groups of islands, and enables a better grouping to be made than that proposed by Loesener.

As the differences are slight and the plants from the different localities apparently related to one another, it is proposed to describe the following three subspecies:


Loesener’s var. *iberica* is poorly represented in herbaria, and requires further investigation.

**Illex Perado** subsp. nov. *Perado*.


**JOURNAL OF BOTANY.—** Vol. 71. [April, 1933.]
N. excelsa (Ait.) Webb & Berth. affinis quaque differt statura fructibus vel arboris parvus; foliis minoribus (3–5 cm. longis et 1–2–5 cm. latis) obovatis obtusis, subus costa prominentis, nervis inconspicuis; floribus parvis, sepals longe mucronatis, stigmatibus profunde bifidos; fructu maturo circa 1,3 cm. longo. 

_Hab._ in Insulis Azoricis.


_Noteleaa excelsa_ (Ait.) Webb & Berth. is a lofty tree with leaves 7–10 cm. long and 2,5–4,5 cm. broad, ovate, acute, and strongly veined. The sepals are small and semi-orbicular, and the stigma entire or slightly margined. The ripe fruit is about 2 cm. long. 

_Hab._ Madeira and the Canaries.

My thanks are due to Mr. A. J. Wilmott for help with the nomenclature of _Noteleaa Perado._

**OBITUARIES.**

**SIR DANIEL MORRIS.**

With the death of Sir Daniel Morris, K.C.M.G., on February 9, 1933, in his 89th year, we mourn the passing from us of a botanist and an administrator who devoted his energy and administrative abilities to the service of the Empire.

In his Presidential Address to Section K of the British Association at Bournemouth (1919) at the close of the War, Sir Daniel very fittingly devoted his remarks to the importance of botanical research and its practical application—work which he so ably carried out during the time that he held the post of Imperial Commissioner for Agriculture in the West Indies. His Address may be considered a summary of the aspects of botany, for which, with his valued practical experience, he did so much.

His first introduction to tropical botany was under Dr. Thwaites in the Royal Botanic Gardens, Peradeniya, and on his promotion to the Directorship of the Public Gardens and Plantations, Jamaica, in 1879, he started his long connection with the West Indian Islands, which was so fruitful of valuable results. After seven years’ service in Jamaica he was appointed Assistant Director at Kew, where, for twelve years his knowledge of the Tropics was fully utilised. During his time at Kew he was sent on a special mission to the West Indies in connection with the development of economic plant industries, and later was appointed Expert Adviser to the West India Royal Commission. It was in consequence of the valuable services he rendered to the Royal Commission that he was appointed Imperial Com-
missioner for Agriculture. In recognition of his services he received the honour of the C.M.G. in 1893 and the K.C.M.G. in 1903.

He published numerous papers, mainly concerning botanical or horticultural matters. His introduction of the Sea Island Cotton and his work in connection with sugar-cane hybridisation and the cultivation of limes, Cacao, and other tropical products have been of permanent value to the West Indian Islands.

On his retirement, Sir Daniel Morris took an active interest in the work of the Bournemouth Natural Science Society, and did much to stimulate local interest in the natural sciences.

While he was at Kew he acted as Treasurer to the Royal Horticultural Society from 1888 to 1891, and received the honour of the V.M.H. from the Society.

The success of his work in his many spheres of activity was due to his power of organisation and to his ability both as a writer and a speaker, based on sound knowledge and critical observation.—A. W. Hill.

CHARLES ALFRED BARBER.

Dr. CHARLES ALFRED Barber, who died on February 23, 1933, at the age of 72, is best known for his work on sugar-cane, though in his early years, after leaving Cambridge, he contributed several papers of purely botanical interest to the ‘Annals of Botany’ and later published, in the ‘Botanical Memoirs’ of the Department of Agriculture in India, a series of important papers on root parasitism, dealing with the haustoria of Sañtalam album, Olaz scandens, and Cangara Rheedia, and with the inter-relations between the host and parasite.

Dr. Barber’s first introduction to the tropics was his appointment, in 1891, to the post of Superintendent of the Botanical and Agricultural Department in the Leeward Islands. His duties were multifarious, varying from the study of tick-borne diseases in cattle, geology, entomology, and plant pathology to agriculture. It was here that his interest in the sugar-cane was first aroused, and he was instrumental in founding a sugar-cane station at St. Kitts, where he collected a large number of cane varieties and, in collaboration with (Sir) Francis Watts, designed a series of manural experiments with this crop.

He left Antigua in 1895, and was for a short period Professor of Botany at Coopers Hill. In 1898 he was appointed Government Botanist in the Madras Presidency, and did much useful work on the Madras Flora. Later he investigated various problems connected with forestal and agricultural plants and their diseases—notably the “red rot” disease of sugar-cane, which threatened to destroy the sugar industry of the Godavari district.

The excellent work he carried out in the improvement of the cane cultivation in that area led to his selection by the Government of India, in 1912, to fill the newly-made post of Sugar-cane Expert. This appointment gave full scope to his genius. It enabled him to travel throughout India and to study the different types of Indian canes in the field. His “Studies in Indian Sugar-cane,” published in five of the ‘Botanical Memoirs’ of the Agricultural Department of India are classical. His classification of these into five groups, based on morphological characters alone, has recently been fully confirmed by the cytological work of Bremer in Java, and speaks highly of his capacity as a critical and accurate observer. With this work as a basis, he was able to set about the breeding of quick-maturing canes to suit the short growing season of Northern India. By crossing various N. Indian canes with Saccharum spontaneum, seedlings were obtained which gave rise to new varieties, many of which, after extensive trials in N. India, have now entirely replaced the varieties which were previously grown, and have increased greatly the quantity of sugar produced.

In 1918 Dr. Barber received the honour of Companion of the Indian Empire.

Since his retirement from India in 1919 until shortly before his last illness, Dr. Barber held the post of Lecturer in Tropical Agriculture at Cambridge. His interest in sugar-cane was maintained till his health failed, and his reviews on recent sugar-cane research have been an important feature in the ‘International Sugar Journal.’—H. C. SAMISON.

SHORT NOTES.

THE ENGLISH NAME OF SPARTINA TOWNSENDII.—May I, as one of the discoverers of this grass in the early ‘seventies of last century, and joint sponsor for its Latin name, enter a decided protest against the misnomer “rice-grass” as its English name? With one exception, all the British floras of standing within my reach, which give English names, including those of Withering, Sir J. E. Smith, Sir W. J. Hooker, Bromfield, Macreight, etc., agree in calling the members of the genus Spartina “cord-grass.” The exception is S. F. Gray’s ‘Natural Arrangement of British Plants,’ where it is styled “sea-grass.” The earliest use of the name “rice-grass” that I have found is in a paper of 1913 by Dr. Stapf, entitled “Townsend’s Grass or Rice Grass,” which appeared in the ‘Proceedings of the Bournemouth Science Society.’ In the body of the paper the author discredits the name as inappropriate, and it appears that the latter arose from a silly tale current among the villagers that the plant had originated from a ship laden with rice having been wrecked in the neighbourhood of Lymington! Many botanists probably think that English names for plants do not much matter, provided that we are clear about the Latin ones, but, I submit that, after all, established English plant-names are a part, though a very
small one, of our patrimony, and should not therefore be lightly set aside, especially on such very ridiculous grounds. If the names “rice-grass” were in the least appropriate, perhaps it would not so much matter, but the plant does not resemble rice, and belongs to a different tribe of the Gramineae. The newspapers, with the characteristic wrongheadedness of the journalist, have seized with avidity on the name “rice-grass,” and are broadcasting it all over the Empire.—James Groves.

Does Juncus trifidus occur in Ireland?—This high Alpine Rush has been more than once recorded as a native of Ireland. Thus Wade in his ‘Plants Rariores,’ 1804, records it as growing “in the marshy ground at the foot of Mangerton Mountain, Killarney, and on many of the boggy mountains in Cunnemara” (Wade, Gallovid); both records may, however, be safely dismissed as errors of identification.

The only modern record for this Alpine Rush in Ireland occurs in the ‘Journal of Botany,’ 1910, 227, where Messrs. Thompson and Elliott state that they found one small patch on the summit of Carrontohill, Reeks, Co. Kerry, in July of that year. This record has been repeated by Mr. A. Wilson in his important and very useful paper on “The Altitudinal Range of British Plants,” 1931, 102 (supplement to the ‘North-Western Naturalist’).

Unfortunately, neither Mr. Thompson nor Mr. Elliott was aware at the time of the extreme interest to Irish botanists of their discovery, and no specimens are available. Carrontohill has been examined by many botanists, including Mr. H. C. Hart, whose detailed report on this range appeared in the ‘Proceedings of the Royal Irish Academy,’ 1892. The present writer, too, has visited this summit several times, but neither he nor Mr. Hart, nor any previous botanist, has been fortunate enough to detect this Rush. In the British Isles, Juncus trifidus is known to occur only on the higher mountains of Scotland, a gap of fully four degrees of longitude separating Carrontohill from its nearest Scottish station. While Irish botanists would most gladly welcome this addition to their Alpine flora, it is better to await actual specimens from this summit before doing so.

The present writer has referred more fully to this record of Messrs. Thompson and Elliott in his ‘Flora of Kerry,’ 1910, 290, as well as on p. 21 to their record of Cardamine amara for South Kerry, which also must await actual specimens; this latter plant is unknown outside Ulster as a native of Ireland.—R. W. Scully.

Studies of Flowering in Heterostyled and Allied Species: Part I. Primulaceae (Publication of the Hartley Botanical Laboratories of the University of Liverpool, no. 8, 1932. By James Stirling, B.Sc., F.L.S.).—This developmental study is based on measurements both of fresh material and

of prepared sections of flowers of various species of heterostyled Primulas (P. sinensis, malacoides, vulgaris, and veris) and of the monomorphic Primula mollis. One object of the investigation was to ascertain the stage of development at which the dimorphic condition of the flowers first made its appearance. It is shown by the measurements that heterostyle differences only become evident after the petal has attained a stature of 4 mm. and the tube part of the petal a size of about 1-3 mm. This applies to all dimorphic species of Primula examined. At approximately the same stage in the development of the monomorphic Primula mollis, namely, when the petal has reached about 4 mm. there is a change in the rate of development of the pistil and also in the “insertion” of the stamens, i.e., the region of the corolla-tube below the insertion of the stamens. When compared with the heterostyled Primulas, the rate of growth of the “insertion” of Primula mollis stands between the rates of the long- and the short-styled forms respectively. Measurements of the development of the flowers of Hottontia are also given, and they show a similar commencement of divergence of growth when the petals have reached a length of about 4 mm.

There is therefore a unity in the early stages of the development of the flowers of the Primulaceae whether they be monomorphic or dimorphic—at least events, so far as the species examined are concerned.

In Primula vulgaris, when the divergence into long-styled and short-styled flowers takes place, it is noticeable that the development continues at the same relative rate (shown by a straight line in the graph), while the corresponding organs of the short-styled flower show an alteration in the rate of growth, the “insertion” of the stamens growing more rapidly than the tube as a whole and the style less rapidly.

The author concluded from this fact that the ancestral monomorphic flowers of Primula resembled the long-styled form of Primula vulgaris, and that the short-styled forms were developed by a retardation of the elongation of the style and increased intercalary growth of the region of the tube below the insertion of the stamens. Since in Primula mollis there is as stated also a change in the rate of growth of pistil and insertion at a petal size of about 4 mm., the author assumes that this monomorphic species shows incipient heterostyly.

The author also advances the view that the tube part of the corolla in this Family is receptacular in nature. He does not, however, fully discuss this point, leaving it for further consideration at a later date.

He also deals with the genetics of heterostyly, and his views are generally in agreement with those put forward by Dr. Uebisch, that an inhibition factor connected with the short-styled form
prevents the long-styled forms arising from "legitimate" cross-pollination, thus explaining the dominance of the short-styled forms. A further conclusion from this developmental investigation is that any advantage to the plant as a consequence of its becoming heterostyled is merely capricious and not purposed. One cannot but feel that valuable and interesting as are the exact measurements of floral development described in this memoir, there are a somewhat slender foundation on which to base such far-reaching morphological, genetic, and anti-teleological conclusions.—F. E. Weiss.

Aldeyry Plants.—In August last we had three weeks botanising in Alderney, one of the least known of the Channel Islands, which seems to have been little visited by English botanists during recent years. Practically no plants from this island are to be found in the National Herbaria at Kew or South Kensington, and one of the main objects of the trip was to remedy this omission. During our stay we saw and collected over 250 of the 603 species recorded from Alderney by Marquand in his admirable 'Flora of the Channel Islands,' published in 1900. We were successful in finding many of the more interesting species in the localities he mentions, including a number peculiar to the island, although we arrived too late in the season for some of the special rarities such as: Halimium vatatum, Omi-
thopus bracteatus, Osmia reclinata, and Bupleurum opacum.

It was interesting to notice how little the flora of this island has changed during the last thirty years, most of the species still existing in the localities where Marquand found them. For instance, there is still the small patch of Geranium sanguineum about a yard square at the lower end of the Longy Road, where Marquand saw it in 1899.

We were able to make a few additions to the existing records in the 'Flora,' and these are appended:—

Sagina nodosa (L.) Meyer.—Grassy slopes on Longy Common, sparingly. Found in Alderney sixty years ago by Babington, who records it in 'Flora Sarniensis,' but without definite locality. Marquand was unable to find this plant.

Malva moschata L.—Two plants found on the Blaye in the centre of the Island. Very rare.

Hippuris vulgaris L.—Sparingly in a marsh at Mannez Quarry. We also found it in the spot mentioned by Marquand on Longy Common. These are the only two known stations in the Channel Islands.

Achlysa Cynapium L.—A single plant occurring with other weeds of cultivation on the Blaye. Not previously noted for Alderney, though recorded for Jersey, Guernsey, and Sark.

Tanacetum vulgare L.—Roadside near Mannez Cottages. Possibly a garden escape.
REVIEWS.


Volume III of this work has so far been concerned with an account of the family Hypnaceae, which is divided into nine subfamilies; three of these (principally Brachytheciaceae) were dealt with in Part 1; the Amblystegiaceae occupied the whole of Part 2; and now in Part 3 come the remaining subfamilies—Hylocomiaceae, Hypnaceae, Stereophyllaceae, Plagiotheciaceae, Entodontaceae. The beginning of the next family, Leskeaceae, is also included, one genus (*Thuidium*) being represented. In all, there are descriptions of 22 genera, 85 species, and a number of varieties in the present part.

Great pains have clearly been taken to render the flora suitable to the requirements of the moss student. Keys to the genera and species are provided; the essential characters in the descriptions are italicised; many of the species are figured in the plates; references to other illustrations and to exsiccati are quoted, the type-locality of each species is indicated, and critical notes are appended. Several of the figures are from original drawings, and the rest are usually from standard works. It might be suggested that there is a tendency to multiply genera, but that does not necessarily add to the difficulties of the student, for he can, by means of a key, be guided as easily to a well-defined genus as to a section of a larger and more comprehensive genus.—A. G.

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The second volume of this work has now been completed, the first having been published in 1925. It covers the Roses of Great Britain, France, Belgium, Holland, Switzerland, and Germany, and represents a vast amount of work on the part of the author during the twelve years of his curatorship of the Crépin Herbarium, and for some years previous to his appointment.

The author considers that Crépin’s general arrangement is the best to follow, as other modern authors have done, though he adopts some original ideas in the details. The arrangement adopted is by Almquist, and used in Scandinavia, is rightly condemned as unscientific. That was based largely upon the form and coloration of the leaflets, and the form and direction of their teeth. In Mr. Bouleenger’s opinion, shared by most modern rhodologists, the very large number of species created in former years is totally inadmissible; in many cases these were obviously based upon single bushes. At the same time he considers that each species should be described in great detail, an arrangement which entirely defeats its object, since the leading characters of each are lost in the superabundance of detail.

The author considers that the disposition of the prickles, number of leaflets, form of stipules, presence or absence of bracts on the peduncles, or lateral pinnae on the sepals, and the direction of the sepals after flowering, on which great importance has been laid in the past, are really of secondary value. On the other hand, he lays stress on the number of teeth in each leaflet, surely of very minor interest, but involving an immense amount of work in counting many hundreds of examples to obtain an average for his descriptions. Stress is also laid on the characters afforded by the disc, especially in its diameter and that of the stalar orifice, and in the thickness of the disc itself, which seems to bear a relation to the erection or reflexion of the sepals. The diameter of the stalar orifice in *R. villosa* and *R. Sherardi* is about half that in *R. tomentosa*, which gives a more useful character for segregating the two former than the greater erection and persistence of the sepals, which may be considerable in *R. tomentosa*. The subdivision is as follows (only British species are cited in this review):—

**Section I. Eglanteriæ.**


**Group B. Alpinae–Vestitae.**


**Group C. Cinnamomeae–Caninae.**


**Section II. Synstylæ.**

11. *R. arvensis*.

Followed by all the hybrida.

The reasons for including *R. pimpinellifolia* in the Pimpinellifoli–Suavifoliæ are not very clear, though the author says in his preface that it has a different arrangement of its chromosomes from that of the other species in the Group. This is the only place where I can find any mention of chromosomes.

Comparatively few varieties are recognized—for example, *R. canina* has only 11,—the author relying upon long descriptions and a vast amount of synonymy for distinguishing the few he upholds. An easier course is to rely upon a few characters, such as shape and size of fruit and leaflets, clothing of styles, etc.
R. dumalis replaces R. Asculana and R. coriifolia and their varieties, a course upon which comment has already been made in my 'Revise of the British Roses.'

The description of each species is inordinately long, every possible alternative feature of each organ being given, and there is also a vast number of footnotes, mostly citing stations of specimens which present the alternative features given in the descriptions. These footnotes usually much exceed the main text in length. Thus, the description of R. micrantha occupies thirteen pages, but five-sixths of this consists of footnotes. The important features are not italicised, and thus become obscured under a mass of detail.

Though a dichotomous key is deprecated in the Introduction, a long one is provided, but it deals with the species only, the descriptions of all the varieties and hybrids having to be read before one can be identified. In so far as the species are concerned, the key to some extent counterbalances the defect of the unwieldy descriptions.

There are many excellent woodcuts showing enlarged figures of the various parts, but these seem to have been selected rather to show what a great range of variation exists than to help in recognising the species. Thus there are 20 illustrations of the styles of R. canina and 16 more of R. stylosa which is included with it. These cover a very great degree of form and clothing.

It is doubtful whether the immense amount of research involved has been repaid by a clear exposition of the characters of the species and varieties.—A. H. WOLLEY-DOD.

BOOK-NOTES, NEWS, etc.

LINNEAN SOCIETY OF LONDON.—At the General Meeting on February 16, Professor Sir William Wright Smith gave the Hooker Lecture, taking as his subject "Taxonomy and Cytology." For the most part he dealt with the classification of Primula and showed how cytological investigations at times give considerable help to taxonomists in enabling them to come to a decision, whereas occasionally cytological results are at variance with what appear to be taxonomic certainties. The lecture was illustrated by a series of lantern-slides, which made clear the references to various species.

ROYAL SOCIETY.—We are pleased to learn that Professor E. J. Salisbury, Quain Professor of Botany in the University of London, has been recommended by the Council for admission to the Fellowship of the Society.

A PRELIMINARY NOTE ON THE DISTRIBUTION OF MARINE DIATOMS DURING THE TERTIARY PERIOD.

BY N. INGRAM HENDLEY.

It is apparent from a study of the literature that the geographical distribution of diatoms in geological time has not been understood, and many erroneous ideas have arisen from inaccurate observation. Many of the early workers were obsessed with the idea that diatoms were very old geologically, and could be found in Paleozoic rocks.

Dana (1) thought that the Hornstone in the corniferous limestone (early Devonian), around York Town, in the United States, was derived from silecous sponge-spicules and diatoms. Ehrenberg (2) claimed that the presence of diatoms could be detected in Silurian deposits, while Edwards (3) claims to have found them in Triassic grit from New Jersey. Castracane (4) was one of the first to announce the presence of diatoms in coal, and D. Vitto Zanon (5) in 1928 reported diatoms in coal from Newcastle (Permian) and in a Carboniferous schist. Pantocsek (6) held that the deposit of Kusnetzk in Saratov in southeast Russia was Triassic, while Cleve (7), partly agreeing with Pantocsek, thought that this was the oldest diatom-bearing layer.

Recent work, however, by Julius Pia (8, 9) discredits the early work, and confirms the belief that diatoms were most prolific during the Tertiary age; so that any statement about the presence of diatoms before the Cretaceous period must be regarded with suspicion. It has been always difficult to appreciate the presence of diatoms in Mesozoic or pre-Mesozoic formations, because of the scantiness of the evidence and the fact that the emergence of diatoms in geological time should be precise, because of their abundance and indestructibility.

When considering a fossil deposit it is necessary to determine whether it is primary or secondary—that is, whether it has remained undisturbed and uncontaminated by adjacent deposits; or whether it has resulted from one or more primary formations becoming disintegrated by denudation or movement and re-deposited and consolidated by water or other pressure. A secondary deposit would contain the diatoms present in the primary rocks before disintegration, together with those species contemporary with the reformation.

According to Pia (8) the fossil deposits of marine diatoms were laid down during the Cainozoic or Tertiary formation, and he gives the following chronological arrangement of JOURNAL OF BOTANY.—VOL. 71. [MAY, 1933.]
strata illustrating the position in time of the chief marine deposits:—

<table>
<thead>
<tr>
<th>Period</th>
<th>Deposit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paleocene</td>
<td>Kusnetzk, Russia.</td>
</tr>
<tr>
<td>Paleocene</td>
<td>Ananino, Russia.</td>
</tr>
<tr>
<td>Lower Eocene</td>
<td>Jutland.</td>
</tr>
<tr>
<td>Eocene</td>
<td>Barbados.</td>
</tr>
<tr>
<td>Oligocene</td>
<td>Oamaru, New Zealand.</td>
</tr>
<tr>
<td>Lower Miocene</td>
<td>Nagy Kuracs, Hungary.</td>
</tr>
<tr>
<td>Miocene</td>
<td>Santa Monica, California.</td>
</tr>
<tr>
<td>Upper Miocene</td>
<td>Richmond, Maryland, U.S.A.</td>
</tr>
<tr>
<td>Upper Miocene</td>
<td>Yedo and Sendia, Japan.</td>
</tr>
<tr>
<td>Upper Pliocene</td>
<td>Villefranche, France.</td>
</tr>
</tbody>
</table>

It will be seen from the table that the Kusnetzk deposit is the oldest diatom deposit in the world, and was laid down in the period that immediately followed the Cretaceous—that is, the Paleocene—at the dawn of the Eocene. A period of great activity and prolificacy is indicated from the Oligocene throughout the Miocene, while the deposit in the south of France during the Pliocene indicates some local change.

The geographical distribution of diatoms has always presented many difficulties, and is closely related to the disposition of land- and water-masses on the globe. Much mystery has been caused by the discovery of similar forms in the Hungarian and New Zealand deposits, and in the Maryland and Japanese deposits. These deposits are widely separated, yet the peculiar facts are unquestionable.

To understand this distribution of species it is necessary to have an idea of the probable land and water disposition during the period in which the deposits were laid down. Many theories have been suggested to explain the changes, or effects of the changes, between land and water areas during geological time, chief among which are the "contraction theory" and its derivatives. The "contraction theory" of Lyell (10) was strongly advocated by Dana and Suess (11), and even to-day receives support, although modified to the theory of "tetrahedral collapse" of Green (12). This theory demands the limitless alternation of the raising of the sea-floor above water-level, and the lowering of the land-areas beneath the sea-level, so that the existing continents are the result of a complex series of movements of elevation and depression. This theory has to call to its aid the "land-bridge" theory in order to elucidate the distribution of terrestrial organisms.

The above theories have several serious objections, and although ingenious manipulation makes them more plausible with regard to the fact of land-distribution of plants and animals, they do not explain satisfactorily the transport of marine organisms like diatoms over thousands of miles of sea.

The majority of marine diatoms belong to the Centricae and have no power of locomotion, so that they are entirely at the mercy of ocean currents. The distribution of marine diatoms demands movements of land-areas that would cause currents capable of transporting organisms from the great southern ocean of Tertiary times and depositing them in Central Europe, and depositing Japanese forms on the eastern sea-board of the United States and Californian forms in the south of Spain.

A theory which fulfills these requirements, and at the same time other claims made upon it, is Wegener’s ‘Theory of the Origin of Oceans and Continents’ (13). The Wegenerian theory is one of land-mass displacement, and its fundamental principle is that the land-mass surfaces or continents have remained in outline much as they are found to-day, the chief difference being in their relative positions.

The map on p. 114 illustrates Wegener’s ideas of the land and water disposition of the earth during the Tertiary period. The theory assumes that in pre-Carboniferous times the "land-mass" concentration was complete—that is, all the land-surfaces now known were fused together into one continent, a considerable portion of which was lying beneath a very shallow sea. Lines of weakness developed in this land-mass and eventually fissures developed. The splitting commenced in the earliest Jurassic period when the "land-mass" now known as Australia became separated from India and Africa. By the passage of time the rifts became wider and a gradual "land-mass" movement or continental swing arose.

The North Pole acted as a pivot, and the "land-masses" moved to the westward; the centrifugal forces of the rotation of the earth in conjunction with the tendency of the "land-masses" to move towards the equatorial zone is thought to be the cause of the drift from the poles. The rift between the west coast of Africa and the east coast of South America became greater, and during the Cretaceous period the separation became complete. Towards the end of this period the coast of India became separated from the east coast of Africa and Madagascar. These two rifts, one on either side of Africa, were the forerunners of the sea-areas now known as the Atlantic and Indian Oceans.

This "land-mass" dispersion is more easily understood when the eccentricity of the poles during the Tertiary period is postulated.

In order to understand these "land-mass" movements it is necessary to know something of the nature of the "land-mass" in relation to the floor of the ocean. The rocks of the "land-mass" consist chiefly of acid plutonic rocks and gneiss, and are as a whole of comparatively low density, being composed of silica, alumina, and alcalis; to these Wegener applies the term "sial." The ocean beds are composed of basic rocks of magnesia, iron, and lime; these rocks underlie the continents and constitute a lower band of the earth’s substance. Wegener uses the term "simia" to describe them. The rocks of the
"sima," though solid, are viscous, and show a flow in the same way as Burgundy pitch, which although quite hard will "flow" uniformly, and given time will occupy a space of any shape. Wegener's theory assumes that the continental "land-masses" of "sial" move through the more dense and viscous "sima."

Referring to the map, let the effect of the "land-massa" swing be studied with relation to marine diatom distribution. The western swing of the South American continent, with the consequent widening of the rift between it and the West African coast, would set up currents from the south, and in effect would draw large volumes of water from the neighbourhood of New Zealand and Australia. Similarly, China and Japan, drawing the Indian Peninsula with them, would widen the rift between India and the east coast of Africa and would draw vast quantities of water from the south. This water would flow around Africa upon the east and west, and it is reasonable to suppose that this northward-moving current would carry with it organisms from the southern ocean in the vicinity of New Zealand. The current flowing up the western coast of Africa would, by virtue of the direction of the coast-lines, swerve north-easterly and flow over the low-lying country now known as Central Europe, which was then covered by a shallow sea. It is therefore reasonable to expect that diatoms found in Tertiary deposits in New Zealand will be represented in the Central-European deposits of the same geological formation. Reference to the stratigraphical table show the Oamaru deposit in New Zealand to be older than that of Hungary, so that the diatoms travelled from New Zealand to Hungary, and not from Hungary to New Zealand.

In considering the current of water which flowed from the south up the east side of Africa, it is interesting to notice that the extreme eastern corner of Africa, in the neighbourhood of Kenya, is a continental shelf, covered by a low sea (dotted area on the map). This shelf would act as a trap or nucleus for any organisms that might be deposited by the northward-moving current, and, once such a deposit had commenced to accumulate, it would, by virtue of its position, accumulate rapidly. It is interesting to note that some 200 miles north-west of Mombasa there lies the greatest diatom deposit in the British Empire. In this area it is estimated that one deposit covers nearly 116,000 acres, and is computed to contain 62,000 tons of diatomaceous earth.

The deposit is a remarkably pure one, and, apart from an occasional Cocconeis, it consists entirely of Stephanodiscus astreus. This deposit is almost identical with that found in the Rotorua district of New Zealand. The Rotorua deposit in the Ngongatahaha Valley is a pure earth consisting of Stephanodiscus nova-zelanticus entirely. These two species of Stephanodiscus
are practically identical, and they may have had a common origin. The sea, from which the organisms found in New Zealand were deposited, was drawn towards the African coast by the westward swing of the "land-masses," and here upon the Kenya shelf deposited organisms.

The formula relating the strength of ocean currents to the transport of material are of some interest here, but in the absence of definite information of physical conditions in Tertiary times they have no definite application; similarly, calculations of rate of fall and accumulation of diatoms in Tertiary water are vitiated by the absence of physical constants, but provide an interesting speculation.

The further effects of the westward swing of the American "land-mass" now need to be considered with reference to the distribution of species living in the Pacific Ocean. Certain species found in the fossil deposits in Japan are also found in Maryland on the eastern sea-board of the United States, the most characteristic of these being *Triceratium multiforme*. *Triceratium tabellarium* is found in the Galapagos Islands on the western side of America, and also in Barbados upon the eastern side.

Can the Wegenerian displacement theory satisfactorily explain these facts? It can. The westward movement of the American "land-mass" results in a gradual diminution in the distance between the west coast of America and the east coast of China and Japan, so that large volumes of water would be displaced, and the displacement, although slow, would be very definite and considerable. The North Pole was then situated somewhere in the neighbourhood of the Aleutian Islands off the coast of Alaska, so it is feasible to suggest that the direction of the ocean currents would be as indicated in the map, and that large volumes of water would move down the coast of California from the neighbourhood of Japan and sweep over the low-lying neck of land joining North and South America, which was then covered by a shallow sea.

Experiments with models gave water currents moving in the required direction after movement of the "land-masses."

This current of water moving from the pole to the equator would be greatly increased in volume by a general draining of water from the middle area of the Pacific Ocean towards the Pacific coast of South America; in order to make this clear it is necessary to consider briefly certain geophysical phenomena, which present themselves when a mass of "sial" moves through the viscous "sima."

The progression of the "sial" blocks through the "sima" causes a folding to take place upon the anterior margin of the "sial." This folding or mountain-making takes place above and below the sea-level, and, since the greater portion of the continental block is submerged in the "sima," the folding will take place to a greater degree in a downward direction. To preserve lithospheric equilibrium, the theory of isostasy provides that, although the "sial" is of a certain thickness throughout the greater part of the "land-mass," it is considerably thickened under mountain ranges, and conversely much attenuated or even entirely absent under the oceans. Thereby equilibrium is maintained throughout the earth's crust. The folding of the "sial" or "land-masses," particularly upon the under side, has the effect of forcing down the "sima" of the ocean bed in the neighbourhood to a great depth. This drop in the "sima" level is accentuated by the fact that when the "sima" is so pushed down large portions of the constituent rocks upon the under side melt and are carried away, causing more and more "sima" to be drawn down. In this manner an ocean "deep" is formed along the margin of the progressing "land-mass."

This deepening of the ocean bed will cause a draining of water from an adjacent area not so affected.

It will be readily realised that the westward progression of the American continent and the consequent folding, whereby the Andes were thrown up, would also bring about a deepening in the ocean bed right along the American coast. The filling up of this deepened coastal area with waters from a more distant point would have the effect of drawing mid-Pacific organisms towards the American coast. These currents of water, together with those caused by the actual westward movement of the "land-mass" and polar eccentricity, provide an explanation of the presence of diatoms from Japan and California in deposits east of the United States.

The map illustrates how the currents flowing over the low-lying southern part of the United States are turned back north-westward by the current of water coming up between the coasts of Africa and Brazil from the south; these currents would therefore overflow the eastern sea-board states of America. By this means it is possible to explain the presence of *Triceratium multiforme* (*Triceratium Kainii*) both in the deposits in Japan and New Jersey. At the point of confluence a certain amount of intermingling of species would take place, certain species from the southern ocean would be carried to the westward, and so one or two species from New Zealand would be found in Barbados.

Similarly, certain species passing over the Panama into the North Atlantic would be caught in the current of water from the south moving north-east and would be deposited in Europe.

The following table is an analysis of the genus *Coscinodiscus* as found in the Moron and Californian deposits. It will be seen that more than 60 per cent. of the species that occur in California are also found in the south of Spain. Other genera when analysed
show a great similarity also; over 90 per cent. of the genera that occur in California are also found in the Moron district:

List of Species of Coscinodiscus found in the Moron and Californian Deposits.

Moron. California.

C. apiculatus. C. apiculatus.
C. asteromphalus. C. argus.
C. centralis. C. asteromphalus.
C. centralis. C. centralis.
C. crinicus. C. crinicus.
C. curvatus. C. curvatus.
C. flabellatus. C. decrescens.
C. gigas. C. dionaea.
C. hexaspores. C. elegans.
C. lineatus. C. flabellatus.
C. marginatus. C. gigas.
C. nolisis. C. hexaspores.
C. obesus. C. lineatus.
C. obesus. C. marginatus.
C. oculus-iris. C. micans.
C. radiatus. C. oculus-iris.
C. subradius. C. omphalithus.
C. scintillans. C. radiatus.
C. scintillans. C. robustus.
C. subtilis. C. scintillans.
C. subtilis. C. subtilis.
C. symmetricus.

The appearance of these diatoms in two localities so widely separated has always been regarded as one of the greatest mysteries of diatom distribution, but the Wegenerian "landmass" displacement theory immediately provides a rational solution to it.

It is hoped later to provide a more detailed account of some of the complexities of diatom distribution.

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teraceae. The name *Wintera*, however, cannot stand for this genus under International Rules, for reasons explained in the following paragraph.

*Drimys* was founded by the Forsters (Charact. Gen. Pl. 83, t. 42 (1776)) on two species, *D. Winteri* J. R. & G. Forst. (from South America) and *D. azillaris* (from New Zealand), both of which were defined and figured without either being designated as type of the genus. *D. Winteri* has, however, been generally regarded as the type-species of *Drimys*, and should be accepted as such, since it more closely accords with the Forsters' generic diagnosis*. In 1871 a third species, *D. granadensis* L. f. (from South America), was added by the younger Linnaeus (Suppl. Pl. 269). Three years later Murray (in L. Syst. Veg. ed. 14, 507 (1874)) unnecessarily proposed the name *Wintera Murr.* to take the place of *Drimys* †, and under it listed two species, namely, *W. aromatica* Murr. (including *D. Winteri*) and *W. granadensis* Murr. (based on *D. granadensis*). For some reason he altogether omitted to mention *D. azillaris*. The latter name was, however, transferred to *Wintera* two years later by G. Forster (Floral. Ins. Austr. Prodr. 42 (1786)). When in 1900 Van Tieghem (tom. cit. 277) separated the New Zealand forms as a genus distinct from *Drimys* he adopted the name *Wintera* for them, attributing it (unjustifiably) to Forster (loc. cit.) with *W. azillaris* Forst. f. (D. azillaris) as type-species. Obviously, the name *Wintera* Forst. f. ex Tiegh. cannot be retained. Van Tieghem (loc. cit.) rightly regarded *Wintera* Murr. as a synonym of *Drimys*, but Murray's name was validly published and a later homonym of it is therefore illegitimate.

To replace *Wintera* Forst. f. ex Tiegh. the new name *Pseudowintera* is proposed below.

In his account of the genus *Wintera* Van Tieghem (tom. cit. 290–293) recognized four species. Two of these, *W. azillaris* and *W. colorata* Tiegh. (based on *Drimys colorata*), had previously been described by other authors; the remaining two, *W. monogyna* and *W. terminalis* Tiegh., were proposed by him as new species. He subdivided the genus into two sections: *Euwintera* ‡ Tiegh. (“à inflorescences à la fois terminale et axillaire”), based on the single species *W. terminalis*, and *Pseudowintera* ‡ Tiegh. (having a dehiscent outer perianth-locular) agrees with this, but *D. azillaris* does not. Both species conform with the rest of the diagnosis.

It is evident from a footnote Murray (loc. cit.) observed: “Genus hucus, nobilissimum cortice Winterana, malus prorsum nomine [i.e. Wintera] insignis, quam Drimymias quo posteriore quidem et in Supplemento comparat. Concinus quoque dicì potari Winteram, quam Winterana.”

* The diagnosis begins as follows: “Cal. Perianthium, inferum, monophyllum, integrum, dehiscent.” *D. Winteri* (having a dehiscent outer perianth-locular) agrees with this, but *D. azillaris* does not. Both species conform with the rest of the diagnosis.


*Drimys colorata* var. colorata Kirk, For. Fl. New Zeal. 2, t. 2 (1889); Stud. Fl. New Zeal. 22 (1889).

*Wintera colorata* Tiegh. in Journ. de Bot. xiv. 290 in obs. (1900).

J. D. Hooker (Bot. Antarct. Voy. i. 1, 12 (1852); Handb. New Zeal. Fl. 10 (1864)) included this species under *D. azillaris* [P. azillaris].

* This is the original place of publication of *D. colorata*; in the *Index Kewensis* (t. 799 (1893)) the name was attributed to “Raoul, Choix Pl. N. Zél. 24 (1846).”
3. Pseudowintera Traversii (Buch.) Dandy, comb. nov.

_Hymenanthera Traversii_ Buch. in Trans. & Proc. New Zealand Inst. xvi, 339, t. 28 fig. 1 (1833).


_Wintera monogyna_ Tiegh. in Journ. de Bot. xiv. 291 in obs. (1900).

**NOVITATES AFRICANÆ.**

(Concluded from p. 73.)

_Geetihlis Herrei_ L. Bolus (Amarylidiaceae-Amaryllideae). _Balbus_ 4-5 cm. longus, 3-5 cm. diam. _Vaginae basales_ 2, masculis lineisiquae saturatae purpureis notatae, superne in craterem marginibus involutos ampliatae. _Folia_ 20-30 faxe spiraliter corta anguste linearia glabra, ad per 8 cm. ultra vaginam superiorem exitura, 2-3 mm. longa. _Perianthii tubus_ floris marcid in fructu persistentis 7 cm. longus, in flore normali 4 mm. diam.; segmenta obtusa apiculataque vel abrupte acuta, alba, 3 cm. longa, externa 1-2 cm., interna 1 cm. lata. _Stamina_ numerosa, filamenta brevissimae, antheris sicco ad 1-6 cm. longis. _Stylus_ usque ad 7 mm. exsertus, stigmatem parvo. _Fructus_ clavatus lutescens, "vitiosa 2 sanguinique percurruus", in sicco 8 cm. longus, planatus ad 2-1 cm. diam., odore ingratu.

_Hab._ Namaqualand; Richtersveld, Kambroekop, Sept. 1929. _H. Herrei_ (Stellenbosch University Gardens, no. 3542). Flowered at Stellenbosch Feb. 1930, in fruit May 1931.

_Morea Barnardi_ L. Bolus (Iridaceae-Moreae). _Planta_ glabra 15-26 cm. alta. _Cormus_ 1-5 cm. diam., tunicis extimis et fibris crassis compositis. _Caulis_ gracilis ad 1-5 mm. diam., nodis incrassatis. _Vaginae basales_ ad 3-5 cm. longae. _Filum productum_ 1, parum supra basin positis, anguste lineare, ob margines involutos quasi terete, ad 49 cm. longum sine vagina 1 cm., ad 2 mm. lata; _folia caulis_ reducta 2-3, 3-5 cm. longa cum vagina 1-2 cm. _Cymae_ 2-3, 3-5, pedunculis 4-5-7 cm. longis. _Spatae valvae_ exterior 2-3 cm., interior 3-4-4-3 cm. longa. _Perianthii segmenta_ exteriore pallide rosea, nervis maculato parva in genu saturatoriis, ad 2-3 cm. longa cum unge 7 mm., lamina fere orbicularis ad 1-5 cm. lata, interna nulla. _Filamenta_ ad 9 mm. longa, basi per 1-5 mm. coaila; antherae 4 mm. longae, stigma parum superantes. _Stylus_ ad 2 mm. longus, rami cum crista ad 7 mm. longis et 3 mm. latis, ad 1-5 mm. longi. _Stigma_ bifidum; ovarium 8 mm. longum.

_Hab._ Caledon Div., Shaw's Mountain, between Caledon and Hermanus, Oct. 1929. T. T. Barnard (Beulah Herb. Bar., no. 20067). Flowered in Dr. Barnard's garden September to October 1930, 1931. Allied to _M. tripelta_ Ker, but the flower looks less angular and more compact because the sepals and style-branches diverge much the less. The latter curve inwards so that the anther may be seen from above, and the crests are shorter and broader than those are in _M. tripelta_. No trace of petals has been observed in a number of flowers examined.

_Morea bipartita_ L. Bolus. _Planta_ gracilis glabra sepa dis ad 25 cm. alta. _Cormus_ globosus, 1-2 cm. diam., in colurn 1-2 cm. longum terminans, tunicis et segmentis fibrosis crebre pinnato-nervis et intimis brunneis compositis. _Vaginae basales_ membranae sepe 4-5 cm. longa. _Folia_ producta 2 conduplicata 25 cm. longa vel rarius ad 45 cm., sine vagina 1-5-2-5 cm. longa, ad 3 mm. lata, in plantis minoribus quasi setacea vis 1 mm. diam., 3-5 cm. supra cormum posita, internodio semi-exserto 2-4 cm. longo; _caulina_ reducta 1-3 vaginaeformis 1-3 cm. longa. _Cympa_ graciles 4-fl., pedunculo ad 2 cm. longo. _Spatae valvae_ exteriore ex moriis membranaceae et 1-2-2 cm. longe, interioris superne membranaceae 3-4 cm. longe. _Perianthium_ lilacinum; _sepalae_ 2-5-2 cm. longa, breviora ad 9 mm., longiora ad 7 mm. longa, lamina oblonga inferne leviter angustata, basi ovale lutea albo-clina ornata, genu aureo minute bruneo-maculato, ungue inferne pallido, fossa nectarifera lutea; _petala_ sepa dis concordiora 2-1-2-4 cm. longa, lamina oblonga vel linearia oblonga abrupte acuta apiculata 6 mm. lata, ungue 7 mm. longo. _Filamenta_ 5-6 mm. longa per 3-4 mm. coaila; _antherae_ cyanae ante dehiscentes 5 mm. longae, stigma parum superantes, polline pallidissimae cyanae. _Stylus_ 3-4 mm. longus; _rami_ cyanae, ad 6 mm. longi sine crista oblique linear-lanceolatis, acuminatis, ad 1 cm. longis. _Stigma_ bipartitum, 1-5 mm. lato. _Ovarium_ terete 5-8 mm. longum, 1-5-2 mm. diam.

_Hab._ Riversdale Div., Riversdale Karroo, on the road to Adam's Kreuk, Sept. 1931. _Emily Ferguson_ (Bolus Herb. Bar., no. 20068).

_Ferraria Framesii_ L. Bolus (Iridaceae-Moreae). _Planta_ 15 cm. alta. _Folia_ basa dis 4 adscendentia vel falcate recurvata ad 12-5 cm. longa, parte vaginante 1-4 cm. longa, 0-7-1 mm. lata, caulina 6 prope apicem leviter angustata obtusa vel subacuta, marginibus demum cartilagineo-crenulatis, nervis demum conspicuis, 9-3-5 mm. longa, ad 1-6 mm. lata. _Infloraeentia_ copiosa ramosa, ramis primariis 6, 4-5 cymae gerentibus, cymis sepalis 2-fl.; _spatae valvae_ obsteque, exterior 2-3-5 cm. longae, interior 2-5 cm. longa. _Bracteeae_ sepe 4 cm. longae. _Pedicelli_ 3 cm. longi. _Perianthii segmenta_ ad 3-8 cm. longa, exteriore ad 1 cm. longa, ad 7 mm. longa, laminae immaculata supra medium saturata, marginibus viridii-cyanae, externae viridi-vittatae, ungue pallide cyanae 1-3 cm. longo; "tubum" 8-10 mm. diam. crista stylem omnino tectum. _Filamenta_ cyanae ad 1-2 cm. latae fere ad apicem coaila, parte libera antheram segmento. _Antherae_
ultra ramos styli hand exsertae rubricundo purpureo vix ad 2 mm.
longe, lobis disarticatis, polline aurantiaco. *Rami styli* cum crispa
multifida, 5 mm. longis, 7 mm. latis, rubro-purpureis; stigma
minutum. *Ovarium* cum rostro ad 1 cm. longo ad 2-3 cm. longum.
Hab. Clanwilliam Div.; hill about 6 miles south of Clan-
william, P. Ross Frames (Bolus Herbarium, no. 19928).
Flowered in Mr. Ross Frames' garden throughout October and
more than half of November 1931.

Watsonia Desmitti L. Bolus (Evatsonia) (Iridaceae-Ixioae).
A *W. Galpinii* L. Bolus bracteis obtusis vel inima subacuta,
ad 1 cm. longis, bracteolis parum ultra, perianthii longiore, tubo
segmentis angustioribus duplo longiore, preclipes almost.

*Planta* 1 m. alta. *Cormi* tunici tenues. *Caulis* ad 6 mm.
diam., internodiis 2 superioribus exsertis. *Folia* 7 viridia,
marginibus haud incrassatis, nervo medio leviter prominentem
nervis intermedios inconspicuis, basalia 3, ad 84 mm. longa in
2-2 cm. lata, caulina 60.-7 cm. longa, vaginae clausae 5-6 cm.,
10 cm., 7-5 cm., 3 cm., longis, arte amplexifunibus. *Spica*
terminalis ad 3-6 fl., ramis 4-7 fl. *Bractea* 1-0-7 cm. longa,
internodis sequentibus vel parum superantes; bracteolis 1-0-8 cm.
longae. *Perianthium* pallide roseum 4-7 cm. longum tubo
3-2 cm. longo, apice 5-6 mm. diam., parte cylindrica partem filiformem paulo
superante; segmenta obtusa, exteriora 5 mm., interiora 7 mm.
*Stamina* arcuata apicum segmenti attingentia; antheris
8 mm. longis. *Stigma* 6-8 subexserta. *Ovarium* 4 mm.
longum.

Hab. George Div.; Wilderness, in the shallow part of the
Touw River, Dec. 1930, R. A. H. Fugue de Smidt (Bolus Herbarium
no. 20071).

Gladiolus Emiliae L. Bolus (Iridaceae-Ixioae). *Planta* glabra, a
50 cm. alta. *Cormus* laterititer subcompressus ad 2 cm.
diam., elongatus ex tubo, in segmentis gracilibus dentibus.
*Caulis* teres ad 2 mm. diam. *Folia* prodelta per anthesin nullas;
vaginae basales rubricundae immaculatae ad 5 cm. longae; folia
caulina 2, 3-5-5 cm. longa, parte vaginae clausa ad 4 cm. longa,
lamina nulla vel subnulla. *Spica* laxa ad 19 cm. longa; *flores*
ad 7, suevolentes secundi fere erecti vel demum tubo apecum
versus subgenuliferae. *Bractea* obtusa, 2-5-1-5 cm. longe,
bracteolis eas sequantibus vel parum superantibus obtusis fere ad
apicum coletis. *Perianthium* luteo-brunneo-rubro brunneo-
maculatum sequin 5-6-8 cm. longum, tubo ad 3-6 cm. longo,
parte infundibuloformi 5 mm. longa ad 4 mm. diam., segmentis
obtusis, superantibus 9 mm., lateribus 7-6 mm., infimo 5 mm.,
latis. *Antheræ* cum stylo ultra dimidium segmenti attingentes,
ad 6 mm. longe. *Ovarium* 3 mm. longum.

Hab. Riversdale Div., flaves near Riversdale, on a rocky
outcrop, April 1931, Emily Ferguson (Bolus Herbarium, no.
19608).

Hermas intermedia C. Norman, sp. nov. (Umbelliferae).
*Herba* perennis circa 40 cm. alta. *Caule* erecto robusto haud
ramoso, indumento niveo-villoso vestito. *Folia* basalia congesta
petiolo teresulaceo dense pubescente usque ad 19 cm. longo suffulta;
*lamina* 8-10 cm. × 5-6 cm., ambitu lanceolata vel ovato-lanceolata
obtusa, basi leviter cordata vel rotundata, superne sparse,
inferne dense niveo-pubescenta, margine subintegra vel undulata,
nervis subtus velum prominentibus; *folia* caulina ad bracteas
angusto-oblongas vel spatulatulas reducta, ± 3 cm. longa.
*Umbella* terminalis, radius numerosissimis tenubus erectis
glabratis circa 2 cm. longis; pedicellis glabris circa ·5 cm. longis;
* involucri phylla* numerosa anguste lanceolata acuta villosa ±1-5 cm.
longa; *involucellorum* basi valde longique attenuata lanceolata
villosa ±7 mm. longa. *Flores* (ut videtur omnes fertiles) et
fructus omnis generis.

Hab. Cape Province; "Fairly frequent in crevices of rock
faces facing S., south side of crest of Riebeek Kasteel, Malmsbury
Division," Feb. 1932, N. S. Pillans, no. 0646 (type in Herb.

Apparently intermediate between *H. gigantea* and *H. Pillansii*.
It is a much smaller plant than the former in all its parts,
but approaches it in the outline of the leaves, while their cordate
bases suggest *H. Pillansii*. The latter character is, however,
variable. The indumentum of leaves and petioles—not of the
stem—is shorter and less dense than in either species.

I am indebted to Mr. Pillans for the excellent material recently
received and also presented when I visited Cape Town in 1928.

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A NEW ANTHOCEROS FROM BURMA.

By L. P. Khanna, University College, Rangoon.

The material for this paper was obtained from Maymyo in
the Northern Shan States, Burma. The plant, which grows
in green patches, black when dry, was found growing in a moist
locality near Laughing Water.

Anthoceros Parkinsonii, sp. nov. *Herba* diacea. *Planta*
feminina 5-14 mm. diametro, in medio leviter depressa, margine
undulata. Cellulae epidermae 20-81 μ × 14-54 μ, que
chloroplasto singulo magnis disformibus prehise. *Thallus*
in sectione transversa usque ad 8-14 cellulas altas, ad
marginem 1-3 cellulas; costæ media distincta deest. *Rhizoides*
sequi granulosi. *Involucrum* 1-65-2-8 mm. latum, ad apicom
paule angustius. *Capsula* 13-0-30-0 mm. longa, 28-45 mm. lata,
atro-fusca. *Stomata* 44-55 μ longæ × 30-45 μ lata. *Spori*
41-52, flavo-brunnei spinulosi, spinulis rectis. *Pseudo-elates*


The possession of the yellow-brown spores and the absence of mucilage-chambers from the involucro separates the present plant from *A. erectus* Kashyap (1915). The diocious habit and the number of antheridia in the antheridal cavities distinguishes it from *A. Longii* Stephani (1916). The habit, size, and other characters distinguish it from the other species of the genus.

**RUBUS LATIFOLIUS** Bab. AND **R. LAETUS** WM. WATSON.

**BY WM. WATSON.**

In this Journal last year (p. 108) some criticism appeared of my communication in 1930 (p. 183), which had for its object to disentangle the two very distinct brambles which had until then been, and still continued in the issue of the Journal for October of the same year to be, confused under the single name of *Rubus latifolius*. Certain defects were alleged in my definition of those two species, and an attempt was made to reject the name *R. laetus* which I had adopted in place of the homonym *R. latifolius* Focke.

Amongst other things it was stated that the stem of *R. latifolius* Bab. ought to have been described as "very stout," not as "slender." Weihe and Nees state of nearly every Bramble they describe that the stem measures up to half an inch thick, and that is also my usual experience. Kuntze ("Reform," 119) broadly agrees. To justify the term "very stout," therefore, a stem should be at least 15 mm. thick, but I have seen no stem of *R. latifolius* exceeding 7 mm. in thickness.

The leaves of *R. latifolius* were given by me as shortly hairy (not felted) beneath, and green beneath on the panicle. Babington has "...foliis utrinque pilosis...subtus nunquam tomentosis," Rogers in his "Essay" has "Leaflets...thin, hairy on both sides," and Focke in Rep. B. E. C. 1893 has "the leaves of the typical plant are green beneath." According to Messrs. Barton and Riddelsdell, however, the leaves are very thickly felted, and on the panicle are white beneath. It will be noted that my description, besides being in accordance with the specimen which I quoted, is in agreement with the descriptions of Babington, Rogers, and Focke, the first two of whom were acquainted with the plant in a living state. Further specimens of *R. latifolius* collected at Acharn last summer have the leaves shortly hairy beneath, not felted.

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Admittedly White’s Perth specimen has a large panicle and white felted leaves, but it differs therein and in other respects from Babington’s type; and the conclusion that ought to be drawn surely is not that my description and the descriptions of my predecessors are incorrect, but that the Perth plant cannot be *R. latifolius*. Turning to White’s *Flora of Perthshire* one discovers that Babington only suggested the name *R. latifolius* with doubt, and that White himself regarded the identification as uncertain. “*R. latifolius* Bab. (!) but the teeth are more nearly simple than in my specimen from Acharn or that from Crawond. *I do not think it can be macrophyllus*. A most interesting plant.”—B.A.B. White adds that the plant grew in the island below the Linn of Campsie and that he failed to find it again. Another specimen (which *I have not seen*) was gathered by White in the same island, and was thus reported on by Babington, “Closely approaches *R. sepicola* L. & M. which may be the same as my var. *conjungens*. At first sight it much resembles *R. latifolius*.”

Messrs. Barton and Riddelsdell think it should have been stated that the topmost branch of the panicle of *R. latifolius* was sometimes nearly patent. Babington, who studied the plant growing at Crawond and Acharn, says that the branches are “ascending not spreading.” One panicle in Herb. Bab. certainly has the topmost branch nearly patent, but it has been forced into that position in the pressing of the specimen. With that exception, the branches of panicles in Herb. Bab. are ascending, as in the authentic specimen which I took as the type and in the new specimens (now in Herb. Mus. Brit.) which were obtained from Acharn last year.

Coming now to the Welsh plant, fault is found with my description of the panicle of *R. laeetus*. I described the form of panicle to be seen on a well-developed bush, as it is only on such a plant that the specific characters come to full expression and that specimens for the herbarium are to be sought (see the *Handbook*). To record in a summary of distinguishing characters that young or stunted bushes have the panicles reduced to racemes seems to me useless, since it is not a specific character, but is a condition to be found at times in all brambles. I grant that the descriptions in the *Handbook* sometimes refer to such reduced panicles—as, for instance, the descriptions of *R. longipes*, *R. hirtus* var. *rotundifolius*, and *R. tereticaulis*—but it does not help in the slightest to distinguish one bramble from another. Species are to be defined by the characters in which they differ, not by those in which they resemble one another. When Messrs. Barton and Riddelsdell saw a narrow-panicled bush growing beside a broad-panicled bush of *R. laeetus* they were looking merely at a young plant growing beside an older and stronger one. A narrow simple panicle is the only kind of panicle which the ‘Handbook’ allows to *R. laeetus*, but the broad and spreading panicle which I described is the normal and characteristic form for the species, and alone requires notice in a diagnosis of the species. Incidentally the following comment *a propos* of this species is attributed to Mr. Riddelsdell in a paper read by Mr. R. R. B., before the Royal Institution of Cornwall in 1926. “Cornish plants have panicles very compound as in strong bushes in N. Wales.”

I regret to see that it is desired to keep *R. laeetus* in the group *Subhannifoli.* I indicated a position beside *R. gratus* in the *Silvatici*. The *Handbook* says the stem is “soon nearly prostrate and thus abnormal in this group,” that the sepals “go off altogether from the suberect type,” and that “the broad reddish bracts and stipules are marked features.” The first two characters, which take the plant out of the *Subhannifoli* are just those which, with the third character, mark *R. gratus* and its allies in the *Silvatici*.

In Rep. B. E. C. 1893 Rogers asks whether a specimen of "*R. latifolius* Bab.” found by Griffith does not belong to the *Silvatici*; and Focke is quoted as saying “Near our German *R. silvaticus*,” a position which, in fact, he gave the Welsh *R. latifolius* in his last Monograph.

Another point is instructive. The *Handbook* describes the stamens of *R. latifolius* as far exceeding the styles. This is not correct either for *R. latifolius* Bab. or for *R. laeetus*. The error perhaps arose through the confusion of *R. laeetus* with *R. gratus* and *R. mollissimus*, both of which have very long stamens. Thus the Bucks “*R. latifolius*,” so named by Focke and Rogers, is *R. gratus*; and the Siliven “*R. mollissimus*” (Rep. B. E. C. 1896), for the naming of which Rogers says he was responsible, is *R. laeetus*. On the other hand, specimens of *R. laeetus* have been mistaken for *R. gratus* (Bangor, Coll. Druce, det. Focke) and for *R. villosa* (Bethesda, Coll. Linton, det. Rogers, 1903, in Hb. Mus. Brit.). Is it fanciful to regard these misidentifications by our greatest specialists at the group as corroborative of the real affinities of *R. laeetus*? One does not see it mistaken by them for any member of the *Subhannifoli.*

It will be observed that I keep the name *R. laeetus*. Sudre quotes only “*Fregol* hb. p.p.,” no description, for the name *laeetus*, which he applies as a var. of *R. miosylus* in the group of *R. tereticaulis*. The fact is, Fregol did not publish a description of *R. laeetus*. As a rule, when publishing a new species (e.g., *R. cerchoiensis* immediately before *R. laeetus*) he gave a full description on the usual lines, beginning with the stem, following on with each part of the plant, and finishing with the carpels, and then pointed out the differences from one or two other Bavarian species. In the case of *R. laeetus*, however, the description proper is wanting. The name follows, without
a number but with "ad int." straight on after R. ceroviiensis, which has serial number as an accepted and undoubted member of the Waldmienen flora. Then some differences from R. ceroviiensis are pointed out. Four of these are of the "less or more" character, the rest are very ordinary and wholly insufficient to constitute a description of the species, "prickles not combressed, leaflets green beneath, terminal leaflet not cordate, flowering branch shortly hairy, panicule thyrsoid, and branches shortly peduncled." In such a critical group these few words, omitting all mention of the armature and the flowers, are far from enough to define a species. They would be applicable probably to 100 different plants. Two only of the characters are retained by Sudre in supplying a fresh diagnosis, as a var., and one character is contradicted by him. So incomplete is Progels treatment that he himself placed another different plant, R. curtiglandulosus Sudre, in his herbarium under the name of R. lactus.

I accordingly regard R. lactus Progels as invalid, because not provided with a description. A numbered specimen is quoted, but that, of course, is not an allowable substitute for a description. I imagine he was not ready to describe the plant, not having sufficiently studied it, and intended to return to the matter another day. This he never did, although he published a supplement to his list a few years later.

R. lactus is not taken up as a species in either of the monographs of the Bavarian Rubi by Ade and Sudre. No other specimen than the original one found by Progel "am Plattenberg" seems to be known.

RUBUS OPACUS SUBSP. NOBILISSIMUS, NOV.

BY WM. WATSON.

A TALL pink-flowered bramble which grows on Abrook Common and other commons between Ditton and Church Cobham in Surrey has often caught the eye of botanists and been sent in to the Exchange Club for determination and distribution. In the new Surrey Flora the various determinations are all impartially recorded, the plant receiving a triple record as Rubus opacus, R. holerythros, and R. nitidus. In the last case there is the qualification, "A form with pink petals but otherwise most characteristic." The remark is not very comprehensible as R. nitidus has pink petals.

This Surrey bramble is identical with the R. opacus from Shapwick, Som., which was issued as no. 78 of the 'Set of British Rubi,' and also with a bramble similarly named from West Moors, Dorset. Both these plants were originally pronounced by Focke to be exactly R. opacus Focke. Murray, however, in his 'Flora of Somerset' very justly pointed out that the German plant was described as having white flowers, whilst the Shapwick plant had pink flowers. Focke then modified his determination, and in a paper on the distribution of certain brambles in Western Europe he stated that he had seen forms very similar to R. opacus Focke in England, but none exactly like it. In his monograph of the brambles of Central Europe (1902) he again stated that English forms appeared not essentially different from this plant.

Sudre thought that the Shapwick bramble in the 'Set of British Rubi' was not R. opacus, but a form of the group of R. nitidus, and he published it in his 'Rubi Europeae' as R. nitidus var. anglicanus. The colour of the petals not being shown on the ticket, he trusted to the 'Handbook' description, which says (incorrectly) that the petals are white. He does not show how the new variety is to be distinguished from R. opacus, except implicitly by placing R. opacus as a subspecies under R. plicatus. This does not help much, as the affinities of R. opacus are not obviously with R. plicatus rather than with R. nitidus. Focke, as a matter of fact, placed his plant under each of these species, and also grouped it with R. affinis. Garcke mentions it under R. sulatus.

There has been equal uncertainty as to the relationship of the Shapwick bramble. In the 'Handbook' it stands under R. nitidus, in accordance with Focke's opinion at the time the 'Handbook' was published (1900). A specimen collected by Townsend at Stockton, S. Hants, in 1879, was, however, named R. plicatus, and White states that the Shapwick bramble was known as R. plicatus until 1891. Rogers said that he at one time took it for R. sulatus. He again named an Aberdare specimen R. sulatus in 1905.

The German and the English plants cannot, in my opinion, be placed—as Focke finally placed them—close to R. plicatus. The greyish felted sepals, the cup-shaped flowers, and the con- nivulent stamens must exclude them from the Suberecti proper (to which R. plicatus belongs); although the suberect sub-simple stem, the creeping and suckering habit, the early leaf-fall, and the habitat on peat require a position in the Semi-Suberecti with R. nitidus etc.

I have seen no English plant identical with the German specimens issued by G. Braun as nos. 43 and 190 in Herb. Rub., under the name of R. plicatus f. opaca Focke, or answering to the full descriptions given by Focke and Braun. Before I saw these authentic specimens it appeared probable that a white-flowered plant which E. F. Linton obtained (1890) at Kinson, Dorset, and Focke named R. opacus, did in fact represent that species. Linton's specimen, now in Herb. Mus. Brit., has one flower prepared to exhibit the receptacle, which
is pilose. This character Focke formerly relied on to distinguish \textit{R. opacus} from the nearly related \textit{R. Bertramii}, the type-plant of which had glabrous receptacles. The Kinsa specimen, however, in spite of the pilose receptacles, is undoubtedly \textit{R. Bertramii}. I have myself met with \textit{R. Bertramii} with pilose receptacles in W. Sussex and W. Kent. The type-plant of \textit{R. Bertramii} was also androecious, but individuals with short stamens occur in England and Wales, as well as in N.W. Germany. The variability does not end here: the carpels, glabrous in the type, may be pilose, and the anthers may be glabrous or pilose in different groups of individuals, without accompanying differences outside the flowers. Such instability is, in my experience, very unusual in \textit{Rubus}.


Type-specimen, Hb. W. Watson, collected at Abrook Common, Surrey, August 2, 1930.

A stately luxuriant plant, growing on peat in wet places. \textit{Stem} tall, erect or high-arching, unbranched, not rooting, green in shade, becoming purplish crimson and opaque in the sun, obtuse-angled, sides furrowed down to the base (shallowly below, more deeply above), thinly hairy throughout and furnished with many subsericeous glands and occasional stout prickles; spreading by a thick twisted horizontal root, which creeps just below the surface of the ground and sends up suckers at intervals. \textit{Prickles} very few, large and long, strong-based and falcate. \textit{Leaves} digitate, rather crowded on the stem, yellowish green and strigose above, greyish-white felted and softly pubescent chiefly on the prominent veins beneath; leaflets becoming plicate and convex, finely serrate to serrate-denticulate, the principal teeth sometimes larger and patent. \textit{Terminal leaflet} ovate-cordate, gradually acuminate to ovate or oval-oblong and acuminate-cuspidate, the base entire or somewhat cordate. Intermediate leaflets unusually long and widely spreading, the base cordate to entire. Basal leaflets with stalks 3-5 mm. long. \textit{Petiole} long, furrowed above, and like the petioles armed with few (often grouped) strong-based hooked prickles; stipules glandular.

\textit{Flowering branch} angled, flexuous, subglabrous throughout, usually furnished with a few large-based, hooked or falcate prickles below the panicle, and some 3-5-nate leaves, the terminal leaflets of which are obovate or oval and often cuneate and sharply serrate. \textit{Panicle} subracemose to compound, with long slender ascending many-flowered branches below and 3-1-flowered branches above. Pedicels long, clothed with ascending hairs and subsericeous glands, almost or quite unarmed. \textit{Bracteoles} fringed with subsericeous glands. Terminal flower-stalk about 1 cm. \textit{Flowers} small or moderate. Petals incurved, crumpled, oval or obovate, tapering into a long claw, apex often notched, rose-pink. Stamens white or pinkish, much longer than the yellowish to pinkish styles. Anthers pilose. Sepals felted and woolly all over (sometimes green rather than grey, and then with a very distinct edge of white felt), broadly ovate acute or more pointed and ending in a linear tip, patent in flower and after, loosely reflexed from the ripe fruit. Young carpels pilose. Receptacle pilose. Fruit somewhat roundish oval, sometimes rather small, generally large and well-dwarfed.

Attention to the form and tooting of the leaves will distinguish this plant from \textit{R. pubescens} and \textit{R. sulcatum}. The form of the stem-prickles and armature of the panicle will distinguish \textit{R. nigricans} and \textit{R. affinis}. \textit{R. rhombifolius} bears a closer resemblance, but may be distinguished by its flat petioles, its stem not furrowed in the lower part, and its larger flowers with more conspicuous stamens and bright rose-pink filaments and styles.

\textit{R. opacus} Focke differs as follows:—\textit{Stem} sharp-angled, the sides flat or seldom furrowed, glabrous except at the tip, which bears a few simple hairs. \textit{Prickles} nearly patent, declining or falcate, usually slightly hooked at the point. \textit{Leaves} a deep opaque green above, usually rather grey beneath when young, later green or yellowish brown and soft with shining hairs; unequally serrate. Petiole flat above, armed like the petioles with rather many hooked prickles. \textit{Pedicels} furnished with a few strong falcate prickles, bracteoles eglandular. \textit{Calyx} green and hairy, rarely greyish green and furred. \textit{Flowers} white, rather large. Stamens unequal, the longer only slightly exceeding the green styles. Carpels bearing a few long hairs or glabrous. \textit{Fruit} often in great part abortive, consisting of a few drupels.

\textit{R. nobilissimus} occurs in the following vice-counties:—Surrey (Abrook etc.); S. Hants (Romsey and Stockton); Dorset (West Moors); N. Som. (Shapwick, Burtle Moor, etc.); Westmorland and Lake District (Gt. Langdale and Little Langdale); Glam. (Wenfa Wood, Aberdare).
A small bramble armed with very slender and quite straight prickles, and occurring in S. Devon, E. and W. Cornwall, and in Ireland, has been distinguished by Focke as _R. opacus f. minor_. In the 'Handbook' and records supplementary to the 'Handbook' it is merged with other plants under the name _R. opacus_ Focke. Babington thought it to be referred to _R. jussus_. It is quite distinct from the Shapwick bramble and is not merely a small form of it. Its true place is, I believe, beside _R. Saltleri_ Bab. in the _Silvatici_.

The 'Handbook' records _R. opacus_ Focke doubtfully for East Sutherland, and invites confirmation. A specimen in Hb. Mus. Brit. collected by Marshall 18. vii. 1890 in East Sutherland and marked "_R. opacus_ Focke?" is _R. plicatus_. The 'Handbook' also records _R. opacus_, but without doubt, from East Kent, probably on the strength of a plant found by Marshall on bushy ground near Preston, E. Kent, 2. vii. 1890, now preserved in Herb. Mus. Brit. and marked "_R. opacus_ teste Focke." As the specimen has flat petioles, prickles like _R. affinis_, and white flowers, it is evidently not _R. opacus_ subsp. _nobilissimus_. The material is hardly good enough for a confident determination.

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A SECOND NOTE ON OENANTHE IN TROPICAL AFRICA.

BY C. NORMAN, F.L.S.

In the _Journal of Botany_, 1932, p. 139, an account was given of the genus _Oenanthe_ in Tropical Africa, and the conclusion was reached that it was represented to date by three species, viz. —

1. _Oenanthe Mildbraedii_ Wolff.

Unfortunately, at the time, I was unaware of the identity of Chiovenda's genus _Stephanorossia_. This was described in 1911 (Journ. Bot. Ital. ix. 65), and with it the species _S. palustris_ founded on _Chiovenda_ 981 collected in Eritrea at Ambra Semien.

In 1913 J. J. Clark added a second species, _S. Elliotii_ (Kew Bull. 1913, 77), founded on _Stott Ellioti_ 7791 from Rwenzori. This I also overlooked. Recently Dr. Negri of Florence has kindly sent me specimens of Chiovenda's species (including the type), so that the identity of his genus can now be ascertained. I have also seen _S. Elliotii_ at Kew.

I must confess that I am unable to see that _Stephanorossia_ Chiov. differs in any way from _Oenanthe_ Linn., as understood by, I believe, all recent writers. This involves a change of name of one of the species cited above (no. 2) and an addition to the synonymy of another (no. 3), for _S. palustris_ Chiov. is identical with _Oenanthe Uhligii_ (Wolff) Norman and _S. Elliotii_ with _Oenanthe procumbens_ (Wolff) Norman (for the latter, see citations Journ. Bot. (1932), p. 140).

The synonymy of species 2 and 3 will now run as follows —

No. 2. _Oenanthe palustris_ (Chiov.) Norman, comb. nov.


_Pseudanum Uhligii_ Wolff, Engel's Jahrb. xlvi. 271 (1912).


_Volkeniella procumbens_ Wolff, Engel's Jahrb. xlvi. 265 (1912).

_Stephanorossia Elliotii_ J. J. Clark, Kew Bull. (1913), 77.


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SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.

**Flora of Sussex.**

A new 'Flora of Sussex' has been in course of preparation for several years past, having been initiated by the Botanical Section of the South-Eastern Union of Scientific Societies at the Hastings Congress in 1927. It will contain much more detailed information than Arnold's 'Flora,' all the stations in which have been carried forward and very many added. It is hoped that the completed 'Flora' will bear favourable comparison with those of the neighbouring counties. The number of species already known considerably exceeds those in the Floras of Surrey and Kent, and many new records have been established. Thus _Himuma_ is now recorded from the Lizard and Orchis, has been found in seven or eight places in the county, and is now seen nearly every year. Among other rarities _Thalictrum minus_, _Chrysosplenium alternifolium_, _Eryngium campestre_, _Doronicum plantagineum_, _Cnicus ericiformis_, _Aquilegia minima_, _Lobelia urens_, _Pinguicula vulgaris_, _Ajuga Chamaepitys_, _Cephalanthera rubra_, _Epipactis leptochila_, _Sisyrinchium angustifolium_, _Colchicum autumnale_ (in a new station) have all been added to the 'Sussex list, and many new stations have been recorded for species already known. Old stations have been verified, and the disappearance of a few species has been recorded.

The work is now approaching completion, only a few lists remaining to be sent in. Although reports can be embodied up to the end of the present year, it is sincerely hoped that all long lists be sent to the editor as soon as possible, so as to allow
time for any apparently necessary corrections to be made this year. After Christmas no additions can be embodied in the main text, since it will take some months to write up the 'Flora' for printing, and it is hoped that it may be published before the end of 1934.

Notes may be sent to the Editor, Lt.-Col. A. H. Wolley-Dod, Berkeley Cottage, Mayfield, or the Hon. Secretary, F. O. Whitaker, 51 Grosvenor Avenue, Carshalton, Surrey.

OBITUARY.

JAMES GROVES (1858–1933).

(With Portrait.)

It is with some reluctance and the feeling that there are others better qualified for the task that I have undertaken to write a brief account of the late James Groves, by whose death on 20th March last, after a short illness, we lose one of the most distinguished British systematic botanists, and one of the very few who has become a recognized authority on an important group of plants.

James Groves was born in London on 19th January, 1858, being three years younger than his brother Henry, who died in 1912. The family removed to Godalming in 1863, and the two boys began their education at the local Grammar School, where they received their earliest training in Natural History from the headmaster. In 1869, owing to the death of their father, they returned to London, and in 1872 James entered the office of the Army and Navy Stores. The brothers' interest in nature, however, suffered no check from the changed circumstances, and in 1874 they joined the South London Microscopical and Natural History Club, and made the acquaintance of Hewlett Cottrell Watson, B. Daydon Jackson, Mr. T. B. Blow (who happily is still with us), and other well-known botanists. In his memoir of his brother (Journ. Bot. li. p. 73 (1913)), Mr. Groves gives an interesting account of their early endeavours and of their joint botanical work. They began to study the Charophytes in 1877, and three years later published their first important work in this Journal, a "Revision of the British Characeae." In 1881 they described as a new species, Spartina Townsendii, the grass that has since widely spread and become of considerable economic importance.

In the succeeding years the brothers Groves continued their study of the British Flora, but specialized more on water-plants, and particularly the Charophytes, of which they distributed two fascicles of the British species in 1892 and 1900. In the latter of these Canon Bullock-Webster participated. A series
of their papers on the British Characeae appeared in this Journal at various dates during this period, and in 1901 they described the very distinct hybrid *Ranunculus Hiltonii*. In 1904 the ninth edition of Babington's 'Manual' was published, edited by H. and J. Groves. The book was brought up to date so far as was possible under the limitations imposed by Mrs. Babington, but, as was remarked by a reviewer at the time, a completely new flora, written entirely by the editors, might have been preferable. The nomenclature of our flowering plants, however, was thoroughly revised, and the soundness of the brothers' views, though not always in accord with the present rules, is well shown in their paper on the use of Linnaean specific names (Journ. Linn. Soc. Bot. xxxv. 1902). In 1909 another new British plant, *Lunula pallecens*, was described in this Journal, and in 1911 the brothers contributed an important account of the West Indian Characeae to Urban's "Symbolae Antillanae."

The year 1912 was a sad one for James Groves, for it was darkened by the illness and death of his brother, who had been the inseparable collaborateur in all his botanical work. His interest henceforward became centred on the Charophytes. In 1915 he described (Journ. Bot. lii. 41) a new *Nitella* (N. *Dixoni*) from the south of Portugal, and the following year he was working with Clement Reid on the fossil Characeae of the Purbeck Beds, of which a preliminary report, including a description of the fossil genus *Chara*, is contained in the contemporary 'Proceedings of the Royal Society.' In 1918 he retired from the Army and Navy Stores, where he had become an Assistant Secretary, and left his house at Clapham to reside at Yarmouth, I.W. Here he lived until his removal in 1923 to Freshwater, which remained his home until the end.

An interesting paper from his pen appeared in this Journal in 1920 (p. 50), in which he added to the roll of British botanists the well-known water-colour artist, Cornelius Varley, who read a paper on *Chara vulgaris* before the Microscopical Society in 1845. This year (1920) was notable for the publication of vol. i. of 'The British Charophyta,' written in conjunction with Canon Bullock-Webster and printed for the Ray Society. The volume deals with the morphology of the group, and treats in detail of the section *Nitella*, of which fourteen species are described, with complete distribution, synonymy, and lists of exsiccata. The twenty accompanying plates, mostly the work of Miss Mary Groves, are of the peculiar excellence that distinguishes the figures of all the Groves' papers. Another important article, written with Clement Reid, on the "Charophyta of the Lower Heaton Beds of Hordle Cliffs," was published in the 'Quarterly Journal of the Geological Society,' lxxvii. pt. 2, in November 1921; the systematic account of the fossil remains deals with twelve species of *Tolyphella* and *Chara*, ten of which are considered
new. Two further fascicles of ‘British and Irish Charophyta’ were issued in 1924 (with Canon Bullock-Webster); and in the same year appeared vol. ii. of ‘The British Charophyta,’ dealing with the section Charaene (eighteen species), and including an account of the geological history of the whole group by Groves. Like the first volume, this is beautifully illustrated with twenty-five plates; and the two volumes form one of the most complete Monographs ever written of any group of British plants.


James Groves was a born naturalist, like his brother Henry—interested in many forms of animal and vegetable life. In his early days he worked hard, with little leisure, to acquire a competent knowledge of British plants, and in his more mature years he produced a succession of original papers on a particularly difficult group, on which he came to be a universally recognized authority. His work is characterized by uniform care and thoroughness that are seldom equalled in the writings of his contemporaries. And his fascicles of Characeae, and indeed his herbarium specimens in general, are models of intelligent selection and proper preparation. My own acquaintance with him began in 1902, when he visited me to discuss my reasons for practically deleting Pnumia muralis from the British list in a recent paper in this Journal. I was able to satisfy him, and from that date we were always the best of friends, although from my ignorance of the Charophytes I had less contact with him in recent years than I would have wished. He always appeared of a retiring disposition and shunned all notoriety; but he possessed an insight into plant-life and a well-balanced judgment, which were equalled by very few of his follow-botanists and on all occasions rendered his opinion valuable. Many of his friends will sadly miss his gracious smile and his quiet sallies of wit or humour.

Groves joined the Linnean Society in 1885, and served on the Council for 1914–18, during part of which period he was a Vice-President. After his removal to the Isle of Wight he co-operated in founding the I.W. Natural History and Archaeological Society, and took a prominent part, as a Conservative, in local politics. He was a trustee of the South London Botanical Institute and a Honorary Member of the Watson Botanical Exchange Club.

The sympathy of all British botanists will go forth to Mrs. Groves, his widow, and to his sister, Miss M. Groves, in their grievous loss.—H. W. Pugsley.

SHORT NOTES.

CENTAUREA COMRESSUM IN DORSET.—In connection with experimental work on the genus Centaurea (Erythraea), I am investigating the factors controlling the distribution of C. compressum (Hayne) Druce, (C. vulgare Rafn.), and C. umbellatum (Gilb.) in Britain. As a means of testing certain theories regarding these factors I have planted eleven rosettes of C. compressum from the Lancashire Coast among the sand-dunes of Studland Bay, Dorset. I am recording the fact here so that any botanist finding them may know their origin and will, it is hoped, leave them undisturbed.—J. S. L. Gilmour.

DIATOMS (RECENT AND FOSSIL) OF THE TAY DISTRICT (Journ. Linn. Soc., Botany, ix. (no. 328), 27 Jan., 1933)—Mr. F. W. Mills has kindly pointed out that Navairela peregrina var. producta, var. nov. (p. 252), is a name already occupied—viz., W. West, “Clare Island Survey,” Proc. Roy. Irish Acad. xxxi. pt. 16, p. 16 (32), pl. ii. fig. 22. I therefore propose to name the variety Navairela peregrina var. intermedia, var. nov.—David McCall.

REVIEWS.


The industrious editor of the ‘Annales Bryologici’ has produced in this volume what is practically a general text-book of Bryology. He has had the help of fifteen collaborators, who have contributed chapters on the phases of the subject in which they are specially interested.

Bryology, like other branches of botany, suffers from lack of co-ordination among its workers: those occupied in general research sometimes have very little knowledge of the plants with which they deal and the value of their work is lessened by this narrowness of outlook. The taxonomists, on the other hand, do not pay enough attention to general botanical research on the
group; hence the ill-founded opinions and erroneous conclusions in many otherwise sound taxonomic papers. The present 'Manual' is an attempt to meet some of these difficulties.

The scope of the book will be best judged by an epitome of its contents, which are distributed through sixteen chapters: Morphology and Anatomy of Musci and Hepaticæ are treated successively by R. van der Wijk and H. Buch; the latter also supplies a chapter on Experimental Morphology. Then follow Germination of the Spores and the Protozoa-stage by G. Chland, Association with other Organisms by G. Nicolas, Cytology by J. Motte, Karyology by K. Hoefer, Physiology by A. J. M. Garjeanne, Genetics by P. von Wettstein, Geography by Th. Herzog, Quaternary Distribution and Moss Societies by H. Gams, Ecology by P. W. Richards, Classification of Mosses and of Hepatics by H. N. Dixon and Fr. Verdoorn respectively, and Phylogeny by W. Zimmermann. Six of the chapters are in English, the remainder in German or French.

A useful feature is the historical review with which each contributor opens his subject. The citation of literature has been governed by the availability or otherwise of easily accessible bibliographies. In the Systematic Treatment of the Mosses Mr. Dixon does not go beyond description of orders and suborders, with an indication of the contained families. That of the Hepaticæ includes the families, with an indication of the genera. There are separate Indexes of Plant-names and Authors respectively.

The book, which is clearly printed and admirably produced, forms a valuable addition to general botanical literature.


It is all to the good that a wider publicity should be given to Prof. Salisbury’s valuable presidential address to the Norfolk and Norwich Naturalists’ Society in April of last year, and Botanists outside the membership of the Society will welcome the opportunity of obtaining a copy. The address, described as ‘A Study in Comparative Plant Geography,’ contains matters of general interest to British botanists, which are discussed partly in an introductory section and partly arise incidentally in the portion dealing specifically with the East Anglian flora.

The occurrence of a species in an area may be an accident of dispersal rather than an indication of especial fitness for the area. ‘Information of this character,’ says the author, ‘can, for most plants, be acquired only by the deliberate introduction of wild species beyond their existing range.’ The objection which some students of geographical distribution have to such introductions “cannot be defended on scientific grounds, though it is of course essential that such introductions should be properly recorded.” Would that Prof. Salisbury were with me enjoying the sunshine of Bermuda in the early days of March. He could then observe the effect of the deliberate introduction of wild species from the West Indies and elsewhere, duly recorded, which have completely altered the character of the vegetation over large areas. The deliberate introduction of a new factor into the problem of geographical distribution may perhaps be defended on scientific grounds, but it is not to be encouraged.

In discussing the position of rare species, the need for more data as to the type and phæse of succession of the Communities in which they occur is emphasized. Species associated with artificial habitats may have found a refuge owing to the restriction or obliteration of their former natural habitats. The hedges of the south-east of England may in future be the sole stations for species characteristic of the woodland marginal flora. The view is advanced that the degree of abundance of a species towards the climatic limit of its range varies directly with the stage of succession to which it belongs.

A sketch of the recent geological history of East Anglia is given, and the author regards it as highly improbable that any considerable proportion of the flora survived from preglacial or interglacial times.

The greater part of the Address is occupied by a critical enumeration of the various components of the East Anglian flora, eight in number—the Northern, the Southern, the Oceanic, the Continental, the Western Central, the Eudic, Recent Immigrants, and the Generally Distributed. The distribution of the more important species is illustrated by sketch-maps.

In conclusion, a concise summary suggests generalisations which appear to be justified from the data furnished. A. B. R.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At a general meeting on March 2, Miss D. de Winton gave a demonstration of leaf and bract forms of Primula sinensis and their inheritance. Six distinct types of leaf are known, all of which have mutated by loss from the original, and act as good Mendelian recessives, breed true, and give a mono-hybrid segregation in $F_1$ on being
crossed to the normal. Another Mendelian factor greatly increases the size of the bract, whose shape then closely follows that of the leaf; the factor is a Mendelian recessive to the normal.

Dr. E. C. M. Ernest read a paper on the water relations of plant-cells. It was shown that suction pressure rather than osmotic pressure is the determining factor in water exchange of the plant-cell, and that its value depends largely on the properties of the cell-wall. The method of measuring suction pressure was described and emphasis laid on the necessity for avoiding the section method in plant-cell physiology.

At a general meeting on March 16, Professor E. J. Salisbury opened a discussion on mortality among young plants and animals. He instanced examples of seedling mortality in monocarpic species of up to 99 per cent. The survivors, almost without exception, attained the flowering stage and produced viable seed: the seed from the most depauperate individuals was as viable and gave as high a percentage variation as those saved from the largest individuals. There was hence no evidence of selection in the later stages of development. The very high mortality of plants is practically confined to the seedling stages.

If selection takes place when the morphological characters are so little differentiated that species of the same genus are often well nigh indistinguishable, the morphological characters of the adult may perhaps be the necessary concomitants of the characters upon which natural selection operates, and are only indirectly selected themselves. The actual characters which determine mortality or survival may be entirely physiological, though linked it may well be, with the morphological and other attributes of the adult condition.

On the botanical side Dr. R. A. Fisher held that such an inference could only be drawn from the facts adduced by arbitrarily confining the action of natural selection to a differential death-rate and by defining death in a sense appropriate to the higher animals but not so appropriate to plants, namely, as the elimination of the whole organism. Further, it was not enough to show that all produced some viable seed, as it was necessary, if selection were to be excluded, that all should produce equal quantities of equally good seed.

Professor Weiss called attention to the work on mortality of seedlings carried out at Aberystwyth, where in several grasses self-fertilized plants produced a large number of albino seedlings, and further that two lethal factors have been discovered in plants of normal colour.

Mr. J. Ramsbottom stressed the fact that when mortality of seedlings was considered it was necessary to try to ascertain the cause of death. It appears that though this was sometimes due to parasitic disease, and sometimes to constitution, it was usually the result of starvation.
JOHN GERARD KOENIG.

BY A. B. RENDLE.

(Plate 601.)

JOHN GERARD KOENIG was a native of the Government of Courland on the Baltic, where he was born about the year 1728. He was a pupil of Linnaeus, who dedicated to him the genus *Koenigia*, which his pupil had found in Iceland in 1765. These are at the Linnean Society, in the Linnean correspondence, a number of letters from Koenig to his old master—they date from 1763 to 1782—the earlier ones are written from Copenhagen, the later from Tranquebar. In the 'Mantissa' (1767) Linnaeus describes a number of species from Koenig's Iceland collection.

In 1768 Koenig went to India in the Danish service as Surgeon and Naturalist at Tranquebar. In 1774 he entered the service of the Nawab of Arcot, and in July 1778 was appointed Naturalist in the Madras establishment of the Honourable East India Company, to which he was attached during the remainder of his life.

In the Department of Botany, British Museum, are a number of his letters to his friend, Dr. Patrick Russell, then residing at Vizagapatam. The letters, which range from October 25, 1783, to June 12, 1785—a fortnight before his death,—describe, in what Koenig calls his "bad German English," his travels and natural history and medical observations. In the later letters he refers to the symptoms of the disease (dysentery) to which he succumbed at Jagarnathpuram on June 26, 1785. The last letter, a short one, is to inform Russell that he had made his will on the 6th inst., leaving all his manuscripts and plants to Sir Joseph Banks. By the kindness of the present Keeper of Botany, Mr. Ramsbottom, I am able to reproduce a photograph of this letter (see p. 144), and also of a sheet from Koenig's herbarium (Plate 601).

In the transcript of the Bank's Correspondence, in the Department of Botany, there is a long letter from Patrick Russell from Vizagapatam, dated July 9, 1785, informing Sir Joseph of Koenig's death—"which in respect to the natural history of this country I regard as an irreparable loss,"—of the bequest, and of his own arrangements for sending the plants and manuscripts to England. The original of the portion of this letter relating to Koenig has been incorporated with Koenig's MSS. (vol. 3, pp. 251, 2). The preface to Roxburgh's 'Plants of the Coast of Coromandel,' written by Patrick Russell, gives an appreciative account of Koenig's botanical work in India. Russell also appends an indication of the contents of the MSS. and a list of Koenig's few publications.

* Koenigia islandica L. Mant. 35 (1767) (Polygonaceae). Habitat in Islandia detecta 1765 a Jo. Ger. König qui Islandiam adhibit Historiam naturalem ejus descripsit.—The specimen is in the Linnean Herbarium. 

Journal of Botany.—Vol. 71. [June, 1933.]
As the account of Koenig's collections in the 'History of the Collections contained in the Natural History Departments of the British Museum' is very terse and incomplete—under Botany we read (i. p. 160) merely 'Sent Indian plants to Banks, 1776; herbarium and MSS. bequeathed to Banks,'—it may be useful to give a brief account of the material available at the Museum and to indicate its value to workers on the botany of India and Ceylon.

Dear Doctor,

I received your letter by going and see. I am glad of the good news. I hope you will write soon. I have left all my hangings etc. in Calcutta. The ship is to leave in a few days. I have packed all my plants at Calcutta and a large part of them in a chest in the papers particularly containing my rare drawings. I will send them by the next ship. I am now in the garden and my practice is much improved. I am now spending most of my time in the garden and the last few days I have been very busy. You will hear from me in due course. I send you my best wishes for this new year.

Dear Doctor,

Yours truly,

Letter from J. G. Koenig to Patrick Russell, June 12, 1785.

The MSS. are contained in twenty-one volumes, varying in size from folio to duodecimo. Volumes 1-19 are successively numbered 'Koenig Manuscr.', and are in the original bindings as they were arranged, evidently by Dryander, Banks's librarian, who has annotated them, and was presumably responsible for the preparation of the "Index Manuscr. Koenigii"—a list of the subjects treated, followed by a list (incomplete) of genera and species, arranged on the Linnean System, with references to volume and page of the MSS. Koenig's publications are a very inadequate criterion of his industry and the extent of his botanical work. A list of the items in Dryander's subject-index will indicate the extent and variety of the information contained in the MSS. The notes relating to an individual item are sometimes distributed in more than one volume, owing to the different sizes of the paper used by Koenig.

Index of Subjects, with reference to volume and pages of the MSS.

(I have retained the original Arabic style for the volume-numbers. Since writing this account the volumes have been rebound and numbered in Roman characters.)

Journal at Tanjore, Apr. 6-5, 1775. 10, pp. 129-154.
Voyage to Siam, Aug. 1, 1778-Feb. 21, 1779. 2, pp. 1-180.
Notes from Nov. to March 1779. 3, pp. 1-57.
Notes from March 1779 to Sept. 25. 4, pp. 103-206.
[Sept. 7 to Dec. 4. 18, pp. 1-80.]
Notes from Dec. 15-30, at Quedah. 16, pp. 227-244. [See also 8, p. 81.]

[Chirtonetum Hindiors siamensis. 18, pp. 105-176.]
Voyage from Madras to Tranquebar. 19, pp. 149-160.
May 9-11. 14, pp. 147-161.
March 30 to Apr. 11. 12, pp. 118-148.
Apr. 20 to May 5. 15, pp. 103-133.
Letter to Dr. Solander. 1774-1782. 8, pp. 177-249; 1, pp. 149-156.
Descriptiones plantarum Tranquebar., Fasciculus 2 (1770-73). 4, pp. 77-118.
Descriptiones plantarum, Decas 1. 4, pp. 119-121.
Descriptiones of Plants sent in 1774. 4, pp. 171-185.
Descriptiones plantarum 1775. 5, pp. 125-152.
Plantae siene pro anno 1776. 13, pp. 257-273.
Descriptiones plantarum pro a. 1776 & 77. 7, pp. 1-82.
Descriptiones plantarum 1777. B. mense Augusti-Nov. 1, pp. 1-84.
Malacca, 1779. Lit. A. 9, pp. 257-316.
Descriptiones plantarum novarum. Malacca, 1779 [including an autograph Index]. 19, pp. 131-294.
Descriptiones plantarum Zeylanicae 1781. Lit. B. 17 (the whole volume).
Descriptiones plantarum 1783. 16, pp. 1-93.
Plantae Osiriaes descripte 1784. 1, pp. 206-251.
The last descriptions of plants are in 19, pp. 1-150, as p. 119 is dated Visnupatnam, April 8, 1795.
Palmae Sima sent to Sir Joseph Banks. 9, pp. 229-231.
Monandrum descriptions. 11, pp. 87-159; 6, pp. 125-144.
Epideriorum descriptions. 11, pp. 161-186 & 241-240.

* Items in [ ] are my additions.
Descriptions of the plants and animals observed and collected on this journey occur in several of the volumes of MSS. The "Definitiones plantarum novarum, Malaca, 1779," a small separately paginated MS of 160 pages has been bound up with vol. 19 (12mo); the other portion of the volume consists of very full, apparently final, descriptions of a large number of new genera and species, apparently written in the last two years of his life. That of Dolichos prostrata, pp. 26–28, is headed "Lager-Naarko, 7. Jan. 1784" with the note "ante in Tranquebar 1783 descr."—presumably a reference to a short diagnosis in vol. 6, p. 15.

The letters to Solander, which range from 1774–1782, are written in German, the writing is cramped and not easy to read; that to Banks is in English, in which Koegn was less proficient. These letters were subsequently incorporated with the MSS. The descriptive matter is mainly in Latin, in which Koegn wrote fluently. The character of the notes and descriptions varies from rough notes and preliminary diagnoses to very elaborate final descriptions; and there is naturally some repetition.

Bound up with the MSS. are annotated copies of Hermann's 'Museum Zeylanicum' and Rottboell's 'Descriptiones plantarum rariorum' and 'Botaniakens Udstrakte Nytte.' There are also notes on the 'Hortus Malabaricus' and Burmann's 'Flora Indica.'

For the translation of the following letter to Solander (MSS. 1, pp. 149–150) I am indebted to Miss F. L. Stephens. The letter illustrates the close relations between Koegn and the Banksian Herbarium:—

"Madras, January 24th, 1774."

"Most noble and learned Professor!

"In the previous Autumn I took the liberty to send your noble self a letter; now I write again, and according to your promise send a small collection of this year's seeds, together with some plants, which on the journey between Tranquebar and Madras appeared to me to be remarkable; others I have collected during my personal visit in the region of the small and great S. Thomas mountains, together with those collected in and around the fine garden of Mr. Andreas Koch, and, according to the state of my knowledge, they are described as well as possible, and from this account the particulars have been picked out and included with the plants. I feel sure that some of these will be new; with others there will no doubt mistakes, for which I beg your pardon, as I have no book other than the System of Mr. Archiater von Linné; only quite recently have I had opportunity to run through the Hortum Malabarum, for these plants, however, I can put it to little use; these plants have not come up to my expectations, partly due to my terrible journey, and partly due to the short time I have had; I have been here scarcely a month so they have not turned out to the best advantage."
The Professor will however have the graciousness to regard them as firstlings, for I will certainly be able to send beautiful and better examples.

"I have taken the liberty, according to my slight means, this time to perpetuate the worthy memory of the happy arrival of our excellent Lady Ann Möhnsen* by a beautiful plant apparently new to our science; this Indian plant I found just at the time the above mentioned lady arrived in India: in that I desire it to be so I leave it for the approval of the Professor and Mr. Archiater von Linné.

"A second plant I have dedicated to Doctor Boswall [sic], who as first physician to the Nabob has been a great forwarder and supporter of my search, who at the same time encourages Botanical work here very strongly, and with moreover knows the moorish as well as the Tamil names of the plants. From him I got the Hortum Malab.: through this small act I have wished to show my obligation, and if it is possible I beg at the same time the approval of the Professor.

"I have risked leaving the Danish Service in the hope of enjoying a better fate under the English; nothing that can be achieved by work and good will will be left undone by me; here especially the approval of the Professor and Mr. Banks is desired and for this I offer my most beseeching prayers, and to gain this will be my chief effort; after this I wish very much to know in which branch of Natural History the greatest interest lies; in this I will take the greatest trouble to give the highest possible satisfaction, and will include for each the necessary descriptions as in the plants; I also wish incidentally that I could have some reminders from your noble self which would evaluate my observations!

"The languages English, French, Latin and Swedish are all the same to me; only the preparation prevents me from writing in any other language than German.

"Yesterday I received some new plants, these were, a Corchorus which appears to me to be new, an Indigofera, which I first regarded as a Hedysarum prostratum, more exactly examined it was found to be three-leaved, with acute four-angled pods; a beautiful Dianthus with dark blue blossoms resembling Scutellaria——; the leaves were like a Mentha, and sweet smelling; as these are still in fruit they cannot be included, but a beautiful Triandrus I have put in with a preliminary description; I only doubt if it has a Corollam superan. It is noteworthy that these

* Lady Anne Monson. Illiciorum Monsoniae Linn. fil. Suppl. Pl. 161 (1781) was described from a specimen sent by Koenig, now in Herb. Linn. Described independently by Retzies, Obs. ii. 13 (1781), as Celoria Monsonia. See note below; and for a notice of Lady Anne Monson see J. Britten, Journ. Bot. 1918, 147.

lovely yellow blossoms, after they have withered grow into a tubum . . . , the spiral is twisted up, the limbus is then rolled up in a ball; it seems to me to be a new genus. Finally I beg to be commended to Mr. Banks; I have no other right to this honour than what the mutual possession of an interest in natural history offers me; if I could have the good fortune to be of service to you I should be very happy. May I recall to your noble self our old acquaintance ship. To me, to gain your approval will always be of the greatest importance. I am, with the most indebted esteem

"for your noble self,
"Your most dutiful servant,
"JOHANN GERRARD KÖNIG."

Note.—Koenig, writing here in German, adopts a consistent signature. His letter to Banks is signed John Gerard Koenig, and the same form appears in his letters to Russell, in which, however, the variants Jan, Gerhard, and König also appear. I have not found the form Konig, which was used by the late Mr. B. B. Woodward, in the 'Catalogue of the Libraries at the Natural History Museum.'

The letter to Banks, dated six months before Koenig's death, covers seven pages of foolscap. The large round-hand and errors in the spelling of plant-names suggest that it was copied by a clerk; it is signed by Koenig. The extracts from this letter which follow give an insight into Koenig's work and his relations with Banks. Errors in spelling have not been reproduced:

"Dear Sir

"I received your kind and very agreeable by the Barrington Indianan and was much enjoyed over its contents. I am very anxious to get the book from you, which has the great Value to be an Edition of your own hand and wherefor every body of the learned World has been so desirous.

"I shall not omit to communicate you my discoveries in the History of Nature, especially of the Plants, and I shall only look upon every discovery as a true one when confirmed by you. For I am likewise in want of books and Consultation here. Uncertain Memory and Imagination gives us men often occasion to faults.

"Concerning the Tree which bears the Gummi Guttro and which you would be so kind to add to the Transactions of the Society for which I kindly thank, being certainly the Tree of the re nomated Gumm. in the Materia Medica, I am the more sorry that the given description is so very short. But I have since these two Years past an extensive description ready under my
Manuscripts at Tranquebar, by which I have at the same time the description of the Cambogia Gummi gutta Linnæi, and the certain Supposition of more Species of this Genus and a Chimick examination of the Gum of this Tree in which is a remarkable difference from the real Gummi Gutt. Which I promise to send you as soon as I come to my papers.*

"With this Opportunity I send you from Bengal packed in a Box the following conserved in Spirits ... [a list follows]."

"In a Sack I have lay’d the following Seeds, Dionthera Malabar., Phisalis Sowmiera.

"Lagastroemia flos reginae a New Species. [See note at end of letter]."

"The Young Cap" Cullen at Midnapore was so much pleased with this flower when I first showed it him, with its particular beauty of the separate blossoms, partly of its majestick appearance with its Pyramide erect. Paniculis above the Top of the Tree.

"We dedicated it for this appearance to the remembrance of our present reigning gracious and most excellent Queen Charlotte, her Royal Majesty, who is so rich of high gifts & Virtue which makes her so much Superior to any of her Sex. The knight of Linnæi has it in his Fl. Ceylanica No. 533, under the Name of Marthu Ghas, & Rheed. Hort. Malab. part 4. pag. 45. table 20–21, has two but indifferent tables of them. At Siam I first met with this as a large Tree the bark of which is smooth as by the Gujawes Tree, the Crown extends itself almost round, the wood is white and very hard. Rotters not very easily, and very much used at Siam, especially where it has great weights to bear. I met with it at Ceylon in the Valleys between Madrue [Matarra?] and the Adams mount.

"On my Journey lately from Sambelcotte to Bengal I found it in quantity in the Maratta provinces, in the Valleys there, and fine and agreeable Trees of them in blossom about the size of a Cherry tree, and afterwards by an old fort at Midnapore. If it is likewise agreeable to you to adopt to it the Synonymous name, you will complete our wishes, except any thing contrary to the rules should be found in it."

"Then I would rather beg to exclude it. The Seeds are quite fresh gathered. My Definitive of it is Arborea folis oblongis venis striatis coriaceis. Panicula Pyramidal, Calycibus sulcatis."

"There are different sorts of Plants used here for Hemp ..."


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"Linnaeus's Classification of this Plant is very undetermined. I shall endeavour to let you know my Idea about them.

"Ambroma. I look upon mine as a second Species of Mr. Jacquin's, who has given so good a description of his according to the approbation of Linnaeus. A description of mine follows hereby. I have Dedicated it to the remembrance of Edward Wheler Esq'. as a much esteemed Man and a great friend of our Science; more of which with a fine drawing of it, I hope to communicate you with the first.*

"A New kind of the Diadelphias Class; the Calyx has four uneven leaves, the Corolla is as in the Hedyasaris, the Stamina [† Smithia Sensitiva Hort. Kew.," inserted by Dryander between the lines.]

are in two equal parts, divided into 5 at each side, otherwise as the Class. The following Legumin is likewise parted, that each Seed has his own roughly Legumin, these are 5–7 with flat sides approximated to each other of orbicular figure and hang on the continuing Styles which runs over them in sharp corners (à zik zak) thin thread like.

"The leaves are sensible. I have described it all very particular.

"The fruits of the Mangifera pinnata follow hereby packed in Sand. Mr. Linnaeus has wronged me therein that he calls it on my Name a Mangifera † which it is not, and which I have often wrote him, since these ten Years past.

"Habenastrum Rumphii is a Diospyros: I believe I sent you some examples of it several times pasted on paper to England. Rumphii figure is bad, for the Tree bears a fine, full of leaves and large Crown, like the Mangoe.

"I have, to distinguish it from another fruit of the same kind, which is eat at Siam, call'd it glutinifera ♂. At Ceylon the Book...

* Aroma Wheleri Retza. Obs. Bot. v. 27 (1789) described from a specimen sent by Koenig.

† The species is described and figured in Aiton's Hort. Kew. ii. 496, tab. 13 (1789). The type from Koenig in Herb. Banks is written up by him "Genus novum Classis diadelphiaram a Linne," with a Latin diagnosis. A very full description is given of this "Genus nov. Diadelphiarum," in MSS. 19, pp. 55–58.

‡ Mangifera pinnata Linn. f. Suppl. 150 (1781): "Susa Observatoris acutissimi D. König, qui plantam vivam examinavit & etiam vidi fructum mili ignotum, ad hoc genus refero." Koenig’s specimen in Herb. Banks bears a note "Mangifera" followed by a short description. There are several long descriptions in the MSS under the name Mangifera pinnata. It would appear that Koenig had himself suggested the name, but later regarded it as a species of Spondias. In the latest volume of his descriptions (1784) (19. p. 79) he writes Mangifera pinnata mili Spondias spec. The species was named Spondias Mangifera by Willdenow (Sp. Pl. ii. 751, 1789).

§ A specimen in Herb. Banks from Ceylon is written up by Koenig "Diospyros glutinifera ♂. Foliis lineari-oblongis &c. Habenastrum Rumphii: Herb. Ambolin. f. 3."
binders make use of the juice of the fruits because it is never eaten by the Worms and in the rainy Season never opens. In Bengal the greatest use is made of it for excepting the aforesaid Tippoo Saib has ordered all Cartridges to be covered & glazed with this juice to keep the powder from all moisture. The on the Ganges Used Vessells are covered with this Juice to preserve them from the Worms & rotting of the Wood. The Nets of the fishers are painted with it as well at Ceylon as here either brown or black to preserve them.

"Old Linnen which is easily given to breaking inbibed with this Juice, stands for the first Merchant and has the appearance to be as strong as new.

"In the Medicine it is of great use...

"This Tree is planted at the side of Waters and in Woods, the Wood is reddish at the outside and black at the inside, according to common descriptions I have got it is the Ebenæ Wood of the Mauritius, but not so heavy and fine from texture as the true one.

"I conclude this Letter with a heartly wish that the Seeds may come soon, fresh and well to your hands.

"Against Linnaeus's Supplement I have with great reason a great deal to say which I shall take the Liberty to communicate you in my next.

"To Professor Schreiber* at Erlangen I send a Collection of India Grasses because he excels particular in this way, for to publish the newest of them.

" Recommending myself to your friendship I have the honour to be

"Your
"Active Friend
"and most obedient Servant
(signed) "JOHN GERARD KOENIG."

* Calcutta the 8th
** December 1784.
*** To
**** Sir Jos: Banks Esq.
***** London.

Note.—The name *Lagerstroemia Flos-Reginae* was published in 1789 by Retzius (Obs. Bot. v. 25), who thus renames his *Lagerstroemia β. major* (Obs. Bot. i. 20, 1779), received by Bladh from Java. In 1789 Retzius had presumably a specimen from

Koenig, as he adopts his name and says: "Crescit in sylvis Calcutae König." But although he quotes Linn. Flor. Zeyl. and Burmann Zeyl, he does not include Ceylon as a habitat. In his original description Retzius is doubtful as to the rank to be assigned to the two forms of *Lagerstroemia*—he writes:—


α. *minor*, Chinensis [with diagnosis].

β. *major*, Javanensis [with diagnosis].

*Index Kewensis* quotes both these names as species (of Retzius). If the specific rank is recognised, the combination *L. major* takes precedence of *L. flos-reginae*.

There are two specimens of this species from Koenig in Herb. Banks, one from India and the other from Ceylon, but they are written up by Koenig *Lagerstroemia arbores* and presumably antedate his letter to Banks. The name appears in the MSS. 5, 72 and 9, 125. The genus is not included in Dr. Fischer's list of Retzius's specimens from Herb. Land (see below).

A number of "Lists of Plants," originally kept separate, have been subsequently bound up in two volumes. These lists, dating from 1773 to 1785 are mainly of specimens sent to European botanists; the exact date of sending and the name of the person to whom they were entrusted or of the captain of the vessel in which they were transhipped is sometimes indicated. Some are rough lists, others are more carefully written and include short descriptions of new genera and species or similar notes. Among the recipients is Dr. Daniel Solander: for example, "Missus seminum ad Angliae mensum July, Anno 1777, pro Dr. Solander & Boswell"; "Herbarium fir Hr. Dr. Solander... April 1782." In the same year, October 20, a packet is sent from Tranquebar to Copenhagen for Dr. Retzius in Land, the plants in which evidently supplied material for the "Observationes" no. iv.; many of the names are accompanied with botanical descriptions.

*(To be continued.)*

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THE NAMES OF SOME SOUTH AFRICAN PLANTS.

BY J. E. DANDY AND G. TAYLOR.

In a recent paper entitled "Contributions to the Flora of the Kuyana and Neighbouring Divisions" (in Trans. R. Soc. S. Afr. xxi. 75–102 (1932)) H. G. Fourcade has published a preliminary study of species which are to be included in a list of the flowering plants found in the divisions of George, Kuyana, Humansdorp, and Uniondale, in the Cape Province of South Africa. Many of the species dealt with are described as new, but in addition the author sets out synonymy of previously
known species for which he either makes new names or combinations or restores well-established names in place of combinations proposed during recent years. In his own words (p. 75), "I have added the name changes in my list that have been rendered necessary by the international rules of botanical nomenclature. In testing the numerous new combinations that have already been made by others since the publication of the Flora Capensis, I found a number of illegitimate changes which I have taken the opportunity to rectify." The synonymy given is, however, frequently incomplete, and in some cases consideration of the full synonymy shows that the changes proposed are by no means necessary. It is extremely undesirable that non-valid names should be adopted in an important floristic list, and we therefore recapitulate, under the names which appear to be valid according to the International Rules, the relevant synonymy of some of the species dealt with. The order of the families and species follows Fourcade's paper.

MONOCOTYLEDONES.

Cyperaceae.


*Schoenus bulbosus* (non L.) Thunb. Prodr. Pl. Cap. 16 (1794); Fl. Cap. i. 356 (1811), *]


*Schoenus dispers* Spreng. Neue Entdeck. iii. 8 (1832).

*Ficinia dispers* (Spreng.) Fourcade in Trans. R. Soc. S. Afr. xxi. 76 (1932).


*Schoenus filiformis* Lam. in Tab. Encycl. & Meth., Bot. i. 135 (1791).


*Ficinia marginata* (Thunb.) Fourcade, loc. cit.

*Scirpus striatus* (Nees) Fourcade, loc. cit.

Elegitica striatus Nees in Linnaea [ix. 291 (1835), nomen nudum] x. 165 (1836).

*Scirpus capillifolius* Parl. Fl. Ital. ii. 83 (1852).

IRIDACEAE.


*MUSACEAE.


ORCHEIDACEAE.

*Pterygodiun catholica*um (L.) Sw. in K. Vetenskn. Acad. Handl. xxi. 218 ("catholica") (1800).


*Ophrys alaris* L. f. Suppl. Pl. 404 (1781).


DICOCTYLEDONES.

ANACARDIACEAE.


APOCYNACEAE.

*Carissa bispinos* (L.) Desf. [Tab. Éc. Bot. 78 (1804), nomen nudum].

*Arduina bispinos* L. Mant. Pl. 52 (1767).


*Carissa Arduina* Lam. in Encycl. Méth., Bot. i. 555 (1785).

*Carissa cordata* (Mill.) Fourcade, tom. cit. 82.

ASCLEPIADACEAE.


*Astephanus cordatus* (Thunb.) R. Br. ex Schult. in L. Syst. Veg., ed. nova, vi. 123 (1820).*


*This combination was not made by R. Brown in Mem. Werner. Nat. Hist. Soc. i. 54 (1811), as indicated by the 'Index Kewensis' (i. 1, 218 (1893)).
COMPOSITAE.

Berkheya carduoides (Less.) Hutch. apud Fourcade, tom. cit. 86 ("carduoides").

Stobaea decorrens Thunb. Prodr. Pl. Cap 141 (1794); Fl. Cap., ed. Schult. 621 (1823)—non Berkheya decorrens Wild. (1804)*.


[Oedera aliena (non O. aliena L. f.) Thunb. Prodr. Pl. Cap. 169 (1794); Fl. Cap., ed. Schult. 725 (1823).]


Peyrousea calycina (L. f.) DC. Prodr. vi. 77 (1837).

Cotula umbellata L. f. Suppl. Pl. 378 (1781).

Osmetes calycina L. f. op. cit. 380.

Peyrousea umbellata (L. f.) Fourcade, tom. cit. 87.

CUCCURBITACEAE.

Kedrostis nana (Lam.) Cogn. in A. & C. DC. Monogr. Phan. ii. 637 (1881).

* Willdenow’s combination was based on Retbria decorrens Thunb.

↑ O. aliena was not published by Thunberg as the name of a new species, for in his ‘Flora Capensis’ he attributed it to “Linn. Syst. Veg. per Gmelin p. 1279. Suppl. p. 390.” Obviously Thunberg was identifying his material with the known species O. aliena L. f. Suppl. Pl. 390 (1781), though he misspelled the epithet as alienata. O. aliena is now referred to the genus Heterolepis Cass. as H. aliena (L. f.) Druce.

THE NAMES OF SOME SOUTH AFRICAN PLANTS


Bryonia nana Lam. in Encycl. Méth., Bot. i. 497 (1785).


Contrastra Thunbergii Sond. in Harv. & Sond. Pl. Cap. ii. 484 (1842).

Kedrostis angulata Fourcade, tom. cit. 91.

PROTEACEAE.

Leucospernum ellipiticum (Thunb.) R. Br. in Trans. Linn. Soc. Lond. x. 98 (1810), saltem quad sqn. Thunb.†


Leucadendron phyllanthifolium Knight, Cult. Pl. Prot. 55 (1809).

Leucospermum attenuatum R. Br. tom. cit. 96 (1810).

Leucospermum phyllanthifolium (Knight) Fourcade, tom. cit. 97.

SAPINDACEAE.

Allophylus decipiens (Arn.) Radlk. in Engl. & Prantl, Nat. Pflanzenfam. iii. 5, 313 (“decipiens”) (1893).


Schmidelia undulata (Jacq.) C. Presl in Abhandl. K. Böhm. Gesellsch. Wissensch., Folge 5, iii. 471 (1844), pro parte.†

Schmidelia decipiens [C. Presl, loc. cit., nomem nudum] Arn. ex Sond. in Harv. & Sond. Pl. Cap. i. 239 (1859-60).§


Allophylus spicatus (Thunb.) Fourcade, tom. cit. 100—non A. spicatus Radlk. (1895).

* Bergius misidentified the Cape plant with the American S. angulata L.

† R. Brown’s combination L. ellipiticum was based on Protea elliptica Thunb., but he misapplied it to another species for which the name L. ellipiticum was retained by Phillips and Steph in Dyer, Pl. Cap. v. i. 620 (1912) and which should be called L. medium, as follows:—

Leucospermum medium R. Br. in Trans. Linn. Soc. Lond. x. 97 (1810).

Protea formae Andr. Bot. Repos. i. t. 17 (1878)—non Leucospermum formaeae Loud. (1829).

Leucospermum ellipiticum (Thunb.) R. Br. tom. cit. 98, pro parte.

§ This combination was based on Rhucia undulata Jacq. (Anacardiaceae).

See following footnote.

‡ The names S. decipiens and S. undulata were not published by Arnott in Hook. Journ. Bot. iii. 132–133 (1840), as has sometimes been supposed.
Sterculiaceae.

Hermannia lacera  Fourcroy, tom. cit. 101.

NEW VICE-COUNTY RECORDS FOR SPHAGNA,
MOSTLY NORTH COUNTRY.

By A. Thompson.

Sphagnum fimbriatum Wils. var. robustum Braithw.; ditch, Ecclesall Wood, Sheffield; v.c. 63.
S. pulchrum Warnst.; drying-up pool, Widdy Bank; v.c. 66.
S. recurvum P. de Beauv. var. robustum Breitler; moorland bog near Hazelhead; v.c. 63.
Var. majus Ångstr.; Exe Cleave; v.c. 5.
S. fallax von Klinggr. var. plumosum Warnst.; submerged in pool near Hazelhead, v.c. 63; and almost submerged in pool, Crocse Fell, v.c. 64.
Var. Roelii Schleph.; moor near Hazelhead; v.c. 63.
Var. robustum Warnst.; Ringinglow, near Sheffield; v.c. 57.
Var. Schulzii Warnst.; Slippery Stones; v.c. 63.
S. cuspidatum Ehrh. var. falcatum Russ.; peaty ground, Helvellyn, v.c. 70; and among rushes, Curbar Moor, v.c. 57.
Var. submersum Schimp., Exe Cleave, v.c. 5; and wet places among heather, Thorne Waste, v.c. 63.
Var. plumulosum Schimp.; drying up pool, Widdy Bank; v.c. 66.
S. molluscum Bruch; Exe Cleave; v.c. 5.
S. obscurum Warnst. var. plumosum Warnst.; only heads on surface, muddy pool, Lustleigh Cleave; v.c. 3.
Var. luxurians Warnst.; submerged, ditch, Tootley Moss; v.c. 57.
Var. aequinoctial Warnst.; floating, pool, Tarn Hows; v.c. 69.
Var. hemisiphylum Warnst.; submerged, pool, Coniston Old Man; v.c. 69.
Var. mastigocladium Warnst.; submerged, pool, Loughrigg; v.c. 69.

S. subsecundum Warnst. var. robustum Warnst.; all but heads submerged, pool, Scandale; v.c. 69.
S. inundatum Warnst. var. eurycladium (Warnst.) Sherrin; marshy ground near Haytor Rocks, v.c. 3; marsh, Loughrigg, v.c. 69; marsh, foot of Ben Lawers, v.c. 58; Exe Cleave, v.c. 5.
Var. lancifolium Warnst.; marsh, Tam Hows; v.c. 69.
Var. diversifolium Warnst.; almost submerged, marsh, Tarn Hows; v.c. 69.
S. auricolatum Schimp., near var. submersum Warnst.; in trickling water, near Derwent Dams; v.c. 63.
S. aquatile Warnst. var. intortum Warnst.; Exe Cleave; v.c. 5.
Var. remotum Warnst.; marsh, Lustleigh Cleave, v.c. 3; wet bank, Cupola, Hathersage, v.c. 57.
S. crassicladum Warnst. var. magnifolium Warnst.; edge of lake, Tarn Hows; v.c. 69.
Var. diversifolium Warnst.; Exe Cleave; v.c. 5.
S. papillosum Lindb. var. sublaeve Limpr.; boggy ground, Slippery Stones; v.c. 63.

My naming of these Sphagnum has been very kindly corrected by Mr. W. R. Sherrin. The plants from Exe Cleave, Somersetshire, were collected jointly by Mr. Sherrin and myself.

Vice-county numbers:—3, S. Devon; 5, S. Somerset; 57, Derbyshire; 63, S. W. Yorks; 64, Mid-West Yorks; 66, Durham; 69, Westmorland and N. Lancs; 70, Cumberland; 88, Mid-Ferth.

AN ADDITION TO THE BRECKLAND FLORA:
VERONICA PRAECOX ALL.

By A. J. Wilmott.

Specimens of this Veronica have been collected by Mr. J. E. Lousley in a fallow field near Barton Mills, associated with other species characteristic of the Breckland Flora. They were collected on April 16 this year, in the company of A. W. Gravesen, and some were sent on to me scarcely dry, as the collector was unable to identify them with any known British species.

As he then remarked, it strongly recalls V. triphyllum L. in its rather large bright blue flowers with white centre, but the leaves are less deeply divided. Other differences lie in the stiffer spicate inflorescence and the broad bracts like small foliage leaves, although the deep teeth are fewer in the upper bracts and may disappear in the upmost which are then "elliptic-oblong."

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The leaves are more deeply toothed than in *V. arvensis* L., but less deeply cut than in *V. verna* L. The lowest leaves are less deeply cut than the mid-stem leaves, which are sub-triangularly ovate with a slightly cordate base, about as broad near the base as they are long, with three to four deep teeth each side extending about or more than one-third of the way to the midrib. The teeth of the upper leaves are a little deeper. But from these two species it differs in having pedicels considerably longer than the calyx, a shallowly emarginate capsule with only a right-angled sinus, a longish style (reddish) about one-third the length of the capsule and projecting far above its top. These are all characters recalling *V. triphylos*, to which it is most closely allied. According to Rouy (Fl. Fr. xi. 48 & 51, 1908) these two species have the seeds (which are not yet ripe in the specimens sent) "pelviform (convex on the dorsal face and cupuliform on the other face)," and not "flat on one face or biconvex" as in *V. arvensis* and *V. verna*.

For the rest, the plant is erect, either unbranched or with rather divergent ascending branches. Pubescence on the stem of crisped sub-appressed hairs with some longer patent (arrect) pilae, with a few long glandular hairs increasing in number above. Leaves beneath mostly deep red, with numerous longish hairs, fewer above, margin ciliate, calyx similar but with numerous glands. Pedicels longer than the calyx and about equalling the bracts. Sepals slightly unequal, about as long as the capsule and a little shorter than the corolla. Capsule slightly longer than broad, somewhat inflated with numerous glandular short hairs.

It is astonishing that an additional species of *Veronica* should now be discovered in an area so thoroughly examined by generations of botanists searching for *V. verna* and *V. triphylos*, both of which species often demand considerable hunting before they are found. Can it be a recent immigrant? On the other hand, how could it arrive?

Its geographical distribution affords no reason for doubting its being indigenous here, for it occurs "in the whole of France (rare in the Mediterranean region)," Belgium, Holland, Germany (especially west and south), Austria, Hungary, Transylvania, Rumania, and southern Russia, and extends in the south to Spain, Sicily (mountains), and Greece. It occurs in the Rhine Valley, and could therefore be included as one of the Breckland species supposed by some to be relics from the time when the northern reaches of the Rhine flowed over part of East Anglia. Before we can judge properly we must await further knowledge of its British distribution.

*Note.*—I hear from Mr. Lousley that it has been found in a second station about two miles from the first by Mrs. Sandwith and others, with characteristic Breckland species including *V. triphylos*—A. J. W.
Professor E. J. Salisbury in a recent Presidential Address to the Norfolk and Norwich Naturalists puts the view as follows:—

"... the occurrence of a species in a particular part of England, and not in another, may be an accident of dispersal rather than an indication of especial fitness for the area in occupation. Furthermore, the absence of one species may be of equal significance to the presence of another, provided we can be sure that for both species there have been equal opportunities for invasion and establishment. Information of this character can for most plants, however, be acquired only by the deliberate introduction of wild species beyond their existing range. The strong objection which some students of geographical distribution have to such introductions, whilst it may have some sentimental justification, cannot be defended on scientific grounds, though it is of course essential that such introductions should be properly recorded.

"Experimentation of this character can alone afford us definite data as to the capacity of species to exist beyond their present limits, and may also yield information as to whether the limiting factors are climatic, edaphic, or biotic."

On the other hand many botanists are entirely opposed to this view. Once such an "experiment" has been made, conditions have been altered, and as these are in no way under control, the attempt to find out what is the result so far as the introduced species is concerned may have disastrous effects on other species which may be rare and specialised, thus interfering unduly with the scientific study of geographical distribution. Comparison may be made with the boy who takes his first watch to pieces to see how it works. A further objection is that there is no logical reason on this line of argument against introducing alien plants which on some hypothesis or other might have been expected to occur in this country, or which we know from geological evidence did occur. If there is no logical limit to the kind of introduction nor to the area, we may have "experiments" with results analogous to those obtained by early settlers overseas. An analogous problem is that of the re-introduction of a species in a habitat from which it has disappeared. The Plant Conservation Board (which includes representatives of all the principal institutions and societies interested in the British Flora) considered the matter at a meeting in December last and passed the following resolution: "The Board see no scientific objection whatever to re-establishments, in the same or similar habitat, provided they are placed on record," it being understood that where possible the stock should be the same as, or similar to, the original stock.

It was decided that the records should be sent to the Department of Botany, British Museum, with the hope that they will be noted in this Journal.

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**Notes from the British Museum Herbarium.**


This species is nearest to *C. insulare* Engl. & Diels, from Fernando Po, which it resembles in having unusually thin leaves (for the genus) at the time of flowering. In *C. insulare*, however, the lower receptacle differs in being black and viscid in the dried specimens and the flowers are only half the size of those in the new species. —A. W. E.

*Combretum Luxenii* Exell, sp. nov. *Frutex scandens*, ramulis primo glandulosose-hispidulil demum glabrescentibus. *Folia* opposita petiolata, petiolo supra sulcatum, 2–2.5 cm. longo, glandulosose-hispidul, lamina elliptica vel late elliptica, ad 16 × 8 cm., basi acuta vel obtusa, supra fere glabra subtus ad nervos glandulosose-hispidul, costis lateralis utrinque 6–8 subtus prominul. *Flores* tetramerii rubri breviter pedicellati, pedicello 1–1.5 mm. longo, in paniculas axillares vel terminales dispositi. *Bracteae* lancelolatae glandulosose-hispidul, 5–7 mm. longae, max deciduae. *Receptaculum* inferius fusiforme, 5 mm. longum, albo-sericeum et glandulosose-hispidul, superius infundibuliforme basi versus subglobose infra medium paullo constrictum, ad 10 × 5 mm., dense vel subdense glandulosose-hispidul. *Lobi calycis* filiformes vel anguste triangulares,
ad 5 mm. longi. Discus campanulatus, 2 x 2.5 mm., margine pilosus ceteroque glabrum. Petala ovata vel latae oblongo-elliptica rubra, 0.6 x 2.2 mm., glabra. Stamina biserialia breviter exserta, antheris rubris, filamentis 3-9 mm. longis. Stylos filiformis longe exsertum, 22 mm. longus, glaber. [Fructus ignotus.]


This species is best placed in Sect. Conviventes Eng. & Diels, though it has also an evident relationship with certain species in Sect. Grandiflorae Eng. & Diels, the species of which are pentamerous. It can be distinguished from all other species in Sect. Conviventes by the much larger flowers, though resembling C. Hauvelleianum De Wild. in its glandular indumentum and C. Leocardii Eng. & Diels in the swollen base of the upper receptacle. As regards species in Sect. Grandiflorae, from all of which it can be separated by the tetramerous flowers, it resembles C. grandiflorum G. Don in general appearance, though the latter has much larger petals; its indumentum closely resembles that of C. hispidum Law.; while its elongated calyx-lobes are reminiscent of C. dolichopetalum Eng. & Diels. The genus Combretum cannot readily be divided into clear-cut sections and it is evident that C. Luzcenii could be equally well regarded as an exceptionally large-flowered member of Sect. Conviventes or as an aberrant tetramerous member of Sect. Grandiflorae.—A. W. E.

Anisopappus abercornensis G. Tayl., sp. nov. (Compositae). Herba annua, erecta, ramosa, altitudinis usque ad c. 34 cm. attingens, fere omnino puberula. Folia alterna, manifeste graciliterque petiolata (petiolo usque ad c. 1.2 cm. longo); lamina bipinnatifida (segmentis plus minusve linearibus apice obtusis), ambitu triangulata, usque ad c. 2 cm. longa et basi 2 cm. late, utrinque pelliculo-glandulosa. Capitula ramulos axillares terminantis, longe graciliterque pedunculata (pedunculo usque ad c. 0.6 cm. longo). Involucrum late cupuliforme. Receptaculi paleo concavo, ambitu oblongo-late-dentato, base marginalis tergato. Disci floresculi c. 3-5 mm. longi, aliquot dividuntur. Antherae basi manifestae caudiculatae, stili rami complanati, apice obtusi. Acheniorum pappus in aristis 4-5 et squamis oblongis quadratis longis, tenuibus undumatis constructus.

Hab. NORTHERN RHODESIA. Tanganjika Distr.: Abercorn, under big trees on sandy soil over rocks, at an altitude of about 1500 m., April 1932, Miss A. H. Gamewell 38 a (type in Herb. Brit. Mus.).

In referring this species to Anisopappus I have accepted the opinion expressed by Humbert (Mém. Soc. Linn. Normand. xxv. 248 et seq. 1923) that the genera Anisopappus Hook. & Arn. Epallage DC., Spachophyllum Benth., Astephania Oliv., and Temnolepis Bak. should be regarded as conspecific. It appears, however, that the aggregate genus thus constituted should bear the name Anisopappus Hook. & Arn. (Bot. Beech. Voy. 196 (1836) *) and not Epallage DC. (Prodr. vi. 3 (1837)), the name adopted by Humbert. In this account of the Composites of Madagascar Humbert has noted that in the genus Epallage, among the Tropical African and Madagascar species, "il est possible d'établir une double série parallèle d'espèces homologues dans les deux contrées," and this statement is further borne out by the new species A. abercornensis. The only apparent difference between it and its Madagascar "homologue," A. anemonifolius (DC.) G. Tayl. †, is in the size of the capitula, which are very much smaller in the Tropical African species. A. Rogersii G. Tayl. ‡, the other species from Rhodesia, differs from A. abercornensis in having many more heads and leaves which are ovate with lobed or toothed margins.—G. T.

Crossandra sulphurea G. Tayl., sp. nov. (Acanthaceae). Herba perennis, ex rhizome subterraneo lignoso horizontali ramos erectos scapis flexuosis floriferis emittens, nonusquam indumento cernue vestita; rami floriferi dense seriati, usque ad c. 7-5 cm. longi (in florescentia terminales majoribus) est. Folia et ramorum bases corticata; petiolum usque minusve oblongo-latel, usque ad c. 17 cm. longum, statice, utrinque hispidula. Flores in spicas sacciformes confertae. Bracteæ infima aliquot steriles inter se distantes, relicta fertilia dense imbricatae; steriles imbricate conicati, ambitu lanceolati, c. 1.7 cm. longe et 0.5 cm. late, extus dense sericei, intus saltem ad basim apicemque villosæ; steriles superæ 3-fide, c. 2 cm. longæ et 1.2 cm. late, villosæ, lobis lanceolatis subquadratibus apice breviter spinosecentibus c. 0.1 cm. longis et basi 0.3 cm. latis; fertiles 5-fide, c. 2.2 cm. longæ et parte latissima 2.3 cm. late, utrinque villosæ, lobis 3 medianis lanceolatis subquadratibus apice breviter spinosecentibus c. 1.5 cm. longis et 0.4 cm. latis, lobis 2 lateralis anguste lanceolatibus usque ad c. 1 cm. longis et basi fere 0.2 cm. lati. Bracteæ lineares, c. 1.7 cm. longe et 0.1 cm. late, præservertim in margine costaque dense villosæ. Calyces segmenta lanceolata, apice pubescentia, marginis dense villosa, posticum bifidum c. 1.5 cm. longum et 0.3 cm. latum, antica c. 0.5 cm. longa et 0.2 cm. lata, * This date is given by B. D. Jackson in Journ. Bot. xxxi. 298 (1893). † Anisopappus anemonifolius (DC.) G. Tayl., comb. nov. Epallage anemonifoliae DC. (Prodr. vi. 4 (1837)). ‡ Anisopappus Rogersii G. Tayl., nom. nov. Epallage africana S. Moore in Journ. Bot. lv. 123 (1917)—non A. africana Oliv. & Hern.
Hab. NORTHERN RHODESIA. Tanganika Distr.: Abercorn, bushy plant about 1 m. in height with pink or purple flowers, on river bank at an altitude of about 1000 m., April 1932, Miss A. H. Gamewell 113 (type in Herb. Brit. Mus.).

*T. caudata* is closely related to *T. apiculata* Robyns & Loban, a species occurring in the same area, from which it differs principally in the possession of very much longer caudiform appendages to the leaves and bracts. The bracts of *T. caudata* are also larger and their pubescence is much less dense than in *T. apiculata.*—G. T.

**ABSTRACTS OF PAPERS OF INTEREST TO STUDENTS OF THE BRITISH FLORA.**

**TAXONOMIC REMARKS ON JUNCUS ALPINUS Villars AND SOME RELATED SPECIES.**—Dr. Bertil Lindquist (Botaniska Notsiser, 1932, Häfte 5, pp. 313 sq., and Report Bot. Soc. & Exch. Club, B.I. 1932, pp. 769 sq.) discusses at length *Juncus anceps* Laharpe, *J. atricapillus* Drejer, *J. alpinus* Villars, *J. fuso-ater* Schreber, *J. nodulosus* Wahlenberg, *J. Marshallii* Pugsley, and *J. alpestris* Hartman. The first two he groups together as a species, *J. anceps*, distinguished from the remainder chiefly by its larger anthers. The succeeding plants are treated as five distinct types, which are placed as varieties under *J. alpinus*. It is these latter plants that are most interesting to British botanists.

The treatment of these forms as five types seems to accord with their natural affinities, but the reduction of all of them to the rank of varieties of *J. alpinus* Vill. may well be questioned. *J. fuso-ater* is closely allied to *J. alpinus*, and has frequently been placed under it as a variety, but *J. nodulosus*, to which *J. Marshallii* and probably *J. alpestris* are related, is very much more distinct and has an entirely different geographical distribution. Dr. Lindquist does not appear familiar with the *J. alpinus* of the Alps, where it is a common and relatively uniform species, always with very dark inflorescence and capsules. Lindman, in the last edition of his flora, excluded this plant from the Swedish list, and no Scandinavian specimens have been seen in any British herbarium. Dr. Lindquist remarks that hybrids of *J. nodulosus* and *J. fuso-ater*, morphologically inseparable from *J. alpinus*, occur in Sweden, and, being so, it seems desirable closely to scrutinise any plants of this kind before admitting their identity with Villars's species. Two Scandinavian gatherings, cited by Dr. Lindquist under *J. alpinus*, that have lately been examined, are clearly different from the alpine plant, and have the aspect of the above-mentioned hybrid; and while the Widbybank specimen is correctly figured by him as *J. alpinus*, the Stockholm plant depicted certainly looks like a different form.
The peculiar character of irregularly pedicelled flowers distinguishes *J. nodulosus* Wahlb. from *J. alpinus* so obviously that it is difficult to understand why the two plants were ever associated; and, indeed, the reduction of *J. alpinus* to a variety of *J. lampocarpus* Ehrh. might seem more natural. The difference in the geographical distribution of the two plants is also of importance; *J. nodulosus* is a sub-arctic plant, which is nearly circumpolar, and is apparently unknown in Central Europe; *J. alpinus* is a characteristic species of the Alps, and, like a few other alpines of Central Europe, occurs very rarely in Great Britain.

*J. Marshallii* Pugs. is shown by its inflorescence to be related to *J. nodulosus*, and Dr. Lindquist identifies it with forms from Northern Scandinavia (mainly Norway) and from Iceland, although it could not be matched at Oslo. This identification is confirmed by an unmistakable Norwegian example (J. Groves, Kundshoe, Dovrefjeld, 1888) now in Herb. Mus. Brit., and apparently also by his figure of an Iceland plant, which, so far as can be seen, differs from the Loch Ussie type only by its rather larger flowers. In this respect it approaches Fernald’s Newfoundland plant (no. 27780) referred to *J. Marshallii*, but this Dr. Lindquist identifies with *J. nodulosus*. The occurrence of *J. Marshallii* in Scandinavia and in Iceland is of interest as tending to connect its Scottish and Newfoundland stations. Buchanan-White’s Blair Athol plant, which Dr. Lindquist identifies, albeit with some doubt, with *J. nodulosus*, still appears to me to be a weak form of *J. Marshallii* with a condensed inflorescence.

*J. alpestris* Hartm., the most northerly plant of the group, is considered by Dr. Lindquist to be less characteristic than the other types, and in some degree it seems to be a reduced form intermediate between *J. nodulosus* and *J. lampocarpus*.

It is not unlikely that *J. nodulosus* and even *J. alpestris* may yet be found in Scotland, for hitherto British botanists have had very few ideas on the group, and both plants may have easily been passed over.

Dr. Lindquist has apparently overlooked the paper in Journ. Bot. 1930, pp. 368–370, which is the earliest notice of *J. alpinus* in Teesdale, and its first authentic record for England.—H. W. P.

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**SHORT NOTES**

**May-Lily in Ken Wood.**—The occurrence of the May-Lily (*Maianthemum bifolium*) in Ken Wood has been well known for over 150 years (see 'Flora of Middlesex,' p. 177). When the wood was opened to the public one of the footpaths made unfortunately ran over the site of the plant, which disappeared. This, I believe, has been known to many London botanists, and in October 1932 Mr. H. T. White of Hendon suggested to the Director of the Royal Botanic Gardens, Kew, that it should be replanted near its original site.

The matter was discussed by the Wild Plant Conservation Board which agreed to sponsor the re-introduction and to leave the procuring and planting of the stock in the hands of Kew. Permission for the re-introduction was obtained from the London County Council, thanks to the kind offices of Sir William Lawrence, Bart. Mr. F. W. Parker, Second Officer of the Parks Department, took a personal interest in the matter, specially visiting Ken Wood for the purpose of choosing suitable sites in areas to which the public has not access.

It was considered desirable to obtain a stock of the plant from a British source, if possible, and, after several enquiries, Mr. Clarence Elliott, of Stevenage, very kindly presented Kew with a number of rhizomes which had been taken from the Scarborough locality and planted in a Yorkshire garden. On Tuesday, February 14, Mr. F. W. Parker and myself planted these rhizomes in two carefully chosen sites in Ken Wood, one near the old locality and one at the opposite end of the park. It will be interesting to see whether this attractive woodland plant will re-establish itself and increase its area now that the factor of human interference has, as far as possible, been removed.—J. S. L. Gilmore.

**Australian Acacias in Ceylon.**—In the *Journal of Botany*, 1932, pp. 256–258, Mr. T. Petch, made some very interesting comments in regard to the flowering of Australian Acacias in Ceylon; in this connection it is perhaps worth observing that about twelve or fourteen years ago the following species were planted on a fairly large plantation scale by the Ceylon Forestry Department:—

1. *Acacia melanoxylon*:
   - At Pattipola and Kandapola (6000–6300 ft.).
2. *A. dealbata*:
   - At Bandarawela (4000 ft.) and Ohiya (5500 ft.).
3. *A. pycnantha* at Pattipola:
4. *A. longifolia* was also introduced at Pattipola, Ohiya, and Haputale (4000 ft.) as an ornamental tree.

These stations receive their rain at different times of the year, thus: Pattipola is a South-West Monsoon station (Spring and Summer Rains); Bandarawela, Haputale, and Ohiya are North-East Monsoon stations (Arun and Winter Rains); while Kandapola receives a limited quantity of both North-East and South-West rains.

It would be interesting to know whether these plantation-grown Acacias have altered their seasonal flowering, etc., both as
compared with Australia and as between North-East and South-West Monsoon stations in Ceylon.

There used to be, and may be still, a small (10 acres) plantation of old (30–55 years old in 1920) *Acacia melanoxylon* between Kandapola and Iron Bridge (about three miles east of Nuwara Eliya); these trees fruited regularly though not in great quantity during the years 1919–1921, and I believe did so in most years; the seed was collected in October or November.—J. R. AINSLIE, B.Sc.

REVIEW.


By translating Dr. Braun-Blanquet's 'Pflanzensoziologie' Messrs. Fuller and Conard have rendered useful service to English-speaking ecologists and students of plant geography. The author, who is director of the Geobotanical Institute of Montpellier, has had a wide experience of plants in the field, in the study of which he has been actively engaged for thirty years or more, especially in Switzerland, France, and Germany, and has written extensively on the study of plant communities.

The study of plant sociology is still young; many debatable points arise in consequence, and many of the conclusions need to be tested by further research and experience. The growth of this study, which has enlisted many workers both in Europe and America, has been rapid, and already a vast literature has grown up dealing with the many aspects of the subject. Dr. Braun-Blanquet has hazarded the task of testing and arranging this material with the view of putting the subject on a firm basis as a new branch of science. The result is a comprehensive survey of the scope, aims, and limits of plant sociology, and a handbook which will be helpful to those studying vegetation.

The author's view is that every plant community is a social unit. Every natural aggregation of plants is the product of definite conditions, past and present, and can exist only when these conditions are fulfilled. The definite objective of plant sociology is to catalogue and describe the plant communities of the earth, to discover their causal explanation, to study their development and geographic distribution, and to arrange them according to a natural classification.

The subject is divided into six sections: the basis of social life among plants; the organisation of plant communities; synecology or community economics; syngenetics; synchorology; and, finally, systematics of phytosociology.

It is obvious that in any attempt to cover so wide a field and deal with so vast a literature, much condensation is necessary, and only a selection of the available material can be made, but the author has endeavoured to indicate the more important results of workers in Europe and America. In the present volume, however, the translators have taken the opportunity, with the approval of the author, of producing a revised and enlarged edition, and included further results of American investigators. There are many helpful diagrams, charts, transects, and quadrats illustrating methods and results of study in the field, and the 180 illustrations include many excellent vegetation photographs.

The work serves well to show the extent and variety of investigations into ecological problems, and the rapid progress that has been made in recent years. It is clear, however, that some of the methods and deductions will need modification as a result of wider application and experience before satisfactory conclusions can be drawn. The author has developed an elaborate system of classification of plant communities, and, as an example of the practical applications of the principles he has laid down, concludes with a table of the communities of Higher plants of Bas Languedoc, classified on the basis of their sociological progression.—T. W. Woodhead.


The two instalments of Schiller's *Dinoflagellata* under review, which complete the first part of the treatment of this group, are devoted to the naked forms (Gymnodiniinae). These are classified, largely in correspondence with Lindemann's treatment in the 'Natürliche Pflanzenfamilien,' into the families Pronocticuliceae, Gymnodiniaceae, Polykrikaceae, Noctiluceae, Warniaceae, and Blastodiniaceae. The last of these is, however, not included in the present volume and is apparently to be dealt with at a later stage, although the reason for its separation from the others is not altogether apparent. As in the first instalment of this volume, the general treatment and the plentiful and clear illustrations leave nothing to be desired. It is, however, unfortunate that the author did not see his way to give keys to the species of such large genera as *Amphidinium*, *Gymnodinium*, and *Cochlodinium*, which for the most part are not even divided into sections. This will materially lessen the value of the work to those attempting to use it. Unfortunately, too, although the third instalment completes a volume and is provided with an index, there is no enumeration of literature, and one will
presumably have to wait until the second volume is complete before the numerous references briefly cited under the various species can be consulted in full.

Schiller follows Pascher in dividing the Dinoflagellata into Desmokontae and Dinokontae. In my opinion, however, the latter name would be by far the most suitable designation for the whole group, with Desmokontae and Dinokontae as subdivisions. Much of the matter in these instalsments is based on the large monograph of the naked Dinoflagellates by Kofvid and Sweeney, and many of the illustrations come from the same source.—F. E. Pringsheim.


The second edition of this handy little reference-book combines the matter of the original edition of 1927 and the Supplement of 1928. These were noticed in this Journal for 1928, p. 311.

The book is of special use to nurserymen and other growers of plants who wish to call their plants by their generally accepted names; and it should serve to lessen the confusion prevalent in horticulture from a lack of appreciation of synonymy. Since the appearance of the first edition, horticulturists in Congress at Vienna, London, and Paris have made concerted efforts to remedy this confusion and to bring horticultural nomenclature into line with botanical. Dr. Zander has been much interested in these efforts, and his 'Handwörterbuch' will be of service to those interested in the attainment of a uniform system of nomenclature.


The late J. S. Gamble's 'Manual of Indian Timbers,' for many years the standard authority on the subject, was last revised in 1902. The need of a more up-to-date reference-book embodying information on the distribution and available supplies of Indian Timbers, their technical properties and uses, led to the inception of the present work in 1924. At that time, Mr. Pearson was in charge of the Economic Branch of the Forest Research Institute at Dehra Dun, Dr. Brown being temporarily attached to the Institute for the purpose of investigating the anatomical structure of the more important Indian timbers. Mr. Pearson's part of the project has been to bring together the results of technical investigations carried out at Dehra Dun and elsewhere, a task which his unique knowledge and experience rendered him exceptionally well fitted to undertake, while Dr. Brown is responsible for the detailed descriptions of the wood structure and the excellent photomicrographs which accompany them. The species to be dealt with were selected from a careful consideration of their importance in India, regard being paid both to the quality of the timber and to the supplies available. It is of interest to note that there exist in the forests of India some 2500 species of trees and an approximately equal number of woody shrubs. The proportion of commercially important timbers in tropical forests is indicated by the number of species included in the present work, namely 320. Of nearly one half of this number it is stated that considerable quantities are available for which there is at present little or no demand.

The subject-matter is arranged in botanical sequence following Bentham and Hooker's classification and preceding each family is a brief account of its chief botanical characteristics, including the anatomical features of the woods. The introduction includes a good account of the forests of India, and discusses the effect of topographic and climatic conditions and geological formation on their area and distribution. The information on the uses and qualities of the various timbers has been restricted to such facts as have a direct bearing on their present or prospective uses, and should go far towards fulfilling the object of the book, which is to encourage the use of many Indian timbers of unquestionable beauty and merit. Apart from the utilitarian aspects of the subject, the book will be found of value as a work of reference for students of economic botany and plant anatomy.—B. J. Rendle.

**BOOK-NOTES, NEWS, ETC.**

LINNEAN SOCIETY OF LONDON.—At the meeting on April 6 a paper by Mrs. M. R. Levys on "A Revision of Lobostemon," a South African genus closely allied to Echium, was read. Twenty-eight species are recognized, several of the previously so-called species having proved to be hybrids or habitat forms.

Prof. W. H. Longley followed with a lecture on "Evolution in the Light of Incidental Records of Taxonomy." The records specified are dates when currently accepted species of organisms were named, those when specimens of each were first collected, and what is set down anywhere according to their range: the number of species in each genus is also included.

Dr. E. S. Semmens then described the hydrolysis of starch by the action of polarized light.

On April 27 Professor E. B. Poulton analysed a manuscript by Searles Valentine Wood, Junr., written shortly before the publication of the 'Origin of Species,' which brought forward several convincing arguments in favour of organic evolution.
Dr. E. J. Collins and Mr. K. Mather gave an account of the genus *Crocus* and its cytology. The complex evolution of the various chromosome complements explains the unsatisfactory taxonomy of the genus.

Mr. E. M. Marsden-Jones described the pollination of *Ranunculus Ficaria* and the differences between bulbil- and non-bulbil-producing plants.

On May 11 Sir Daniel Hall gave an account of the scarlet tulip of the near East, *Tulipa oculus-solis*.

Miss E. R. Saunders summarised her study on *Veronica* from the view-point of certain floral characters.

Dr. Elmer Drew Merrill, Director of the New York Botanic Garden, Dr. Erwin Bauer, Director of the Kaiser Wilhelm Institute of Plant breeding, Münchberg-i.-Mark, and Prof. Adolf Pascher, German University, Prague, were elected Foreign Members.

At the Anniversary Meeting on May 24, the President, Prof. F. E. Weiss, F.R.S., presented the Linnean Gold Medal to Prof. Robert Chodat, F.M.L.S., of the University of Geneva. The President referred to Prof. Chodat’s versatility, as illustrated by his taxonomic work on the Polygalaceae, his ecological study of the vegetation of Paraguay and of the Iberian peninsula, his elaboration of methods of obtaining pure cultures of Algae and his book on the polymorphism of the group, his studies of the organism of fermentation and of the Paleozoic Pteropoda, and his admirable ‘Principes de Botanique’. Unfortunately, owing to ill-health, Prof. Chodat was unable to be present, and the Medal was received by the Swiss Minister, who thanked the Society on his behalf.

The President then gave his Address on ‘Variegated Foliage,’ which was illustrated by a series of lantern-slides.

Professor Weiss, Mr. Francis Duce, and Mr. John Ramsbottom were re-elected respectively President, Treasurer, and Botanical Secretary; and Mr. H. A. Hyde, Dr. Margery Knight, and the Hon. Henry D. McLaren replaced Prof. T. G. Hill, Mr. G. W. E. Loder, and Prof. J. R. Matthews on the Council.

After the meeting a number of the Fellows and their friends dined together at the Trocadéro Restaurant.

In the ‘Irish Book Lover’ for March–April 1933 (xxi. 37–40), Mr. J. Ardagh has written a supplement to N. Colgan’s ‘The Shamrock in Literature’ noticed in this Journal in 1897 (p. 159).

ROYAL SOCIETY.—Friedrich August Ferdinand Christian Went, Professor of Botany in the University of Utrecht and Director of the Botanic Garden, has been elected a Foreign Member.

The Editor returns thanks to Mr. Ramsbottom for kind assistance in producing the numbers of the Journal during his own absence abroad.

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JOHN GERARD KOENIG.

BY A. B. RENDLE.

(Continued from p. 158.)

There is no record of the number of specimens contained in Koenig’s herbarium at the time of its passing into Banks’s possession. The number must run into thousands. In a letter to Patrick Russell, Dec. 4, 1783, he writes:—“My Flora Orixensis runs up to 1000 species; I have got several new genera and species in the botanical way.” Descriptions of these are found in vol. 1 of the MSS., “Plantae Orixensens descriptae, 1784” (pp. 208–251). The specimens are now incorporated with the general collection in the British Museum Herbarium.

The plants were sometimes mounted on thin foil sheets, but more often on larger stiff sheets similar to those in use in Banks’s herbarium—a standard of size still followed in the British Museum Herbarium. The sheets are labelled on the back in the top left-hand corner “Ind. Orient. Koenig” (or similarly), generally by Dryander, who succeeded Solander as librarian to Banks in 1782. In many cases species-name with a diagnosis and note of locality was written on Koenig by the back of the sheet (see Plate 601).

As already mentioned, Koenig sent plants from time to time to various European botanists during his life. Notes and lists of these are intercalated among his manuscripts. Thus in vol. 13, p. 243, a note “Enumeratio & descriptiones Plantarum, Seminum, Lapidarum cum nonnullis ex regno animali transmissa ad europaeum annis 1776 & 77” is followed by a number of lists with descriptive notes. One of these lists (p. 257) of 100 specimens, dated 1776, seems to be the origin of a list of species in Herb. Mus. Brit. in Solander’s writing headed “Koenig 1776.” The corresponding herbarium sheets are noted in Solander’s hand “India orientalis : Coromandel J. G. Koenig, 1776.”

Koenig also sent many specimens to the elder and younger Linnaeus, descriptions of which are published respectively in the ‘Mantissa,’ pt. ii. (1771), and the ‘Supplementum,’ 1781. The specimens are in the Linnean Herbarium. A numbered list, with descriptions, of the specimens sent from India by Koenig to the elder Linnaeus and described in the ‘Mantissa’ has recently been found by Mr. Savage among Sir James Edward Smith’s effects at the Linnean Society. The specimens in the Linnean Herbarium are indicated by corresponding numbers which thus serve to connect them with Koenig.

The failure of Banks to publish accounts of the rich collections in his herbarium is well known. The careful descriptions drawn up by Solander and his successor Dryander, two experienced...
and industrious botanists, trained by Linnaeus, are preserved in the British Museum Herbarium. If the rich harvest gathered by Banks and Solander in their World voyage with Captain Cook remained unpublished, it is not a matter for surprise that Koenig's extensive Indian collections suffered in the same way. Koenig had, however, sent many specimens to Retzius at Lund, and descriptions of these appeared in Retzius's 'Observationes' (1779–1791).

In a recent number of the 'Kew Bulletin' (1932, no. 2), Dr. C. E. Fischer has recorded the results of his examination of 346 specimens attributed to Koenig in the Lund herbarium, and has correlated these with the descriptions of Koenig's plants published by Retzius. I have not seen any of the Lund specimens, but from Dr. Fischer's remarks the association with Koenig is less intimate than is afforded by the evidently much fuller and frequently annotated material in the British Museum Herbarium. For instance, of Holmskioldia sanguinea Retz. Dr. Fischer states (p. 64) that the specimen in the Lund herbarium, written up 'Holmskioldia,' is 'presumably the type of the description in Retz. Obs. vi. 31, but there is nothing to connect it with Koenig.' In Herb. Banks there are two sheets from Koenig. The first bears on the back, in the usual left-hand corner, the indication (in Dryander's hand) 'Bengal, culta, König,' and is written up 'H. sanguinea Retz.' On the back of the sheet is a long description, in the same clerical hand that transcribed Koenig's letter to Banks, diagnosing the plant as a new genus, and stating that it was brought from the valleys of the highest mountain peaks of Bounta cura propra of the Governor-General of Bengal, Warren Hastings, and is now flourishing spontaneously in his garden. The following is the text of the garden:


Koenig gives a very full description of the plant in the MSS. vol. 19, pp. 73–77, under the heading 'Hast. augustiss, gloriosa.' Above the description Dryander has written 'Holmskioldia sanguinea Retz. obs. 6, p. 31.' A second sheet in Herb. Banks, bearing the note 'Bengal, Koenig. 1785,' is written up by Dryander 'Hastingia augustiss (Mscr.) Holmskioldia sanguinea.'

The name was subsequently published by J. E. Smith in Rees' 'Encyclopaedia' (1819) as Hasteninga, 'so named by the late John Gerard Koenig in honour of his patron, the celebrated governor Warren Hastings.' 'The design proved abortive,' the genus 'being published by Retzius under the uncouth name Holmskioldia.'

At the end of his communication Dr. Fischer gives a list of thirty-three species mentioned by Retzius, but not found in the collection from Lund. I thought it might be useful to see how far these were represented at the Museum, and the following notes are the result. It is not the same time on the information that may be gathered from the specimens and manuscripts. The notes are numbered to correspond with the numbers in Dr. Fischer's list of omissions.


Retzius states that Koenig has sent him a specimen named Menispernum 'hisutum,' which agrees excellently with Pluknet's figure, 'Mantissa,' 345. This figure was referred to Linnaeus (Sp. Pl. ed. 2, 1468) to M. Coccus. Retzius cannot understand how Koenig could have been ignorant of a plant so common in India, and suggests that there is some confusion, adding: 'Dubitat aecolae autoptae.'

There are two good sheets of specimens in Herb. Banks from Koenig, one of which bears the note in Koenig's hand:

'Menispernum hisutum. Folias lanceolato-ovatis villosas a Linne Spec. pl. pag. 1469 [sic] [Ed. 2]; habitat in nemorosis inter frutesces scandens. Planta medicinals per totam indiam presentem in morbis infantum.'

The specimens represent, as Koenig indicates, M. hisutum L., now known as Cocculus hisutus Diels (C. villosus DC.). Pluknet's figure, t. 345, fig. 7 (not fig. 2 as erroneously cited by Linnaeus) was not quoted under M. Cocculus in Spec. Pl. ed. 1. It represents a different species, Pachygone ovata Miers: there is a specimen in Herb. Pluknet in Herb. Sloane. Menispernum Cocculus L., now known as Anamirta Cocculus Wight & Arn., is distinct from both the above.

It is of interest to note that in his MSS., vol. 18, pp. 94–96, Koenig gives a full description of the species headed:—'Observ. in Menispermo hisutus [sic] myosotide' with the locality 'habitat ad latera pedesque & summittatis montium Waendefrahemium frequens.' I find no specimen with this note in the herbarium.

M. hisutum and M. myosotides were both described by Linnaeus from Pluknet's figures; corresponding specimens exist in Pluknet's herbarium in Herb. Sloane, and both represent the same species, Cocculus hisutus Diels.

C. C. horrida Linn. f. is a nomen dubium. It was described by the younger Linné (Suppl. 264, 1791), a specimen from Ceylon from Koenig. There is, however, no specimen of it in the herbaria at the Linnean Society. In Herb. Banks a specimen from Koenig is written Capparis horrida Koenig, and bears the following note in Koenig's hand:


This specimen is of the type of C. stylosa DC. Prodr. 1. 246 (1824) characterised by patent stipular thorns, narrow leaves, and solitary axillary flowers. It comes, as De Candolle states, from Coromandel, not Ceylon. On the same sheet, in Herb. Banks, is the specimen from Mysore, Buchanan, on which de Candolle founded his var. ß velutina. There is no specimen of Koenig's from Ceylon in Herb. Banks. What was the specimen sent to the younger Linné on which he founded his C. horrida?

The leaves of C. horrida Linn. f. are described as "ovate-lanceolate" and the peduncles as "binate." S. T. Dunn in Kew Bull. 1916, 62, suggests that the younger Linné was re-describing C. zeylanica Linn. (Sp. Pl. ed. 2, 720, 1763), the type of which was in Hermann's herbarium, and, therefore, presumably unknown to him. But C. zeylanica is a climbing shrub, while C. horrida is "arbor rigida." Nor does "ovate-lanceolate" suggest the leaves of C. zeylanica. De Candolle (Prodr. i. 246) regarded C. horrida Linn. f. as distinct, with ovate leaves and 2-4 supra-axillary pedicels. He cites "Coromandel and Ceylon in Herb. Banks," but there is no evidence as to what specimens he saw. If the plant sent by Koenig from Ceylon to Linne was conspecific with the one named C. horrida from Coromandel in his own herbarium, then C. horrida is an earlier name for de Candolle's C. stylosa. In view, however, of possible differences of opinion as to the identity of C. horrida and the absence of any definite type, it would seem best to reject it as a nomen dubium. A specimen from Wight in Herb. Mus. Brit. represents C. stylosa DC.; this is figured as "C. divaricata Lam." in Wight, Icon. 899. Lamarck knew neither flowers nor fruit of his species (Encyc. Meth. i. 606, 1785), but de Candolle, who saw the plant in Herb. Jussieu, put it among his doubtful species; (Prodr. 252); it has hooked not the patent stipular thorns characteristic of C. stylosa DC.

3. Mangifera pinnata Linn. f., Retz. Obs. v. 4. (See above, p. 151.)


6. Diospyros ebenaster Retz. Obs. v. 31, presumably a synonym of the following species.

7. Diospyros ebenum Koenig (1778), Retz. i. c.

A specimen in Herb. Banks, "Coromandel J. C. Koenig," bears no writing of Koenig's, but is written by up Banks Diospyros Ebenum. There are several descriptions of this species in the MSS. under Melanosyzon and Ebenum; in vol. 10, pp. 119-122, is a very full description of Diospyros Ebenum, to which Dryander adds the note "Published in Physiographica Saléskapets Handlingar,' Del. 1, St. 3, pag. 177-180."


The specimen is Symplocos spicata Roxb.

In the MSS. 17, 'Descriptiones Plantarum Zeylancarum,' p. 20, there is a full description (dated 5 Mar. 1781) of Laurus serrata Burm. Zeyl. Above the name, Koenig has written, presumably at a later date, "Myrtus." The name Myrtus serratus Koenig appears, quoted in synonymy, in Steudel, Nomencl. ed. 1, 321.


A sheet bearing two specimens in Herb. Banks, written up by Banks and labelled "Ind. Or. Koenig," bears the note by Koenig —"Vinca parviflora," followed by a brief diagnosis, a reference to Rheed. Malab., and the locality—"habitat in agris sicciibirius intra segetes."

The species has been referred to Vinca pusilla Murray.


No specimen from Koenig found in Herb. Banks. There is a description in the Manuscript, Cynanchum cordifolium f, 5, p. 29.

12. **Strychnos colubrina** L., Retz. Obs. ii. 12. A specimen "Ind. or. König" has been referred doubtfully by A. W. Hill to *S. Benthamii* C. B. Clarke.

S. Tetanokotta Retz. l. c. (see Fischer in Kew Bull. 1932, 60). A specimen from "Koenig, Ceylon," bears no notes, but is written up by Banks, "Strychnos Tetan Colto Koen. MS. 4to, clearing nut." There are several descriptions of this in different volumes of the MSS. It is referred by Dryander to *S. potatorum* Linn. f.


"Justitia parviflora sp. nova. Caule diffuso ramosissimo. Spicis terminalibus axillaribusque sessilibus obtusis planisulcis folio brevioribus; bracteis diphylis marginatis ciliatis. Habitum ad margines hortorum prope Calcuttam satis frequens alibi rarissima planta & distinctissima sui generis cum floribus suis minima magisque coloratissimis corolulis."

There is also a short description in Koenig MSS. 5, p. 1. The specimen is written up by Dryander in Herb. Banks *Justicia pectinata* L. C. B. Clarke has assigned it to his *Bungia parviflora* Nees var. *pectinata* in Hook. f. Fl. Brit. Ind. iv. 590.


16. **Celosia margaritacea** L., Retz. Obs. iii. 27 (1782). Retzius refers to a specimen sent by Koenig from Tranquebar under this name. Koenig MSS. 1, p. 243, and 7, p. 45, has a description which he queries "Celosia margaritacea," "Habitat in agris oryzazetus, inter Cynosuro Corocan corobon momblon invenit."

I have found no specimen thus named in Herb. Banks, but a specimen of *C. cristata* L. labelled merely "Ind. Orient. Koenig," may perhaps be the original of the description.

17. **Celosia comosa** Retz. Obs. vi. 26 (1791). No specimen from Koenig thus named can be traced in Herb. Banks, and I have found no mention of the name in the MSS. There is a specimen of *C. argentea* L. labelled "Coromandel 1774 J. G. Koenig." A ticket in Koenig's hand with the specimen reads "Celosia argentea habitat in agris oryzazetus prope Cuda. Floret mense Decembris."


There are two full sheets in Herb. Banks from Koenig, one bearing on the back the following note by him:

"Celosia baccifera species nova [Retz. Obs. 5, p. 23. n. 55, added in Dryander's hand]."

"Caule flabellato levi ramosissimo; foliis alternis ovatis subtomentatis. Spicis terminalibus axillaribusque raris; Floribus trigynis. Habitat in ruderatis & intra sepes hortorum prope Calcuttam satris frequens, alibi non quam observavi."

The second sheet is labelled "Bengal, Koenig, 1786."

The plant is *Deeringia baccata* Moq. (D. celosioideae R. Br.).

Koenig's description occurs as above (the words after hortorum are omitted) as no. 2 in a list of plants, the contents of a packet, sent from Calcutta, January 13, 1785. The list is headed "Eingeklebte Krauter welcher als Proben fertig machte von einem Horto Sicco," and includes 32 numbers, among which are new genera and species with descriptions.

This heading explains the presence in Herb. Banks of sheets from Koenig with his own writing on the back.

19. **Celosia Monsonia** Retz. ii. 13. Retzius states that fruit, necessary to determine the genus with certainty, is wanting in his specimen, which he received from Koenig. He cites no locality.

There are two full sheets from Koenig in Herb. Banks. On the back of one (see Plate 601) Koenig has written "Celosia Monsoniae sp. n. habitat in ardis steriliobus prope Samalcotta copiose ad Madrasam minus frequens."

The second sheet is labelled (not in Koenig's hand) "Coromandel 1774, J. G. Koenig. Peritschalli Wereeti pandu."
Solander MSS. "Tamulis" is added, and is written up by Solander. *Celosia Monsonias MS.* In Koenig MSS. 19, pp. 7 & 8, is a full description of *Celosia Monsonias* "habitabit in aridis arenosis," but with no further locality. The species is *Aeroa Monsonias* Mart.

A specimen sent by Koenig to the younger Linneus was described as *Illecebrum Monsonias* (Suppl. Pl. 161, 1781). Unfortunately the incorrect form *Monsonia*, initiated by Retziius, has been perpetuated by subsequent workers.


21. **Cyperus Luzulae** Friis Rotth. Descr. et in. p. 23. no. 27; Retz. Obs. iv. 11 (1786). Retziius undoubtedly applied this name to a specimen from Koenig. He adds the note "*A Scirpo Luzulae* III. a Linné diversissimus, nisi erronea sit ill. Viri descriptio. Cyperus enim Rotthollí, quem benevolencia Cl. König possideo, sine ullo dubio Cyperus est. Variat multum quoad involucrum numerum, vidi enim foliis tantum tribus instructum."

Rotthoel gave no specific name, merely a descriptive phrase: — Cyperus umbella simplicissima &c. Descr. Pl. Rar. Icon. Ill. 23 (1772); Desc. et Icon. Pl. 23, tab. xii. fig. 2 (1773). His species was based on a dried specimen from the Amsterdam Botanic Garden, and his figure represents the widespread tropical American species known as *Cyperus Luzulae*. There is no evidence that he had a plant from Koenig; the usual indicating letter K is not appended to the diagnosis in his earlier work (p. 23).

The origin of the name is *Scirpus Luzulae* Linn. Syst. Nat. ed. 10, 868 (1760), without locality. In Sp. Pl. ed. 2, 75 (1762), Linneaus adds "Habitabit in India," but cites no specimen. The specimen in the Linnean Herbarium is, fide C. B. Clarke (Journ. Linn. Soc., Bot. xxx. 319), the same tropical American species; Clarke suggests that by "India" we must understand the West Indies.

Rotthoel, however, cites references to Burmann, Pl. Ind. 22 (1768), Plukenet, and Sloane. In this he is following Burmann with some hesitation, for he mentions a small variety from Surinam, the existence of which leads him to accept, "cum dubio tamen," Burmann's authority for referring the Indian species to *Scirpus Luzulae* Linn. The confusion is therefore traceable to Burmann, who under *Scirpus Luzulae* Linn. cites: "Cramen cyperoides orientale, panicula elegantiassime &c.," Pluk. Mant. 97, f. 417, f. 3, from Malabar. No specimen has been traced in Herb. Plukenet (in Herb. Sloane), but the figure evidently represents the Indian species *Cyperus diffusissime* L. Burmann also cites Sloane, jum. t. 79, fig. 1, but this is a different species.

John Gerard Koenig

Wildenow was therefore justified in excluding these references when citing *Cyperus Luzulae* Rottb. in his Sp. Pl. 1, 276 (1798); but he overlooked Retziius's publication (as does also the 'Kew Index,' which quotes C. Luzulae Rottl. (sic) ex Willld.).

Koenig presumably followed Rotthoel and Burmann in determining his plant; there is a very full description in his MSS. (14, p. 120), as *Cyperus luzulae* (p. 131 is dated 11 Nov. 1783). No specimen named *C. Luzulae* by Koenig has been found in Herb. Banks, but there are four sheets of *C. diffusissime* L. from him under this and other names.


There are two specimens in Herb. Banks from Koenig; on one he has written *Scirpus ciliaris*, with the habitat on the back of the sheet, the other, received from Koenig in 1776, is written up by Solander *Scirpus ciliaris* Linn., Koenig MS.

23. **Scirpus Caribaeus** Rottb., Retz. Obs. iv. 12. The specimen on which Retziius based his observational were presumably conspecific with two in Herb. Banks from Koenig; one sheet bears Koenig's note "Scirpus capitatus a Linné," the other bears a note in Dryander's hand "Scirpus forte caribaeus Retz. Obs. (not Rottb.)." Both were determined by C. B. Clarke for the "Flora of British India" as "Eleocharis capitata R. Br." There has been some confusion as to the name of this species—the valid name is *E. caribaeus* (Rottb.) Blake (in 'Rhodora,' xx. 24, 1918).


26. **Arundo Bengalesis** Retz. Obs. v. 20 (A. Donax L.). I have found no specimen named *A. bengalesis* from Koenig, but there is a description in the MSS. 5, p. 197. There are two sheets of *A. Donax* from Koenig; one bears Koenig's label *Arundo bifaria* sp. nov. with diagnosis and habitat, and is presumably a duplicate of the specimen described by Retziius from Koenig (Obs. iv. 21); the second, obviously conspecific, is written up by Koenig "Arundo nana," also with description and locality.

27. **Andropogon Incurvatum** Retz. Obs. v. 21. A specimen from Koenig is written up by him *Andropogon incurvatum* with a short description and locality. It is *A. caricosus* L. There is also a specimen from Koenig named by him *Andropogon caricosum*.

29. Panicum setigerum Retz. Obs. iv. 15. No specimen found from Koenig.


31. Embelia Burmanni Retz. Obs. iv. 23. This is a misquotation; Retzius is referring to the genus Embelia Burmann, not to a species*, as is evident from the typography and the remark which follows: "De charactere hujus generis essentia nihil certi pronunciare audeo, non visa specie Burmanniana, fide autem Opt. König binae ejsudem sunt Species, s.e."


There are specimens in Herb. Banks from Koenig (presumably from Ceylon and the Coromandel coast), and in Koenig MSS. 1, p. 166, is a full description. The latter is the source of the description by Koenig published as a footnote in Roxburgh's 'Plants of the Coast of Coromandel,' i. 27, under Salvadora persica L., of which E. Grossularia Retz. is cited as a synonym. Koenig in the MS. cited gives no botanical name, but quotes the native name "Olan chiddi." He seems to have confused the species with Embelia Riber Burn., as there are notes on it in his MS. under this name, and one of the specimens in Herb. Banks was apparently sent thus named, as Dryander has annotated it Embelia Riber Koen. (non Burmann).

Walker Arnott, in his discussion on the species of Salvadora (in Proc. Phil. Soc. Glasgow, iii. 160), distinguishes the plant of Koenig, Vahl, Roxburgh, and others as Salvadora Koenigi, and the sheets from Koenig in Herb. Banks have been thus written up by J. J. Bennet, apparently before the actual publication of Arnott's paper, as reference to volume and page is not given. Arnott's paper seems to have been overlooked by C. B. Clarke when revising the genus for the 'Flora of British India' (iii. 619), and the combinations proposed by Arnott are also omitted from the Index Kewensis.

* The 'Kew Index' makes the same mistake, as does also Walker Arnott in the paper referred to below.
"Optime Koenig, Descriptiones tuae exactissimae, quae Te
inscio publicas facio," and Koenig, writing to Patrick Russell,
Sept. 19, 1784, complains that Retzius had published these
descriptions contrary to his knowledge and "aft er a wrong copy.
"The nomenclature is obviously, in some cases, tentative. The
first entry "Hura Stamenius Novum genus" affords an example.
This has been accepted in botanical literature as a species-name,
but Koenig's MS. (11, p. 87) reads: "Siam: Hura. Genus
novum, Monandra Gynandra." The interpretation is, of course,
"the plant named Hura by the Siamese is a new genus."
Compare also the kinds of Langius (pp. 64-67), and, among the "Descr.
Epidend.," Epidendr um Fl. aeri s ? nos. 18 and 23; and E. Calceo-
lariae nos. 3 and 22; two distinct species in each case. Hooker
(Flor. Brit. Ind. vi. 197) includes the Epidendra as of undeter-
mined affinity, and says, "they are for the most part Peninsular
and probably all communicated by Heyne." But dates and
indications of locality in the manuscript descriptions, which
can be correlated with frequent references in the Journal to
collection and description of Epidendraceae between May 4
and Sept. 14, 1779, show that they were collected by Koenig mainly
in Malaca, and in Jung Ceylon and adjoining islands. The last
species only, Serapias Epidendracea, is Indian.

Koenig's descriptions are lengthy, but data essential to deter-
mination are sometimes not given; he occasionally adds rough
figures in his MS. Mr. Ridley has kindly gone through these
descriptions and makes the following determinations or sugges-
tions:

(1) Epidendrum spathulatum—Aerides suavisissimum Lindl.
(2) E. variegatum—doubtful.
(3) E. Calceolariae—a Dendrobium, probably D. acerosum Lindl.
(4) E. hexandrum—Appendicula Koenigii Hook. f.
(5) E. ophrydis—Microstylis congesta Rchb. f.
It cannot be Dendrobium atropurpureum as suggested by
Rolfe as that has not the flowers in distant whorls.
(7) E. loricatum—Cerochilus orchideus Lindl.
(8) E. squillum—Sarcochilus Wightii Hook. f.
(9) E. complanatum—probably Thrixsernum arachnites Rchb. f.
(10) E. clavatum—I. Saccotiumium c l a v a t u m Lindl.
(11) E. subulatum—doubtful.
(12) E. nudum—Dendrobium pumilum Roxb.
(13) E. tomentosum—probably Eria albido-tomentosa Lindl.
(14) E. bidentatum—Cleisostoma sp.
(15) E. Lycocephoides—Oberonia sp., probably O. anceps Lindl.
(16) E. longiflorum and (17) E. fiabilenum versus are certainly
Cirrhophytes: (16) being hairy on the flowers is perhaps
C. papillosum Rolfe, (17) is probably C. minutum Rolfe,
but both may be unknown species.

EXPLANATION OF PLATE 601

Photograph of Koenig's specimen of his Celasia Mohnessanae, sp. nov.,
in the British Museum Herbarium (one-third nat. size). Below a
photo of the note in Koenig's hand on the back of the sheet (reduced
by one half). The note reads thus: "Celasia Mohnessanae sp. n.
habitat in arida sterilioribus propo Saff ineotana e came ai Madrasam
minus frequens. Amaranthoides spicatam indica rum nam estinimum,
pag. 13, Tab. 357, Mant: Tab. 334: f. 4."

CONTRIBUTIONS TO OUR KNOWLEDGE
OF BRITISH ALG.E.*

BY F. E. FRITSCHE, F.R.S.

V. A BRITISH SPECIES OF ECBALLOCYSTIS
(E. FLUITANS, SP. NOV.)

The alga that forms the subject of the present communication
was collected in 1924 by the late Mr. C. Turner, F.L.S., of Wilms-
low, Cheshire, from a small stream running from the adjacent
moorland alongside of a farmyard near Tal-y-Bont, Merioneth-
shire, in Wales, at an altitude of between 500 and 600 feet and
about two miles from the sea. The area lies on Silurian rocks.
At the time I exchanged a number of letters with Mr. Turner
with reference to the nature and probable taxonomic position
of the alga, and he sent me a small quantity of formalin material
from which a number of stained preparations were made by
Dr. N. Carter. Some little time after the death of her husband,
Mrs. Turner very kindly placed his material at my disposal,
but unfortunately the tubes that were received did not contain
any material of the alga in question. On the other hand, there
were innumerable stained mounts of the alga, the majority of
which afforded very little information, but on a number of them,
and on the slides originally made by Dr. Carter, the following
description of the alga is based.

There is much that remains doubtful about the structure and
mode of growth of this form, but it is felt that it will be well
to call attention to it in the hope that someone may have the
good fortune to find it again and be in a position to study it
more completely. From the very first I was of the opinion that

* From the Department of Botany, East London College, University
of London.
the alga was probably a species of *Echalcycystis* *, but it was not until I had had the opportunity of examining the numerous interesting members of the genus described by Lyngar † that I became fully convinced of the fundamental similarity. Fig. 1 is a reproduction of figures found among Mr. Turner's papers, while figs. 2 & 3 are drawn by myself.

Mr. Turner describes the alga as forming a thin mucous stratum in the shallow water on the bottom of the stream at a depth of about 2 to 3 inches. It is, however, highly probable that the stratum consisted of innumerable colonies attached at one end and trailing out with the current. As to the length of these colonies there is no available information. Under the microscope the colonies appear simple or branched (fig. 1, B) with large numbers of small elongate cells, loosely or compactly aggregated within a more or less tubular mass of apparently rather soft and readily diffusible mucilage. The cells are grouped in one or two or sometimes even three or four longitudinal series, but there is no great regularity about these series, and the arrangement of the cells is often anything but parallel, many of them lying at an angle to others (fig. 1, B; 3, A). The mucilaginous envelope of the colony, which is mostly not very evident until stained, usually shows a rather irregular outline and at many points is clearly stratified, although the strata exhibit a very uneven course and are often exceedingly difficult to follow up in the longitudinal direction. In many cases successive strata from without inwards are of increasing density, as shown by the depth of staining (fig. 3, F).

The individual cells are elongate, usually three to four times as long as broad, and are most commonly broader at one (the upper) than at the other end (fig. 2, B, D, E). The cells contain a number of parietal chloroplasts, in practically all cases apparently four, grouped generally in two pairs in the upper and lower halves of the cells respectively. These chloroplasts have the form of curved plates. In certain strongly elongate cells the four chloroplasts were, however, found to lie in a linear series and to be larger and more or less of the form of curved bands (fig. 2, C); I suspect that these are cells about to divide and that each daughter-cell will receive two of the chloroplasts, which will then subdivide. I have been unable to recognise a pyrenoid in the chloroplasts, but do not think that the material was adequate to disprove its presence. Nor has it been possible to demonstrate starch in the cells, and the product of photosynthesis must at present remain an open question. No fat could be clearly demonstrated with the usual reagents. A large proportion of the

† "Two little-known Genera of Green Algae (Tetrasporidium and Echalcycystis)," Ann. of Bot. xlii. 161 (1922).

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**Fig. 1.**—*Echalcycystis rutilans*, sp. nov. (from drawings made by Mr. C. Turner*), A, C, D, small portions of colonies, showing dividing cells and escape of the protoplasts from the membranes; B, a branched colony. (x about 650.)

There can be little doubt that the frequent binucleate character of the cells merely marks an early division of the nucleus antecedent to actual cell-division. In the latter process the protoplast always divides obliquely (fig. 2, A; 3, A–E), the plane of

* The actual drawings were not received, but there were a number of photographs of groups of drawings, and one of these enlarged is reproduced in fig. 1.
division being usually very much inclined to the transverse one, although in occasional cells the division-plane approaches more nearly to the horizontal (fig. 2, H). Each cell possesses a delicate cell-membrane, usually fitting closely round the protoplast,

but sometimes more offstanding (fig. 3, B). After division each daughter-cell forms a complete new membrane of its own within the original parent-membrane, and in many cases the two sets of membranes are clearly seen (fig. 3, A, B, D, E). It seems that quite commonly the two daughter-individuals may thus remain enclosed within the wall of the parent for a considerable length of time. The latter no doubt becomes somewhat mucilaginous, and can evidently undergo considerable stretching as the new individuals enlarge; moreover, it is not uncommon to find the two daughter-individuals more or less widely separated from each other (fig. 3, E), but still enclosed in the membrane of the parent. It would seem that there is a good deal of variety with respect to the stretching capacities of the parent-membrane,
which certainly, in some cases, becomes ruptured at an early stage of the enlargement of the daughter-individuals. Recently divided cells are always easily recognisable by the obliquity of their approximated ends (figs. 2, 3), and such cells are almost invariably unimicate. The binucleate condition seems to arise at an earlier or later stage of their growth. In many cases the successive division-planes slope in the same direction, but this is not an invariable rule.

Most of the larger colonies taper to a single cell at one end, and this is invariably the case with the smaller ones. At this end, at which it is believed that the colony was originally attached (cf. below), the details of the mode of formation of the colony are often clearly recognisable (cf. especially fig. 3, B, D, E). Here one can often find a succession of ruptured parent cell-membranes corresponding to the successive divisions that have taken place. Fig. 3, E, is a complete 6-celled colony in which the uppermost cell is only partially shown. The membrand of the primary cell was only recognisable at certain points as a goblet-shaped mucilaginous envelope surrounding the whole. Within are found the two daughter-generations, the lower having divided once, the upper twice. The membrane of the upper individual of the first generation has ruptured, that of the lower intact, although it shows clear indications of a probable breaking down at the apex in the near future. The spatial separation of the two individuals of the lower generation is noticeable, and may depend on excrion of intervening mucilage.

Similar stages to this were repeatedly observed at various points within larger colonies (cf. the upper part of fig. 3, A). In fig. 3, B & D, the individual of the upper generation shows a prominent basal foot, more marked in fig. 3, B, than in fig. 3, D. This usually conical foot stains much more deeply than the rest of the membrane and appears to correspond to the attaching mucilaginous pads described by the writer\* and by Eyinger\†. In these cases, therefore, the upper individual of the first division has become attached to the parent-membrane near one of its ruptured edges, and such conical attaching pads were repeatedly means always recognisable—for instance, not in the colony shown in fig. 3, E. This may either mean that such definite attaching pads are not developed in all cases or that they are not always equally stainable. It will be noticed that the parent-membrane breaks open obliquely, the plane of the oblique aperture being probably always parallel to the plane of division of the protoplast. It seems that this aperture is produced by gelatinisation of the apical part of the membrane.

\† Loc. cit. 206 etc.

The method of arrangement of the two daughter-individuals of a division, the one at the base of the parent-membrane and the other at the rim of its ruptured apex, is altogether that typical of Ecballium, and it would appear that this type of construction is always realised in the young colony. On the other hand, I think there is very little doubt that it does not obtain throughout an older colony. All the daughter-cells appear to be capable of continuous division, although there are indications (cf. fig. 3, E) that the upper daughter-individual may (sometimes or usually?) divide more rapidly than the lower. The fact, however, that in many of the larger colonies nearly all the cells may be binucleate indicates that division continues more or less regularly in all of them. This is an unusual condition for an Ecballium, and is responsible for the close crowding and irregular arrangement of the cells in many of the larger colonies. In such cases (fig. 3, C) the individual membranes of the cells are not easily distinguishable, but appear merely as a network of fine lines separating the protoplasts (cf. also fig. 3, A). Moreover, many of the obliquely disposed pairs of cells are to be found enveloped by the still intact parent-membrane, and I am inclined to think that in such dense colonies the entire parent-membrane sooner or later becomes mucilaginous, and that there is none of the characteristic breaking down of only the upper part of the membrane, such as can be recognised in the more loosely aggregated parts. The close crowding resulting from repeated division of the cells is probably also responsible for the frequent irregular shapes of the latter in such colonies. The cells may be flattened or even slightly concave on one side or slightly attenuated at one or both ends (cf. fig. 3, A & C). In many cases the membrane is drawn out to a point at what appears to be the lower end of the cell (fig. 3, A), and these are probably cells whose membrane is or was attached to that of the next older generation. But such attenuated membranes are also occasionally seen at the upper ends of the cells (fig. 3, A, lower part). I am unable to explain such cases except by the hypothesis that the soft mucilaginous membrane has been squeezed into this shape by the pressure of adjacent cells or drawn out by pushing apart of cells. Perhaps this also explains the curios condition shown in fig. 2, N, which was occasionally observed, where the cells were connected to one another by shorter or longer thread-like strands, apparently mucilaginous in nature. Attention may be drawn to the fact that in many of the pairs of cells in older colonies the membranes of the daughter-individuals appear joined together (cf. fig. 3, A, B, D), so that a subsequent separation of two such cells might easily lead to a thread-like prolongation of the membrane.

Yet another peculiarity is often to be noted in older colonies. Occasional cells are to be found in which the membrane has broken down apically in the way above described, but in which the proto-
plast or proplasts have escaped and either lie at the aperture (fig. 2, K; 3, F) or are not to be traced (cf. also fig. 1, C, D). Such cases are not very common, but one or more of them are nearly always to be found in a larger colony. When such empty membranes collapse they probably afford the confused series of strata seen on the left-hand side of fig. 3, A.

It has not been possible to establish the mode of origin of the branches. Possibly they arise at points in older colonies where the true Ecballiaostis-type of daughter-cell formation obtains, which may well lead to a cell-series being developed along a line inclined to that of the main axis. There is a possibility, too, that some of the colonies may have occasional fenestra
tions, two branches joining together again at a higher level and leaving a more or less oval or elliptical space between them. A case like this was shown in one of the figures received from Mr. Turner (not here reproduced), but in view of the very different nature of the mucilage around the colonies this question cannot be settled by an examination of slides alone. It may merely be a case of two branches overlying one another. Whether the mucilaginous envelope of the colony is formed solely from the gelatinised membranes of successive generations must also remain an open question. There may well be some additional secretion of mucilage from the cells themselves, which, indeed, alone explains the not uncommon spatial separation of the daughter-individuals within this parent-membrane (fig. 3, E).

Another point upon which I am unable to give exact data is whether the polarity of the cells of a colony remains the same throughout. I have seen some cases which seemed to indicate occasional reversal of polarity, but the evidence is unsatisfactory.

A careful examination of the slides disclosed numerous cells of the alga attached to other algae or to particles of débris. In all cases such cells were attached by the more pointed lower end of the cell (fig. 2, F). In many of them the membrane was clearly discernible, and was commonly, but not always, slightly thicker at the point of attachment (fig. 2, G, M, P, R). Moreover, in the immediate neighbourhood of the point of attachment, particles of fine débris were often observed (cf. fig. 2, R), as if there were a local formation of mucilage here serving for attachment. Such a mass of mucilage was clearly seen in the colony figured in fig. 3, E. In a few cases, but not as a general rule, there was a definite basal mucilage-tube (cf. fig. 2, O), which may merely be an empty parent cell-membrane, the proplast having shifted up to the aperture, as in fig. 2, K. Some of the unicellular attached stages were placed obliquely on the substratum (fig. 2, F), as if they were undergoing gradual erection after the manner described by Iyengar (loc. cit. 215), but no one-sided secretion of mucilage could be observed.

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In no case was division into more than two cells noticed, although Turner in his notes refers to a very occasional division into four. I must confess to being rather doubtful about this. In any case there are no sporangial stages, such as have been observed in other species of Ecballiaostis, and reproduction would appear to be effected solely by cells detached from the colonies.

It may be well to summarise the colony-development of this form, as it appears from the above considerations. The single cell floated on to a suitable substratum clings there by virtue of its mucilage wall, and becomes gradually erected (presumably in the way described by Iyengar) and firmly attached by its more pointed end with the help of a basal mucilage-pad. There follows an oblique division of the proplast (fig. 2, F) and the secretion of new membranes around the daughter-cells. With their subsequent enlargement the membrane of the parent-cell breaks down apically, and the upper individual becomes fixed to the rim of the oblique aperture. Both cells divide again with the same succession of events, the membrane of the first cell becoming more and more mucilaginous. Division of all the resulting cells continues at more or less equal rates, and thus we get gradually a lengthening mass with the cells distributed in two or more linear series, and the whole enveloped in a mucilage-tube formed from the older membranes, possibly supported by additional secretion of mucilage from the proplasts. As the colony becomes in this way many-celled and the individuals become more closely compacted, further division is not accompanied by the gelatinisation of only the apical part of the parent membrane, but by a gradual gelatinisation of the whole wall, so that the definite Ecballiaostis-structure recognisable in the early stages becomes lost in the later ones or is only of occasional occurrence. Where it occurs we have possibly the formation of branches. While I believe that these suggestions represent the correct course of events, they require to be tested on living material.

The stages shown in fig. 3 recall to some extent certain stages of Ecballiaostis Frischii Iyengar (loc. cit. 200), but the habit of this species is altogether different, owing to the fact that both daughter-cells of a division assume a position at the mouth of the ruptured parent-cell. It is this that leads to the general dendroid habit that is assumed. In the present species, however, the fact that the daughter-cells retain more or less markedly the positions in which they are left after division, and proceed to divide with great frequency, leads to a disposition of the cells in linear series and to their close crowding in the older colonies. The absence of starch, associated with the possible lack of pyrenoids in the chloroplasts, suggests that our alga may not belong to the Chlorophyceae at all. It is not out of the question that forms parallel to Ecballiaostis may have been developed among the
Heterokontae. This matter can, however, only be conclusively
established by an examination of living material.

The following is the Latin diagnosis of the new species:—

Echaleocystis fluitans, sp. nov., familiis microscopiciis, sim-
plicibus vel ramosis, probabiliiter satis elongatis, basi fluminibus
desidiaosis affixis; cellulis numerosis parvis elongatis, diam.
3-4 plo longioribus, laxe vel dense et sepe irregulariter in seriibus
1-4 longitudinalibus (sed sepe cellula singula terminali) aggrega-
gatis, tubo macro diffusus iterum irregulariter lamellato
inclinais; cellulis oblongis, plurumque uno polo paulo attenuatis,
in partibus vetustis sepe forma irregularis, chromatophoris
parietalibus 4 (sine pyrenoidibus?) sine amylo, sepe binucleatis;
divisione cellularum obliqua, cellulis filialibus juvenalibus
uninucleatis et membrana propria praeeditis; membrana matriciali
probabiliiter sepe equaliter deliquescenti, sed in partibus basali-
bus familiarum juvenalium et iterum alio loco familiarum
seniorum in apicem oblique dehiscenti, cellulis filialibus una
supra alteram affixis, superiore plurumque in ostio; divisione
cellularum filialium versamiliiter plus minus constanter. Diam.
cell. 3-3.5 μ; long. cell. 9-18 μ; diam. colon. 14-18 μ.

Hab. In a small stream near Tal-Y-Bont, Merionethshire,

BYSSOCHLAMYX SPULVA, sp. nov.

By Mamie Oliver, B.Sc. (Messrs. Chivers & Sons, Ltd., Histon),
and George Smith, M.Sc. (London School of Hygiene and
Tropical Medicine).

(Plate 602.)

Westling (Svensk. Bot. Tidskrift, iii. 1909, 134) described
a new monotypic genus Byssochlamys, whose chief interest
lay in its systematic position, the asci being produced in roughly
globose clusters, but without peridium or any trace of the hyphal
web which characterises Gymnascus, the new genus being thus
a transition between the Endomycetaceae and the Gymnoascaceae.
The new species here described clearly belongs in Westling’s
genus, but differs from his species, B. nitea, in colour and in
dimensions of ascus and spores.

B. fulva has been isolated many times from processed fruits,
and appears to be of fairly widespread occurrence. It is of
considerable economic importance as a cause of spoilage in canned
and bottled fruits of various kinds, and a more detailed account
of this aspect of its history will be published in due course.
The conidial fructification is very similar to that of Paecilomyces
variabilis Bainier, and the fungus is readily disseminated by the small
and very abundant conidia.
Diagnosis.—Fungus colonii albis deinque fulvis, paulo floccosis aut funicularibus; reverso bruneo; conidiophoris ex hyphis longis repentibus, irregulariter ramosis, hyalinis, 2–3 μ diametris; basidibus verticillatis aut solitariis, basibus sflatis, et apicibus conidiiferis longis, perithecibis, curvis; conidiis ellipticis, 4–9 μ × 2–3–2–5 μ, in catenis longis; ascis abundantibus, aggregatis sed sine peridiis, globosis, octosporis, 11–12 μ diametris; sporidibus ellipticis, glabris, hyalinis, 6–6–5 μ × 4–3–4–5 μ.

Colonies growing well on most solid media, better on natural than on purely synthetic media, most readily at temperatures between 30° and 37° C.; on liquid synthetic media growing fairly slowly at 20°–25°; better at 30°; at 37° the spores are readily wetted by liquid media, and growth is very slow until the submerged mycelium reaches the surface: surface white, then buff to pale brown in central areas, slightly floccose or funiculose, after seven to ten days showing clusters of ascii visible to the naked eye as minute globose masses partially embedded in the mycelial felt; reverse slowly turning pale brown; conidial fructification of the Paecilomyces type, conidiophores very variable in length, arising as side-branches from long trailing hyphae, simple or variously branched, 2–3 μ in diameter, bearing whorls of sterigmata or solitary sterigmata at various points along the length, sessile or on short side branches; sterigmata short tubular or much swollen at the base and terminating in long slender tubes, frequently curved or bent away from the main axis, up to 25 μ long and usually 2–3 μ in diameter, but occasionally up to 7 μ; conidia one-celled, hyaline, ovate to elongate, very variable in size but mostly 4–9 μ × 2–3–2–5 μ, borne in very long, unbranched, tangle chains; ascii abundant on all media, produced in roughly globose clusters without any trace of peridium or enveloping hyphae, globose, 8-spored, 11–12 μ in diameter; ascospores smooth, hyaline, ovate, 6–6–5 μ × 4–3–4–5 μ.

The natural habitat has not yet been discovered, all isolations having been made from canned and bottled fruits. The mature spores can survive cooking for thirty minutes at 87°–88° C., which explains their survival in the processed cans and bottles, since the maximum temperature of sterilization, although it may exceed 90°, is maintained for only a few minutes.

We tender our best thanks to Mr. J. Rambottom, of the British Museum (Natural History), and to Mr. F. T. Brooks, of the School of Botany, Cambridge, both of whom have kindly examined the fungus and confirmed our placing; also to Messrs. Chivers & Sons, Ltd., for permission to publish the work carried out in their laboratories.

Explanation of Plate 602.

Fig. 1. Conidiophores, showing typical sterigmata, × 250. From slide-culture on Czapek agar.

Fig. 2. Portion of cluster of young ascii, × 500.
SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.

THIRTY-EIGHTH ANNUAL CONGRESS, NORWICH.

The Thirty-eighth Congress of the Union was held at Norwich, from June 7-10, under the presidency of Professor E. J. Salisbury, F.R.S., who chose as the subject of his address "The Influence of Man on Vegetation." The President deplored the failure to give adequate recognition to human activities as a means of dispersal of plants throughout the world, though his effective in this respect is probably greater than that of any other agent, and there is no a priori reason why introductions by man should not colonize the same situations as if they had been introduced in any other way. Sycamore and Pine are testimony to the fact that human introductions can become completely assimilated by natural vegetation. The striking correspondence in the distribution of the remains of neolithic man and the members of the Lusitanian floras suggests that he may have been an important agent in their dispersal, and their occurrence in suitable habitats in no way militates against this fact. The corn and flax seed, which he brought with him from the south, was surely not less contaminated by weed seeds than were modern agricultural seeds prior to the introduction of efficient screening methods.

The cultivation of land from the time of neolithic man to the present day provided habitats for plants of open communities, which must previously have been restricted to the very limited areas, where competition was not severe, presented by naturally disturbed soil. Many of these have become weeds of cultivation, and have thus attained a prominence which may bear no relation to their original and natural frequency. With the extension of cultivation the abundance of the introductions and of the potential weeds amongst the aboriginal flora has thus increased.

Regarding 1 per cent. of seed impurity as representing about 5000 seeds in a pound, the returns for a given year suggest that on a conservative estimate between two and six billion weed seeds from abroad are sown in Britain with the Clover and Grass seed imported from abroad. Such introductions involve mainly species characteristic of arable land. Seeds or fruits of plants from communities representing later phases in the plant succession, if brought by man, are mostly incidental to human movement. A series of experimental germinations from the mud on boots or the dust from trouser brushings after a week gave some striking figures showing what considerable collections of seed may be accumulated in a comparatively short distance.

The moment human intercourse between Britain and the European Continent began, the relative biological isolation of these islands ceased and the rate of influx of plants was accelerated; the introductions persisted or perished according as the suitability of the new environment permitted. The efficacy of these changes increased with improvement of methods of transport.

On the other hand, man's activities have depleted our flora in numbers, if not also in kind. The deliberate burning of considerable areas by neolithic man for increasing available grazing, and thus the population of the herbivorous animals which he hunted, and the migratory cultivation of neolithic man, changed large areas of forest into grassland or scrub. The chalk downs of the south-east were the nursery of English agriculture, and reasons were given for the belief that they were originally clothed with forest and were cleared for cultivation at an epoch when the alluvial soils would be too wet for the purpose. On slopes where the topography ensures good drainage, removal of forests lowers the water-table, and the retentive upper layers of soil become quickly eroded, so that we cannot judge from the relatively arid soil on the slopes of the denuded downs of to-day as to the soil-conditions which obtained in the remote past.

In the higher precipitations of the west and north the rate of accumulation of humus is much more rapid, and, even after removal of trees and shrubs may more than keep pace with the rate of decomposition so that in places of erosion there is peat accumulation. The evidence that present-day moorlands (including heather moors) occupy the sites of former forests rests, not only on the occurrence of buried tree-trunks in the peat, but on the numerous place-names indicative of forest in Saxon or Danish times in areas which are now bare moorland.

The flint implements of neolithic man were more suited to the cutting down of soft-wooded trees such as Birch, Willow, Scotch Fir, and Alder, than to the felling of hard-wooded trees such as the Oaks. The small remnants of climatic Birch-wood still extant may well be due largely to the fuel demands of neolithic man; the Scotch Fir, which is abundant in the submerged forests of neolithic age, was probably the earliest tree to be extensively exploited for fuel, and this may account for the disappearance of native Fir woods in Southern Britain. Later, the smelting of iron ore caused extensive forest destruction, particularly in the north and south-east of England, and by the latter half of the 16th Century prohibitory measures were passed to check the destruction in Surrey and Sussex. The Gorse- and Bracken-clad heaths of Sussex and East Anglia, the Heather-clad Commons of Surrey and Hampshire, bear witness in their flora to their woodland origin, and, like much of the grassland, revert under protection to woodland vegetation. The continued
effect of man’s presence maintains their vegetation in the successive phases of grassland, scrub, or seminatural woodland. The construction of hedges as windbreaks has provided sanctuaries for the marginal species of the woodland, which are probably more abundant and frequent than in primitive times. The practice of coppicing results in a periodic impetus to the light-loving species of the woodland flora, with an increased pressure of competition upon the shade species of the interior.

Examples were quoted of the effect of fires, such as preventing the natural colonization of heath vegetation by trees or causing spread of Bracken at the expense of Heather. If it were possible to permit all the land in Britain to revert to its natural state, the increase of forest and consequent reduction of area occupied by heath and scrub would bring with it a diminution of many of the species we most prize.

At the meeting of the Botanical Section a report was received on the progress of preparation of the Flora of Sussex by Lt.-Col. A. H. Wolley-Do, which was initiated at the Hastings Congress in 1927. The work is now approaching completion, and the Editor begs that lists should be sent to him as soon as possible (address, Berkeley Cottage, Mayfield, Sussex).

Prof. F. E. Fritsch, P.R.S., was President of the Section, and his address, an examination in detail of the evolutionary sequence traceable among the Desmids, was a valuable contribution to our knowledge of a subject on which we have hitherto had but little information. It was illustrated by a large series of lantern-slides.

The enormous range of form displayed by these unicellular plants invites a study of the group from the point of view of form-evolution, and the President claimed that a general evolutionary trend is very patent and that in miniature the Desmids afford more abundant instances of parallelism in evolution than is at present evident in any other group. He supported Olffman’s view that the Mesotaeniacae, characterized by a cell-wall of one piece, represent the primitive form from which the Desmidaeaceae proper, with a wall composed of two equal portions, may have been derived. Deeply constricted forms are regarded as more advanced than those with little constriction, and a further specialization is indicated by flattening of the cell and ornamentation of the wall.

The genus Cosmarium, with more than 800 species, was used to illustrate certain marked evolutionary tendencies, afforded by diversity in the shape of the cell, the absence or presence of ornamentation of the wall and the type of ornamentation, and the number and characters of the contained chloroplast. The tendency towards a triangular outline of the cross-section was shown to be widespread among the more specialized Desmids.
OBITUARY.

Spencer Henry Bickham
(1841–1933).

The death of Spencer H. Bickham, J.P., F.L.S., at Underdown, Ledbury, on April 7, removes a keen amateur botanist and a valued member of the Watson Botanical Exchange Club, of which he was Treasurer from 1907 to 1920. Before coming to Ledbury in 1891, he was a member of a Manchester business firm. He had been a student at the Owens College and a pupil of Leo Grindon, the Manchester botanist and naturalist. In his younger days he travelled much abroad, and had accumulated a considerable herbarium. In his beautiful gardens at Underdown he grew more than a thousand kinds of plants from various parts of the world; his rock garden was particularly interesting. He contributed some short notes to this Journal:—‘Silene noctiflora in Worceester’ (1903), ‘William Poole and his Herbarium’ (1916), ‘Carex pseudoparadoxa S. Gibson’ (1917), and a few others. He took an active and prominent interest in local affairs and had been a magistrate for forty years. He joined the Linnean Society in 1896. A portrait and biography by H. S. Thompson appeared in the recently issued Forty-ninth Annual Report of the Watson Botanical Exchange Club.

REVIEWS.


Nearly seventy years have elapsed since the publication of the first edition of Henney’s ‘Clydesdale Flora,’ and more than forty since it was revised by the late Professor King. Since then many changes have occurred in the Clyde area, particularly in the more densely populated districts, and a new account of the flora of this varied part of the country is therefore to be welcomed. Like its predecessor, but unlike most local Floras, Mr. Lee’s handbook gives not only a considerable amount of parochial information, but also full descriptions of the flowering plants and ferns occurring wild or established within the drainage area of the River and Firth of Clyde. The area covered embraces the counties of Lanark, Renfrew, Dumbarton, and Bute, together with large parts of Ayrshire, Stirlingshire, and Argyll and the small portion of West Perth draining by the River Falloch towards Loch Lomond. An outline map showing the exact boundaries of the district would have been helpful, but it is clear that a considerable part of south-west Scotland is covered, and the Flora is consequently a useful addition to the rather small number of floristic works dealing with Scottish botany. The distribution of species is based primarily upon the Watsonian system of vice-counties, modified to suit local requirements, ten sub-areas being distinguished, each defined by a letter. Records of plants occurring on Ailsa Craig are shown separately. Under each species a note of the habitat is given, and for the rarer species reference is made with caution to the localities in which the plant has been found.

The general arrangement of the Flora shows a noteworthy departure from that of previous British Floras. The author has been impressed with the need for showing the student some sort of phyloetic sequence in the arrangement of families, and has made a praiseworthy attempt to meet this requirement. While it is obviously impossible to illustrate fully plant relationships in any linear sequence, the system which is here adopted brings the classification of families more into line with modern ideas. The ‘Apetalae’ as a separate group disappears, and the families formerly placed therein are distributed through the Archichlamidaceae according to their possible affinities. The arrangement is, in fact, a compromise between the system of De Candolle and the scheme suggested by Hutchinson. It may be argued that the main purpose of a Flora, particularly one which is concerned only with a restricted area, is to afford a ready means of identification, yet the reviewer feels that no opportunity should be lost in bringing before the student the evolutionary concepts that underlie modern taxonomy. In this respect Mr. Lee’s handbook is a step in the right direction. With regard to terminology the author might have adopted ‘Family,’ now generally used, in place of ‘Natural Order.’

Artificial keys to the families are provided as well as similar keys to the genera and species. So far as they have been tested the keys seem to work satisfactorily. The names of species are printed in heavy type, making reference conveniently easy, and by the use of small type and a number of abbreviations quite considerable descriptions of the species have been attained. A conservative view as to the limits of species has been taken and no attempt has been made to deal with “critical” genera, though the Boraginaceae section of Ranunculus is treated fully along the lines of Mr. Pearsall’s monograph, to which reference is made in the text. This procedure might usefully have been extended, but the only other reference noted under “aggregate” species comes under Rubus fruticosus, where Roger’s ‘Handbook’ is quoted. Well-marked varieties are included, but, as the author states, it is often a matter of opinion whether they should rank as varieties or as subspecies. Here and there, however, more exact information might have been given, as, for example, under Alchemilla vulgaris, which is said to ascend to over 2500 feet, without any reference to the fairly distinct altitudinal range...
of the three forms which are mentioned, viz. minor, fraternis, and alpestris, the last being the mountain plant. The exclusion of micro-species generally results, however, in uniform treatment of the material as a whole, but some readers may be surprised at the inclusion of a considerable number of plants which are certainly not native, such as Aesculus Hippocastanum, Laburnum vulgare, Nectilia ovatifolia, Sambucus racemosa, Abies pectinata, Picea excelsa, and others. The author takes the view, however, that such taxa as the Spruce Fir and the Horse Chestnut "have as good a right to be regarded as British as have the Sycamore and the Lime." In compiling a Flora the question as to what should be included and what excluded will always remain a difficult one, but it would, perhaps, be less misleading to those unacquainted with the vegetation of Britain if the names of introduced or planted species were distinguished from natives by some such device as the use of different type.

With regard to nomenclature the author adopts a somewhat conservative attitude. He has not hesitated to use, as a rule, the older and more familiar names, believing that "the avoidance of confusion and inconvenience is a matter of more practical importance than mere conformity to rules." The volume includes a glossary of botanical terms, drawn up for the convenience of beginners, and ends with a double index—one of orders and genera, the other of popular English names.

Altogether, this little volume is to be thoroughly commended, and should prove a useful handbook to students of field botany in the Clyde area. Convenient in size for the pocket, the book is well produced and the price is reasonable.—J. R. MATTHEWS.

* A regrettable attitude! The object of the "Rules" is to ensure uniformity, and neglect to observe them engenders confusion, such, for instance, as a want of uniformity with similar works.—Ed.-Journ. Bot.
BOOKNOTES, NEWS, ETC.

BRITISH MYCOLOGICAL SOCIETY.—Vol. xvi. pt. iii. of the Transactions of this Society contains a description of the British species of the genus Diaporthe Nits., and its segregates, by L. E. Wehmeier, and notes on the life-history of the four-spored form of Sordaria fimicola by Winifred M. Page. C. L. Hear gives some account of the original MSS., notes and drawings for James Bolton’s work “An History of Fungusses growing about Halifax” (4 vols., 182 copper plates), 1738–91. The MSS. has recently been purchased by the Library of the U.S. Department of Agriculture from a bookseller in Zurich. A useful Index to Berkley and Broome’s “Notices of British Fungi” (1837–1858) is contributed by J. Ramsbottom. G. E. Deacon describes the effects of Botrytis cinerea in producing die-back in roses, and W. P. K. Findlay supplies a note on the conditions required for the germination of the spores of Merulius lacrymans.

FLORA OF SURINAM.—As a thesis for a doctorate at the University of Utrecht, F. J. Eyma has published (J. H. de Bussy, Amsterdam), in English, a number of notes on new and critical species of the families Polygonaceae, Guttaferae, and Lectethaeae in the flora of Surinam.

‘COUNTRY-SIDE.’—The Summer number of the organ of the B. E. N. A. contains a sympathetic appreciation, with a photograph, of the life-work of the late Sir J. Arthur Thomson by his friend Sir Leslie Mackenzie. Sir Maurice Abbot-Anderson gives suggestions for a botanist’s holiday in June on sand-dunes and shingle; J. F. Rayner describes, with good figures, some of the commoner malformations occurring in plants; and J. Lamb recalls the examination of a Somerset post-bog in mid-July. ‘Nature Records’ includes notes on first flowering of plants, from a selected list, from a number of counties.

SIR JOHN KIRK.—By the courtesy of Dr. Spurrier, Curator of the Zanzibar Museum, we have received a copy of the Supplement to the ‘Official Gazette’ containing an account of the Centenary Commemoration at the Museum on December 10, 1932, of the birth of Sir John Kirk. During his thirty years’ connection with East Africa, from his appointment as botanist and medical officer to Livingstone’s expedition for the exploration of the Zambesi, in 1857, to his retirement from his office as His Majesty’s Agent and Consul General at Zanzibar in 1880, Kirk did much to advance our knowledge of the botany and natural resources of East Africa.

NOTES ON THE TAXONOMY OF BRITISH MATERIAL OF ANTHYLLIS VULNERARIA.

By E. M. MABSDEN-JONES and W. B. TURRILL.

For the past seven years we have been breeding and making field studies of populations of British Anthyllis Vulneraria. The results have been published in the Journal of Genetics (1933). In the course of our investigations it has become necessary to consider certain of the names which have been applied in floras and monographs to variations of this species. As indicating how very unsatisfactory for exact genetic research is much of the published systematic work on polymorphic species, the following account should be of interest to taxonomists. If it serves to reduce the giving of names to variations within a highly polymorphic species, in the absence of experimental evidence as to the nature of the variation, it will serve a useful purpose. We have limited our remarks to the names given in Druce’s ‘List,’ ed. 2, or to those which concern plants used in our experiments.

From the modern taxonomic standpoint Anthyllis Vulneraria dates from Linnæus, Sp. Pl. 719 (1753). His description is very brief, but he quotes five synonyms which are sufficient to fix this name to the ordinary yellow-flowered inland kidney-vetch. In addition he has a var. β based on Dillenius’s “Vulneraria supina,” flore coecino” (Dill. 4th. 431, t. 320, f. 413). No trivial is given to this variety. In the ‘Flor. Suecica,’ ed. 2, 248 (1755), Linnæus repeats the specific description and has four varieties based essentially or entirely on flower-colour: α lutea, β alba, γ coecina, and δ rubra. These names have been largely ignored by subsequent writers.

The var. lutea is apparently the common inland yellow-flowered plant of N.W. Europe, e.g., the plant used in the Transplant Experiments at Poletten, and fully described in Journ. Ecol. xviii. 369 (1930). The var. alba, with white corolla, must be of rather rare occurrence. It is probably the same as A. communis L. Rouy a genuina Rouy subvar. albiflora Rouy (Flor. Fr. iv. 286; 1897). We have not seen any British material with really white flowers. The var. coecina is important and has often been given specific rank, or included as a variety, under such names as A. Dillenii Schultes and A. rubra Gonon, both of which are nomina nuda according to the references in ‘Index Kewensis.’ The variety is dated back to Ray, and Dillenius’s Hort. Etch. (1732) by Linnæus’s synonymy. For an account of the specimens in the Dillenian Herbarium at Oxford, Druce & Vines, ‘The Dillenian Herbarium,’ pp. 100, 183 (1907), may be consulted. The type-material of Dillenius was collected at Newborough in Anglesey, but a reference is also given by Dillenius to Ray’s ‘Synopsis’ and material collected in agro

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flowered plant "floribus flavis, folliis caulibusque parce villosis aut subglabris." Var. \( \beta \) alboflora is apparently the var. \( \alpha \) L. Var. \( \gamma \) rubriflora probably includes all red-flowered variations except those which are very hisnute, e. g., both var. cocinea L. and var. rubra L. would be included. Of his other varieties we have seen no wild British material. All British specimens named var. Allionii DC. seen by us are wrongly determined.

The next plant which we are concerned is \( A. \) maritima. This dates from Schweigg, in Hag. Chlor. Borruss. 365 (1819), where the following description is published: -- "Caula diffuso..." "Caula diffuso, ineano; pilis in caulpo..." "Caula diffuso, ineano; pilis in caulpo..."

"In arena mobili maris baltici reperta a Cl. Schweigger. Jul. Caul. multo altior priori, saepe 2-pedalis, et ramosior; ramis elongatis. Foliia angustissima, subtus sericeo-tomentosa. Capitula 4-7 in singulo ramo; terminale subsessilari. Petala flavu..." As a species the plant is kept up in Reichb. Flor. Germ. Excurs. 515 (1832) and figured in Icon. offic. 2, t. 122 (1824). It was made a variety of \( A. \) Vulneraria by Koch, Deutschl. Fl. v. 124 (1839), according to A. Schon. u. Gr. in Syn. vi. ii. 626 (1908), and Syn. ed. 2, 175 (1843). It is a tall, many-headed, densely hairy plant with yellow flowers.

L. Corbière, Nouv. Flor. Norm. 148-9 (1893), retains maritima as a subspecies of \( A. \) Vulneraria, and describes under it a variety \( \beta \) ochroleuca. "Sousche ligneuse, grosse, très rameuse, à rameaux courts, étalés-ascendantes. Plante toute pubescente-soyeuse, à poils appliqués. Fleurs jaune très pâle, presque blanches; céréne obtuse à sommet d'un jaune plus foncé, mais non rouge sang (comme dans la var. polyphylla Koch et l'A. affinis Britting.). RR. -M. falaise de Carteret!"

Again, with the more detailed descriptive work necessary in genetic studies, it is difficult to know to what character combination this name should be applied. We have worked with two pale-yellow-flowered plants of immediate wild origin—one from Porlock Weir, Somerset, and a second (with still paler yellow flowers) from the Chesil Beach, opposite Wyke Regis, Dorset. In both the corollas were monochrome except for a blotch at the base of the standard in the Chesil plant; but it is possible Corbière did not separate keel and androecium when he described the keels of his ochroleuca as darker in colour at the summit. The anthers give a false appearance of deeper colour near the top of the keel if the latter is viewed with the androecium unremoved. We have taken our Porlock Weir material (Stock-Plant 2) as a standard for var. ochroleuca, and accept our pale-yellow Chesil Beach plant as a still paler but unnamed variation. Other pale-yellow-flowered plants have occurred in wild populations.
There can be little doubt that the var. bicolor (Rouy & Fouc.) Druce is one of the various heterozygotes found in populations involving var. cocinea and a yellow-flowered variety. Rouy’s description (of the plant placed as A. Vulneraria subsp. A. communis var. affinis subvar. bicolor) is “Corolle orangé ou rouge, au moins au sommet." Whether Druce’s material (if he had any) and Rouy and Foucaud’s are phenotypically identical remains uncertain.

No description of var. villosa Corr., given in Druce’s ‘List of British Plants,’ ed. 2, p. 26 (1928), has been traced. Ascherson and Graebner (l. c. 638) quote under their subspecies 1 C. A. vulnerarioides (i. e., A. vulneraria var. Allioni DC.) a var. villosa Car. u. St. Lager : Etud. des fleurs, 8 ed. 169 (1889).”


At Par Harbour and on Par Sands, Cornwall, amongst other variations, there occurred a striking variation of suberect growing habit with deeply coloured flowers, which segregates for stem indumentum characters. Technically the plants can be classified under A. Dilleni Schult. subsp. tricolor sensu Asch. u. Graebn. l. c. 630. Unfortunately the original description of Angylysis tricolor Vuk. in Rad. Jugoslav. Akad. xxi. 121 (1878), does not fit the Par plant, especially in flower-colour. Ascherson and Graebner record a number of variations in the indumentum of the stems and calyces in their subspecies, which occurs mainly from the Balkan Peninsula to Asia Minor and Palestine. We have little doubt that the Par Harbour Amaranth Purple plant was introduced from abroad.

In the European Herbarium of the British Museum (Natural History) is a specimen named Angylysis communis Rouy var. tricolor Rouy, collected at Montserrat, rochers calcaires, entre 750 et 950 m., F. Sennen, Plantes d’Espagne no. 2588. This specimen is nearer to the Par material than any other dried or living material we have seen. Since we are unable to retain A. Dilleni or A. communis as a distinct species, it is convenient to refer to the Par plant simply as A. Vulneraria var. “Amaranth Purple.” For further references to var. tricolor see Rouy et Fouc. Flor. Fr. iv. 288 (1897), and Sagorski in Deutsch. Bot. Monatschr. viii. 139 (1890).

There remains one other plant about which a few words must be said. In 1927 we received seeds of an A. Vulneraria from Zürich Botanic Gardens under A. Vulneraria. These produced plants of a characteristic erect bush growth with leaflets up to fifteen per leaf, rather narrow except for the terminal leaflet of the lower leaves, red-purple calyces, and yellow corollas except for red keels. The plant bred true for all characters. In the vegetative parts this plant matches Hungarian material of A. Vulneraria var. polyphylla (Kit.) DC. remarkably closely; yet its calyces are those of A. Vulneraria—in fact, in the flowering state, rather more bulging than those of most of the A. Vulneraria material with which we have worked, and in contrast with the narrower yellowish-green calyces of true var. polyphylla. The original description (DC. Prod. 170, 1825) of var. polyphylla reads: “floribus flavis, foliis 11-15-foliolatis parce villosis, foliolis infer. oblungs, super. linearibus, caule erecto pedali—in Hungariâ, Volhyniâ, Lithuanîâ. A. polyphylla Kit. ex Bess. in litt. (v. s.).” So far as it goes this description fits our plant, but the calyx character of Hungarian specimens is so distinct that we prefer to regard the Zürich plant as probably a hybrid segregate from a cross, with var. polyphylla as one of its parents, and to designate it for our purposes simply as A. Vulneraria var. “Zürich.”

We have no intention of monographing Angylysis Vulneraria as it occurs throughout its wide range of distribution. We hold that any attempt to classify the numerous variations and variation-combinations should be based on cultural and genetical, as well as on field, laboratory, and herbarium studies. It is interesting to compare the results of taxonomic studies in connection with which experiments have been neglected. Habitat fluctuations, genetic varieties, and heterozygous phenotypes are mixed together in almost hopeless confusion. The descriptions are frequently quite inadequate and the occurrence of character variations which can be separately inherited and which therefore occur in many combinations are not taken into consideration. Reference to the following will suffice to prove our statements:—Beck, Flor. Niederöst. ii. i. 858 (1892), and in Ann. K. K. Naturh. Hofmus. xi. 61 (1896); Rouy et Fouc. Flor. Fr. iv. 283 (1897); Sagorski in Allg. Bot. Zeitschr. xiv. 40, 55, 89, 124, 164, 172, 184, 204 (1908); Aschera. u. Graebn. Syn. vi. ii. 620 (1908); Dalla Torre u. Sarthein vi. ii. 672 (1909); Becker in Beih. Bot. Centrbl. xxvii. ii. 256 (1910).

A list of colour comparisons with Ridgway, ‘Color Standards and Nomenclature,’ Washington, 1912, will indicate how much more exact descriptions can be made by using published standards. We insist in our own work that at least two persons (preferably of different sex) should agree that the colour match accepted is the nearest obtainable in Ridgway. Unless otherwise stated the flower-colours given are those of flowers at their prime. Colour of calyx and corolla often changes from the bud to full anthesis and again after anthesis. Breeding work has shown that the keel colour is of great importance, especially for identifying back-crosses and some segregates.
A. Vulneraria var. butea.

Harbury, Warwickshire (Stock-Plant 1).
Calyx: Seafoam Green, tipped Barium Yellow; sepals may be tipped or tinged Prussian Red, later becoming Dark Cornishian Purple.
Standard and wings: Lemon Chrome veined Orange, often a tinge of Deep Purplish Vinaceous at base of standard.
Keel: Lemon Chrome.
Ovary and gynophore: green.
Style: below bend Seafoam Green, above bend Barium Yellow.
Fruit: Mummy Brown.
Seeds: Isabella Color to Ecru Olive.

A. Vulneraria var. ochroleuca.

Cliffs beyond Porlock Weir, Somerset (Stock-Plant 2).
Calyx: Seafoam Green, tipped Barium Yellow; sepals tipped with a minute trace of Dark Indian Red, later becoming Anthracene Purple.
Standard, wings, and keel: Pale Lemon Yellow, standard with a Deep Purplish Vinaceous blotch at base.
Ovary and gynophore: green.
Style: below bend white, above bend Barium Yellow.
Fruit: Tawny Olive to Mummy Brown.
Seeds: Tawny Olive.

A. Vulneraria var. coccinea.

Bude, Cornwall (Stock-Plant 3).
Calyx: Seaform Yellow, lobes and uppermost part of tube and basal veining Chocolate becoming Anthracene Purple.
Standard: Carmine; wings, ground-colour Chaliceomy Yellow heavily tinged with Carmine; keel Ox-blood Red.
Ovary and gynophore green, ovary nearly surrounded longitudinally on the abaxial side by Spinel Red and with a blotch at base of same colour and a trace of colour running into gynophore.
Style: below bend Spinel Red, above bend Barium Yellow tinged Spinel Red.
Fruit: Mummy Brown.
Seeds: Orange Cinnamon to Tawny Olive.

A. Vulneraria var. "Amaranth Purple."

Par Harbour, Cornwall (Stock-Plant 5).
Calyx: Seafoam Yellow, lobes and uppermost part of tube and veining throughout tube Deep Cornishian Red becoming Anthracene Purple.
Standard and wings: Amaranth Purple; keel, ground-colour Seafoam Yellow, upper portion Violet Carmine shading into Amaranth Purple.

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Ovary and gynophore green, ovary nearly surrounded longitudinally on the abaxial side by Spinel Red, with blotch of same colour at base and a trace of colour running into gynophore.
Style: below bend Spinel Red, above bend Ox-blood Red.
Fruit: Mummy Brown.
Seeds: toning on the same seed from Isabella Color to Ecru Olive.

It is evident that taxonomic studies of intraspecific variation should be based on experimental research if the subjective element is to be kept at a minimum and evaluation of characters given a stable basis in fact.

Taxonomists are urged to take more trouble in preparing descriptions which make new names valid, whether such names are published as specific, varietal, or as of some other taxonomic status. The possibility of using symbol-combinations instead of names for intra-specific variations should be more widely tried. Descriptions associated with "varietal" names should definitely be diagnostic of a taxonomic entity, or, alternatively and clearly stated, a phenotypic character should be named or otherwise symbolized and defined. The latter is the only method of avoiding an unnecessary and impracticable nomenclature in such a species as Anthyllis Vulneraria if the whole species polymorphism is considered.

The research on which this paper is based has been aided by a Royal Society Government Grant.

NEW AND RARE SPECIES OF NEW ZEALAND MOSSES.

BY H. N. DIXON AND G. O. K. SAINSBURY.

The present list forms a Supplement to the "Studies in the Bryology of New Zealand," the last part of which was published in N.Z. Inst. Bull. no. 3, part vi., Jan. 1929. (This work is referred to in the following pages as "op. cit."

The reference numbers given for the different specimens are those in which they appear in Herb. G. O. K. Sainsbury; they are not always identical with the collecting numbers of the various collectors.

The types of the new species and varieties must be considered to be those in Herb. H. N. Dixon.

Ditrichium fragiliscus Dixon & Sainsb., sp. nov. Gracilescens; elatum, ad 3 cm. altum; superne atroviros, inferne fuscum. Caules simplices vel his illic dichotome ramosi. Folia con- fertiuncula, sicca aequo ac madida patula, inferiores semissime diffracta; 3-3·5 mm. longa, e basi lanceolata convoluta sensim
in subulam longam linearem acutam, sat tenuem, integerrimam angustata, apice nunc subobtusa nunc hyalino-apiculata; costa late, male definita, in subula soluta. Cellulae inferiores valde irregulares, nunc longissime lineares, nunc breviter rectangulares, ad marginem haud angustiores; supra sensim abbreviata, medianae rhomboideae, superiores breviter rectangulares et subquadrate, omnes incrassate, laves.

[Frutus ignotus.]


Quite distinct from all the New Zealand species, and very near to the South American *D. conicum* (Mont.). That plant, however, has the leaves contracted just above the insertion, the cells are less incrassate, and there is a marginal band of very narrow cells in the basal part. *D. hyalino-cuspilatum* Card. from South Georgia is also near it, but that is compared with *D. conicum*, and presumably has the same basal marginal areolation, while the base is more rapidly contracted and the subula finer than in the present plant; the highly fragile leaves also are a marked character here. The apex is occasional, but rarely, shortly hyaline-tipped; the cells of the expanded part of the leaf are nearly always unusually short and wide, but are somewhat irregular. It is remarkable that it should have been gathered in two so widely separated stations, and by the same collector.

**Pseudodistichium Buchananii** (R. Br. ter.) Dixon ("Studies in the Bryology of New Zealand," N.Z. Institute Bulletin, no. 3, 53, 363). This species has been found recently by Mr. Allison both at Rotorua, North Island, the original locality, and from there southwards to the Waikato River, 20 miles distant. It grows on poor soil in open places, usually on gently sloping ground, and is not uncommon in that district. Mr. Allison reports that in a fresh state the seta is markedly flexuose.

**Seligeria Cardotii** R. Br. ter. (op. cit. 54). Lake Waikaremoana, Wairoa County, 2000 ft. (Sainsbury), cfr. The only North Island Station at present known, but an extension of the distribution is probable. Found on calcareous rock, which accords with the usual habitat.

**Campylopodium Lineare** (Mitt.) Dixon (op. cit. 71). An addition to the former localities, namely Canterbury, South Island, and near Wellington, North Island, is Mt. Ruapehu, North Island, where the species has been twice found (Mundy 217; Sainsbury 504) in widely separated stations. On earth, in forest, cfr.

**Camphylopodium euphorocladum** (C. M.) var. nov. *thermophilum* Dix. & Thér. Elatum. Folia perlatia, sica atque medusa fortiter divaricata, saxpe squamose, subula saxius lata, breviscula, subobtusa capillaris divaricata.


This is not var. *squarrosum* Besch., from which the description appears to have the form of the leaves typical, while the fruit has certain characters which do not appear here; the capsule appears to be quite normal.

A note on the label states that the stones on or among which it was growing when picked up were too hot on the underside to hold!

**Eucamptodon Inflatus** (Hk. f. & W.) Mitt. (op. cit. 95). Miss L. B. Moore reports that this interesting and beautiful moss grows in abundance among rocks with low-growing shrubs and on rather boggy slopes of Mt. Moehau, Coromandel, North Island, 2000 ft., and that it is often associated in large areas with the equally handsome and striking *Breutelia elongata* (H. f. & W.) Mitt. In Herb. Petrie at Auckland there is a specimen from Wairakei, near Taupo, North Island, which is apparently a completely isolated station for the plant. It has not been found in the nearby districts of Aitamuri and the Tongariro National Park, where mosses have received attention in recent years, and where, at any rate in the case of Aitamuri, the soil and climatic conditions are similar to those of Taupo.

**Dicranoweisia Antartica** (C. M.) Par. (op. cit. 72). Appears to be quite widely distributed in the North Island in mountainous districts. It has been collected on Mt. Egmont, Mt. Ruapehu, and the Rimutaka Ranges, as well as on Mt. Hikurangi, the culminating peak of the East Coast Range.

**Dicranum (Trichodontium) Aucklandicum** Dixon (op. cit. 81). The published localities are Auckland Island and South Island. It has since been found on Mt. Ruapehu (Sainsbury 541, Waikohou, on earth, 3500 ft.; on rock near Ohakune, 4500 ft.). These stations are separated by the main mass of the mountain, and an extension of the distribution both here and in other mountainous parts of the North Island is quite possible. In both cases the plants were in fruit and growing in the open.

**D. Trichophorum** Mitt. A remarkable form of this was collected growing as an epiphyte on the top of wind-swept juvenile *Eelocarpus* on summit of Moehau Mt., Auckland, by Miss Moore. It varied much in size, but was often very small, blackish, reduced in many ways, with the nerve homogeneous,
sarcely thicker than the lamina itself, and was at first supposed to be a Blinia. Further specimens, however, intergraded with more normal D. trichopodum, of which it is not an abnormal state.

A further striking and very pretty form was gathered by Sainsbury (656) in the Tararuas Mts., near Levin, on the bark of subalpine scrub, emitting from the upper portion of the stem very numerous long-leaved branchlets, exceedingly fragile and easily detached, evidently of the nature of "brood-branches."

**Dichranoloma integrifolium** Dix. c. fr. Perichaetia about .75 cm. long, the leaves erect and convolute, the lower shortly cuspidate, the inner shortly tapering to broadly acuminate points. Seta 1-1.5 cm. high, theca short, curved, smooth, strumose; lid paler, about the same length, decurved.


The inner perichaetal leaves are quite erect, not aristate or cuspidate as in most species, nor truncate and mucronate as in _D. Billardieri._

**Fissidens Allisonii** Dix. & Sainsb., sp. nov. (§ _Crenularia_). 

Fusillus, viridissimus; caulis brevis, plurijuga, vix 4 mm. altus; folia conflerta, late vel anguste lanceolata, interdum lineari-lanceolata, acuta, sicca falcata. Lamina vaginans in media lamina apicali (inter costam et marginem) sepium terminata. Folia omnina icmargiinita, minutissime crenulata; costa per-pallida, longo infra apicem soluta. Cellulae parva, intus chlorophyllus, parietibus pertenuibus, pallidis, dense, humiliter papillosae. 

Diocicus. Seta terminalis, brevis, vix 2 mm. alta, pallida; theca erecta, minuta, anguste ovalis, leptodermica, viridis. Opcrculum tenuiter rostratum.


The first section of the species recorded from New Zealand, and not very closely allied perhaps to any known species. It is perhaps nearest to _F. abbreviatus_ Mitt. from Raoul I., but apart from the presence, at times, of an inconspicuous limbidium on the vaginant lamina that species has a concororus nerve and the cells of the vaginant lamina are distinctly enlarged.

**Fissidens vitatus** Hk. & W. (sp. cit. 103). Any doubt as to the occurrence of this species in New Zealand is set at rest by its discovery near Wairua, Hawkes Bay, North Island, by Mrs. E. A. Hodgson (478 and 506). On open hillside and land adjoining sea-beach; without fruit.

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_F. subelongulosus_ Dixon (sp. cit. 364). Further investigation shows that this is a form of _F. inclinabilis_ C. M. with a very long seta and ventricose vaginant lamina. The species therefore be dropped.

**Leptodontium interruptum** (Mitt.) Broth. (sp. cit. 121, 364). Further stations, all in the North Island, are Rotorua (Dixon, 508, on heated soil); Maketu Beach, Bay of Plenty (Allison, 457, sand-dunes); Puriri, Poverty Bay (R. C. Murphy) and Masterton, Wairarapa (J. K. Welch 49). Cheeseman's Auckland specimens are the only known fruiting plants. Brood-bodies are sometimes present, clustered plentifully on cauline threads as described and figured by Correns ("Vermischte der Laubmoose," 65) for _L. styricum_ (Jur.) Limpr. The gemmae in _L. interruptum_, however, are much shorter and normally ovoid. A striking association of this species with _Bryum camptothecum_ Tayl. occurs on sand-dunes in the Bay of Plenty and Hawkes Bay.

**Hyophila novae-zealandiae** Dix. & Sainsb., sp. nov. Seta robusta, ad 2 cm. alta, astro-viridis, dense caespitosa. Folia conifera, madida subquarrosa, sicca incurva, haud contorta, 2 mm. longa, e basi haud dilatata, late oblonga, concavo-carinata, apice obtuso, leniter recurvata, rario minute apiculato; costa saepta, infra apicem soluta, dorso levis vel sublevis; margines erecti, integri. Cellulae superiores subrotundae, subincrescatae, laevae, basin versus subquadrate, majores, infimae basales pauciter rectangulares, hyaline, parietibus tenuebus.

Seta perbrevis, c. 5 mm. alta; folia perichaetialia foliolis caulini subsemilunari; theca parva, deperculata 1 mm. longa, anguste elliptica, gymnostoma.


This is the first species of the genus described from Australasia (_H. inflata_ (Tayl.) C. M. is a _Hymenostomum_), and is very distinct in the form of the leaves, the entire margin, the small ovoid capsule, and other points.

**Triquetrella curvifolia** Dix. & Sainsb., sp. nov. A _T. papillata_ differt folis parum decurrentibus, costa dorso fere levis, cellulis pellucidioribus, papillis multo humidioribus, apice acuminato, acuto hyalino-apiculato, costa longa sub apice desinenti, pellucida; ab omnibus speciebus folii sicco circum caulem arce subspiraliter curvatis, unde caulis subcatenulatus fit.

[Fructus ignotus.]

A very distinct species in the leaves finely ciliate, with a smooth hyaline tip, much less strongly papillose than in most species, and especially in the leaves closely twisted round the stem when dry, often forming an indistinct spiral. The stems are slender, elongate, flexuose, more or less prostrate, so that the tigroides arrangement is not so marked as is usually the case when moist. The plant was growing with Bartramia alaria, sp. n.

**Didymodon Binnis** (R. Br. ter.) Dixon (op. cit. 125). Port Lyttelton Hills, South Island, and Wairoa, North Island, are the only known localities. At Wairoa it is not uncommon, and grows in open places on bare exposed earth, fruiting rather scantily. When the coastal districts of New Zealand have been investigated with any degree of thoroughness there are quite likely to be further findings of this small and inconspicuous moss.

**Pottia Stevensii** R. Br. ter. (op. cit., 139). Also reported from the North Island, Wairoa (E. A. Hodgson 464). On open silty ground near the sea, and without fruit.


This was described for an Australian moss (Victoria: Tasmanian) as "*P. phythiscomitrioides* C. Müll., ex Argentina, valde affinis." It appears highly probable that the two are identical, but no specimen of the South American moss has at present been available for comparison.

**Tortula viridipila** Dixon & Sainsb., sp. nov. *Pusilla. T. atrivirens* (Sm.) fructus affinis, foliis autem toto coelo distincta. Folia in comam bulbisformem dense congesta, et basi latiore oblongo-lanceolata, 2.5-3 mm. longa, abrupte acuminata, cum costa aristata, concava, marginibus medio folio recurvata; costa validissima, versus apicem paulo dilatata, in aristam flexuosam viridem vix dentiulatum, apice hyalino, quartam vel tertiarm partem longitudinis folii exaequantem excurrens. Cellulae superiores maguscula, circa 13 μ late, subpellucide, subincurvatae, dense altissumcula pluri-papillosa; marginales vix mutatae; basales per partem quartam vel tertiam folii perline, breviter rectangulares, parietibus tenuibus, marginem versus paullo angustiores. Folia superiors latiora, subhyphalata.

Seta circa 1 cm. alta, rubra; theca anguste elliptica, subitens; operculum oblique rostellatum. Calyptra longa, superne tubulosa, basi late dilatata. Peristomium rubrum, dentes ad basin in membranam brevissimam coherentes, superne irregulariter in

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**Cruma filamenta**, papillosa, hie illic conjuncta, obliqua vel subrecta divisi. Columella exserta. Spori circa 20 μ, muricati.

**Hab.** On earth, summit of Mt. Arthur, Nelson, 5800 ft. alt.; coll. Sainsbury (571).

A well-marked species with leaves something of the form of *T. muralis*, but—the upper ones at least—broader above, and with a long green flexuose arista. The leaf-form and structure is similar to that of *Desmatodon*, but the peristome appears to be rather that of *Tortula*.

**T. abruptinervis** Dix. It appears probable that the young leaf is normally terminated abruptly by a clavate prolongation of the nerve, which is broken off usually at a very early stage, and leaves the truncate end of the nerve as it is generally seen, the clavate tip being evidently of the nature of a reproductive “brood-body.”

**T. flavinervis** Dix. var. nov. *gigantea* Dix. & Sainsb. Elata; terrestria, usque ad 10 cm. alta. Folia magna, superne lata, apice late rotundata, nonnunquam obtusa, pilo flavido longiore.

**Hab.** In grass in damp spot, Patoka, Hawkes Bay, Apr. 13, 1926; coll. Mrs. Hodgson (362).

The typical form has been further collected near Hastings; on the Mahia Peninsula; on the Waikato River, near Ati-Airangi, in the North I. Also in the South I. In Aniseed Valley, Nelson; and Port Lyttelton Hills, Canterbury.

**Grimmia obtusa** Hampe & C. M. Craigieburn Mt., on rock near Hogsback Creek, Canterbury, Jan. 9, 1931; coll. Miss L. B. Moore (631).

Otherwise only known from Australia, where it appears confined to two localities, one in Victoria, the other in New South Wales.

In Hampe's herbarium there are two tufts, labelled (a) and (b). The description says it is near *G. montana*, but differs in the curved seta and striate capsule. Now in all the fruit of (β) the seta is longer and cymose and the capsule striate, while in (α) the seta is short and erect and the capsule smooth. There is also a difference in the length of the lid. The specimen (β) must therefore be considered the true plant, while (α) is probably a different species.

**Amphidium cyanthocarpum** (Mont.) Broth. (op. cit. 162). There are two (montane) records for this moss in the North Island, i.e., Mt. Ruapehu, at 4500 feet. (Sainsbury), and Whanakeo, Raukumara Mts., East Coast, 300 feet (L. B. Moore, 468). In both cases on rock and fruiting. The Ruapehu plant has the leaves entire, whilst in the other they are usually bluntly dentate towards the apex.
NEW VARIETIES OF MYCETOZOA FROM JAPAN

By G. LISTER.

I have been favoured by receiving from Dr. H. Hattori, head of the Biological Laboratory of the Imperial Palace, Tokyo, Japan, some interesting specimens of Mycetozoa gathered last summer at Nasu, in the Tochigi prefecture, by the Emperor himself. They consist of varieties of two species, Didymium leoninum Berk. & Broome and Arcyria pomiformis (Leers) Rost., which appear not hitherto to have been described. They arrived in perfect condition, and are accompanied by photomicrographs illustrating the capillitium and spores.

Didymium leoninum var. nov. effusum. All previous gatherings of this species consist of groups of scattered subglobose sporangia borne on short orange stalks. The present gatherings have the form of flat effused plasmodiocarps, tawny or pale brown in colour, varying from a few millimetres to several centimetres across, and sometimes completely covering one face of the maple- and birch-leaves to which they adhere. They were found maturing from "flame-scarlet" plasmodium and, as Dr. Hattori writes, they might have been mistaken for a new species if similar plasmodium from another collection had they not produced in the laboratory sporangia that were undoubtedly those of D. leoninum. The intimate structure of the effused form resembles that of the typical sporangia in many ways. The cartilaginous sporangiophorus, chasmat-brown by transmitted light, breaks up on maturity into small areoles and is clothed with a layer of comparatively large stellate crystals of lime; the capillitium forms a close network of slender purplish-brown threads, and the pale violet-grey spores, 8-9 μ in diameter, are marked with patches of very minute warts. But no definite columella is present, the thickened orange floor containing scanty deposits of nodular crystals like those in the subglobose columella of the stalked form. Typical D. leoninum has been obtained several times in Ceylon, where it was first discovered, from near Singapore, in Java, and also in Japan. The present remarkable effused variety, which appeared in some abundance in the woods of Nasu, shows no pulvinate or stalked sporangia among the flat plasmodiocarps, and seems deserving of varietal distinction.

Var. effusum may be defined as follows:—Sporangia forming flat effused plasmodiocarps with no definite columelle.

Habitat. On dead leaves.*

It may be noted that effused plasmodiocarps not infrequently occur in Didymium squamulosum (Alb. & Schw.) Fries, but they are usually associated with stalked or pulvinate sporangia. Didymium ochroides G. Lister, obtained from Japan, North India, and Long Island, U.S.A., shows affinity to D. leoninum in spores and capillitium, but differs in the slender plasmodiocarps having membranous walls mottled with pale orange patches.

Arcyria pomiformis var. nov. heterospora. This form of Arcyria pomiformis sent by Dr. Hattori consists of scattered and nearly sessile dull buff-coloured sporangia, seated on lichen (Parmelia sp.) and bark of a living trunk of Cornus controversa Hemsl. They differ chiefly from the usual form in microscopic characters. The capillitium threads are marked for a short distance near the base (where they are attached to the persistent cup) with two to three well-defined spiral bands; the remainder of the capillitium shows no peculiar features, the threads being thickened on one side and marked with transverse bands and spines arranged in a very open spiral, faintly warted or reticulated elsewhere. The spores are larger than usual, averaging 9-10 μ.

* Didymium leoninum var. nov. effusum, peritidis (plasmodiocarps) deplanato-effusis; columellae indistinctis.
causing the sporangia to droop from their own weight as in the
typical form of D. cancellatum (Batsch.) Macbride, but are of
much the same width throughout, as in D. cancellatum var.
alpinum*. Without a lens the species might be mistaken
for Cribaria rufta (Roth.) Rost. from the bright carrot-red
colour of the spores, but when magnified the structure of the
ribs is entirely that of a Dicytium. It differs from any form of
D. cancellatum in the smaller number of the ribs and in the
colour of the spores; also the walls of the spores have no plasmodic
granules adhering to them as have the spores of D. cancellatum.
Miss Fraser writes that she thinks D. rutulum is not uncommon
in the neighbourhood of Sydney.

The following is a short Latin diagnosis:—Dicytium rutulum,
sporangia gregaria, stipitatus, subglobosa, rufts, 0-35-0-5 mm.
mm.; stipite nigro-brunneo, ereto vel arcuato, 0-6-1-5 mm.
mm.; venis 14-16; sporis diluto-aurantiinis, 6-7 μ diam.

In conclusion, I wish to thank Miss Fraser for letting me
see her interesting gatherings and for permitting me to name the
new species.

NOTES ON RUBI.

BY WILLIAM WATSON.

I. WHAT IS RUBUS RHOMBIFOLIUS WEHE ?

It is the purpose of the present communication to show that
the plant which for the past fifty years on the Continent and in
this country we have, through the dominating influence of Focke,
been calling Rubus rhombifolius Wehe is not the plant of Wehe
of that name, and by directing attention again to the descriptions
and figures of Wehe and Nees to secure the needful rectification
in the application of the name.

The confusion seems to have arisen in two stages:—firstly,
the unfortunate combination by Focke of two distinct Wehean
units under the name of the first (and earlier) unit, and, secondly,
through the greater prevalence of the second unit, the exclusive
association to it—in some quarters—of the name proper to the
first unit. Focke himself seems not to have proceeded to the
second stage, and his earlier contemporaries declined to accompany
him even on the first stage. In this country we have gone on to
the second stage, using a fresh (and altogether unnecessary)
ame for the first Wehean unit.

* M. Meylan considers that this alpine variety is worthy of specific
245, 1924); it is clearly the same form as that named by Rostafinski
Heterocladetum mirabile.

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Rubus rhodanthus, sp. nov.—In Weihe and Nees’ Monograph of the German Rubi, pt. iii. (1825), Latin version, pp. 36-7, German version, pp. 38-9, there is briefly described a bramble which is named—in the Latin version only—Rubus carpinitifolius b. roseus, and is said to grow around Mennighüffen (in the Becker Bog) and in other places. Weihe was a doctor at Mennighüffen, and it may be assumed that the description is from his observation of the living plant. In the same locality R. carpinitifolius was plentiful, and Weihe was content to regard b. roseus as species of the descriptions in the two versions and from tab. xiii. b the following description of the plant has been drawn up:—

Rubus carpinitifolius b. roseus W. & N. Stem rather slender, angled, with flat or furrowed sides, moderately patently pilose, neither glaucous nor glandular, green to red. Prickles purplish-based from the first, declining or more or less recurved, longer than the diameter of the stem. Leaves quinate-digitate; petiole villose, armed with many hooked prickles; intermediate petiololes one half as long as the terminal petiole; leaflets flaccid, not plicate, somewhat strigose above, velvety and whitish beneath, unequally or doubly serrate; terminal leaflet ovate-lanceolate, gradually acuminate, twice as long as broad, base subcordate; stalk of basal leaflets about 5 mm. long. Flowering branch slender, panicle branches very patent, the lower ones racemose, the upper ones simple; or the panicle more compound. Pedicels about 2-5 cm. long, armed with about seven fine declining prickles. Flowers up to 9 cm. across; petals pink, oval, 8-9 mm. broad, margin slightly undulate, apex rounded; stamens pink, much longer than the styles; sepals greenish, acuminate, appendiculate and foliaceous on the terminal flower.

Habitat. Wet soils. I have seen a specimen of this plant gathered by G. Braun in Weihe’s district in 1876, and am acquainted with the same plant in England (e. g., at Chislehurst Common, W. Kent, in marshy soil; and at Wimbledon Common, Surrey, on the edge of the flood-plain of the Beverley Brook). From these sources I venture to supplement Weihe’s description slightly as follows:—

Basil leaflets often longer than the petiole. Sipules glandular. Panicle often almost unarmed and lax, the lower branches sharply ascending and exceeding the leaves in the axils of which they spring; rachis clothed with long patent hairs, with patent prickles below, falcate ones above. Pedicels furnished with 1-2 sunken glands.

Lower leaves on the flowering branch composed of deeply incised nettle-like leaflets; their petiole short, not more than about two-thirds the length of the terminal leaflet. Terminal leaflet of the ternate leaves obovate, narrowed to both ends, the sides curved, the base subtruncated, 5-7 mm. wide; the teeth broad, ovate, regular.


Rubus carpinitifolius stands rather isolated amongst European brambles. It goes best in the forefront of the Thyrsoides, as a connecting-link with the Suberecti. Weihe and Nees of b. roseus is related more to R. villicaudus and R. Lindleianus, and ought consequently not to stand as a variety of R. carpinitifolius. As there is already a Rubus roseus, a fresh name has to be found. I propose Rubus rhodanthus, and quote the sufficient description of Weihe and Nees and their plate (for both of which references are given in the first paragraph above), and as illustrative specimens G. Braun’s exs. no. 34, Herb. Rub. germ.

Rubus rhombifoilus Weihe.—In the same work of Weihe and Nees, part iii., at pp. 38-40 of the Latin version, and pp. 40-42 of the German version, another bramble is described, under the name of Rubus vulgaris d. rhombifoilus, and it is said to be exceedingly common around Mennighüffen. In the year previous to the appearance of part iii. Weihe had published a description of the same plant as a separate species under the name of R. rhombifoilus in Boennigh. Prodr. Fl. Monast. p. 151, and that is no doubt its proper status.

The authors point out that this plant, in its calvecent stem and its terminal leaflets narrowed to the base, differs from R. carpinitifolius and b. roseus, which have a pilose stem and terminal leaflets with a cordate base. The following description is prepared from their descriptions and remarks and tab. xiv. d of their work:

Rubus rhombifoilus Weihe. Stem more or less distinctly angled, sparingly pilose, and where exposed to the sun more or less glabrescent. Prickles about 15 to each internode. Terminal leaflet oval-rhomboid, less than twice as long as broad, with a very long acuminate point, decreasing in width towards the obtuse base, and so subacute; the other leaflets ovate-oblong acute. All leaflets hispidulous and shining above, softly pubescent and greyish felted beneath, the midribs and veins papulose when old. Intermediate petiololes one-half to one-third as long as the terminal petiole.

Panicle pyramidal, much narrowed to the apex, conspicuously flexuose; the middle branches somewhat patent, cymose. Flowers larger than in R. Selmeri and R. polyanthemus. Petals and stamens pink.

Habitat. In hedges and thickets. I have seen a specimen of this bramble, gathered by G. Braun in Weihe’s district in 1876, and issued by him as no. 11 of his t 2.
Herb. Rub. germ. This is exactly matched by specimens collected at Shotover by Druce in 1896 and at Boar’s Hill by Focke in 1884 (as R. pyramidalis). This bramble is also found on the commons south of London, but often poorly developed, e.g., at Wimbledon Common, Barnes Common, Hayes Common (W. Kent), and Chislehurst Common (a forma minor); and also a magnificently developed specimen at Stedham Common (W. Sussex), which is quite comparable in vigour with Braun’s specimen.

The following characters will serve further to distinguish the present bramble from its near allies and from R. rhodanthus:—

Stem obtuse-angled, sides flat or slightly concave, bearing an occasional short-stalked gland or prickle. Petiole furrowed below, longer than the basal leaflets. All leaflets thick and coriaceous, becoming convex, often imbricate, clothed with shining pubescence and white felt beneath which becomes yellowish when old; teeth subequal, triangular-ovate, often rather shallow and sinuate, the principal teeth sometimes patent. Terminal leaflet less than twice as long as broad, on the lower leaves ovate-cordate, on the upper leaves more rhomboid-ovate, with a somewhat truncate or narrowed entire base. Basal leaflets shortly stalked (about 2 mm.).

Panicle cylindrical and dense above, pyramidal below, lower branches shorter than the subtending leaves. Terminal leaflets narrowed below to a point, finely toothed. Lower leaves rather long-stalked, the petiole equaling the terminal leaflet. Rachis armed with patent or slightly declining prickles above and larger falcate and hooked long-based prickles below; the rachis and branches and lower bracts furnished with short-stalked sunken glands. Petals moderate, roundish oval, abnormally sawed, contiguous, rose-pink to pinkish. Sepals small, olive-green, grey-felted and villose, with a whitish margin, ovate, somewhat obtuse, acuminate, especially at the base, patent after flowering. Stamens much longer than the pink or pink-based styles. Anthers and young carpels pilose.

This bramble appears to fall best into the Argentea, near R. incarnatus P. J. Muehl., which is distinguished by its leaves glabrous above, terminal leaflet ovate-deltoid, always entire-based, glabrous carpels, and the stem, panicle, and bracts completely eglandular.

For fifty years following the publication of the two foregoing plants by Weihe and Nees one finds very little notice of them. Wirtgen and Mueller appear to have mistaken the closely related R. argenteus for R. rhombifolius. Then Focke, collaborating with Banning and G. Braun, explored the Duchy of Minden with the object of re-discovering Weihe’s species in their original stations. At the same time he grew plants of R. carpinifolius b. roseus in his garden from seeds and clones sent by Banning from Minden, apparently for the purpose of testing an idea which had formed in his mind that that plant was only the forma subrosea of R. rhombifolius—any rate it is clear that he expected his plants to develop into R. rhombifolius. They did not do this; but, instead of taking warning of the unsoundness of the conclusions which he had drawn from his field observations, he recorded it as an unexplained exception to his general experience of brambles that the seed faithfully reproduced the parent plant, and proceeded to combine R. carpinifolius b. roseus with R. rhombifolius in the systematic part of his ‘Synopsis’ (1877).

His collaborator, G. Braun, did not share this opinion, and just as Focke’s work issued from the press he distributed examples of each plant from the Minden district under the names used by Weihe and Nees, without any suggestion that they belonged to one and the same species. Braecker also, who knew both plants in the neighbourhood of Cologne, described them a little later (1882) under the names that Weihe and Nees had used, and stated that Focke had done wrong in treating them as identical.

Notwithstanding these objections Focke clung to his opinion that both plants were R. rhombifolius, and so great was his reputation that his view has prevailed unto the present day. Even Sudre, who saw a specimen of each plant which had probably belonged to Lejeune and still bore the names used by Weihe, identified the one named R. carpinifolius b. roseus as R. rhombifolius on the ground that it agreed with specimens so named by Focke; the other species, labelled ‘R. vulgaris d. rhombifolius,’ he could only refer to R. argenteus (as Wirtgen and Mueller had also done), although he recognized that it did not completely agree. In so far as he saw that the two plants were distinct he was right; his mistake lay in relying upon Focke’s authority for R. rhombifolius. The plant described and illustrated in his ‘Monograph’ as R. rhombifolius is R. rhodanthus.

In this country the bramble I have called R. rhodanthus has always been named R. rhombifolius since Focke gave that name to our predecessors for it. The true R. rhombifolius remained unrecognized until very recently (Rep. B. E. C. 1931, p. 643 infra). The plant was, it is true, noticed by Rogers in the Wye Valley as long ago as 1899, and was very cautiously referred to by him as ‘a second form of R. incurvatus distinct enough to be recognized by a glance, and yet perhaps hardly needing a varietal name.’ Eventually it won the name R. incurvatus var. subcarpinifolius. Specimens which reached Focke drew from him the remark that in England R. rhombifolius was frequently mistaken for a form of R. incurvatus. The plant issued in the ‘Set of British Rubi’ as R. rhombifolius is R. rhodanthus.
The name *Rubus incurvatus* var. *subcarpinifolius* should thus disappear from our lists and be replaced by *R. rhombifolius* Wk., whilst the plant which we have been calling *R. rhombifolius* should in future be called *R. rhodanthis*.

II. *Rubus Colemannii* Bloxam.

In Kirby's Fl. Leic. (1850) Bloxam described a bramble which was discovered at Packington, Leic., by Colemann, who was at the time an assistant master at the Grammar School at Ashby-de-la-Zouch, two miles from Packington. The bramble was named after its discoverer *Rubus Colemannii*. No other station is given for the plant either in Fl. Leic. or in Rogers's review of the brambles of Leicestershire in the "Victoria History" of that county. Bloxam's description therefore in all probability refers solely to the Packington bramble.

A specimen from Packington labelled "no. 33 *R. Colemannii*" by Bloxam exists in Hb. Mus. Brit., and as it answers exactly to Bloxam's description it may safely be regarded as a type of the original *R. Colemannii* Bloxam. Besides this I have seen a specimen from a bush growing at Cambridge from seed sent by Bloxam and a bush which is still growing at Kew from a clone sent by Bloxam. These also answer to Bloxam's description and must be regarded as authentic.

A very fair idea of the plant may be gained from Bloxam's description, taken in conjunction with Focke's suggestion that the plant originated from a cross between *R. villicanalis* (I should say rather *R. calvatus*) and *R. radula*. It is not, however, obviously a hybrid, as all the specimens I have seen are fertile.

This original Packington *R. Colemannii* seems to be a very scarce bramble, and the name has for long been strangely transferred to a different plant, which is perhaps most common in Surrey, although it occurs also in other southern counties and in the Midlands. This second species differs in *toto* from the Packington bramble, and, well known though it is to all who study the brambles, the following description has been prepared to accompany and validate the separate name to which it is entitled. The description has been made from a bush growing on Witley Common, Surrey, and a specimen from the bush has been placed in Herb. Mus. Brit.

*Rubus crudelis*, sp. nov.—*Turiones ramique florentes angulati, expositi rubentes, pilosi, aciculis glandulosis in turionibus raris frequentioribus in ramis muniti. Aculei crebri inequalia; majores ad angulos dispositi, e basi compresso alii recti vel leviter declinati alii falcati vel magis recurvi, confluentes; minores sparsi, sape glanduliferi. Folia quinata, petioli breves, aculeis uncinitatis confertiss armati. Foliola omnia medio-crater et inaequilater vel potius duplicato-serrata, supra strigosa, subtus imprimis ad nervos appressa pilosa; infima breviter petiolulata; terminalis ovato-cordatum, sensim acuminatum (ramorum ovatum, grosse dentatum).

*Paniceae pyramidalis* rachis flexuosus acutangulus, rami axillares longi, angulo acute ascendentem multiflori, medi 3-7 floribus cymoso-partiti. Bracteae latae, hirsute, ad margines glandulosae. Florum speciosorium *sepala* aculeis parvis falcatis armata, deflorata patentia, erectechna vel laxe reflexa; *petala* rosea, ovobata; *stamina* rosea stylis tum virecentes tum roseolus multo superantia. Antherae pilosa. Germinina glabra.


*R. crudelis* is intermediate between *Silvatici* and *Vestiti*. As the leaves are green beneath, the sepal greenish externally, and the growth rather high-arching—unlike the grey-felted prostrate *R. Colemannii*—it goes better in the *Silvatici* in close association with *R. pyramidalis*.

SOUTH-WESTERN NATURALISTS' UNION.

ELEVENTH ANNUAL CONFERENCE, EXETER.

The Eleventh Annual Conference of the Union was held at Exeter from June 2-5, by kind invitation of the local University College Field Club and Natural History Society, under the presidency of Mr. C. W. Bracken, B.A., F.E.S., a well-known Plymouth entomologist.

The attendance of delegates and associates of affiliated Societies was larger than usual, and showed that the need for such a Union of Natural History Societies was at last materialising.

The visitors were welcomed at the Royal Albert Memorial Museum by Mr. F. R. Rowley, F.R.M.S., President of the Exeter Society, at an evening Reception on Friday, June 2, and enjoyed a fine display of exhibits arranged by the Museum staff and the Field Club members. These were mostly of a geological and entomological nature, but a collection of nearly fifty confers, mostly with cones, from the Pinetum of Broatham Hall, and a fruiting branch of the Cape Silver Tree, *Leucadendron argenteum*, received a good deal of attention. Maps and plans of Dawlish Warren from 1743 to the present day illustrated in a forcible manner the damage to the coast-line by sea-erosion—a whole line of sand-hills with their vegetation has practically disappeared.
An afternoon excursion on June 3 was taken to Stoke Woods, a few miles on the Tiverton road, where several nightingales were in full song. Species of Lastrea, Polystichum, with Luzula sylvatica and Carex pendula flourished luxuriantly under a canopy of fine oak- and beech-trees.

In the evening Mr. I. L. Sager, M.A., F.L.S., gave a popular address on the "Phyllody of the Corolla in Primula vulgaris," including an account of the primrose discovered in a disused burial ground at Lympstone, South Devon, in 1925, and exhibited at a meeting of the Linnean Society. The plant was transferred to an Exeter garden, where it has increased in size and still retains the abnormal character of the petals that resemble foliage leaves.

The second excursion was a whole-day motor-coach drive through the picturesque Teign Valley to Knighton Heath. The geologists learnt much about the different phases of the Exeter traps and Trusham Dolerite. In some of the quarries visited the botanists noted Melittis Melissophyllum, Lathyrus Nissolia, Rubia, Rhamnus Frangula, and Luzula Forsteri; but it was on Knighton Heath that most material for study was obtainable. The marsh-orchids Orchis praetermissa and latifolia were in great abundance, mingled with colour-forms of O. maculata and elodes, Erica cinerea nearly strangled by the threads of dodder, sedges and grasses in great variety, and Potamogeton natans assuming the narrower foliage of P. polygonifolius in an adjoining pond.

The Conference concluded with an interesting morning spent in a ramble round old Exeter, under the guidance of two local archaeologists.

Mr. C. W. Bracken was re-elected President for the 1934 Conference, which will, it is hoped, be held at Bath, and Miss Roper and Prof. O. V. Darbishire Secretary and Treasurer respectively.—Ida M. Roper.

**OBITUARY.**

**MATILDA CULLEN KNOWLES**

(1864-1933).

The death of Miss Knowles, after a short illness, removes one of the few lichenologists of those islands, and the only botanist in Ireland who was making a special study of that group. From an early age Miss Knowles was interested in the Flowering Plants, and worked at them first in her native county of Antrim and the adjoining county of Londonderry. When 'Irish Topographical Botany' was planned in 1895 she undertook the survey of the county of Tyrone, and sent in a list of over 300 species. In 1902 she took up work in the Science and Art (now National) Museum in Dublin under Prof. T. Johnson, and five years later was appointed to a "Temporary" Assistantship, which post she held until her death. After Prof. Johnson's retirement some ten years ago she remained in charge of the Botanical Section. Her museum duties led to an extension of interests, and she acquired a good working knowledge of the British as well as of the Irish flora, including at least the more conspicuous and familiar of the Cryptogams. The Licbens made a special appeal to her, and when Miss Lorrain Smith undertook the working out of this group in connection with the projected Natural History Survey of the Clare Island district in Mayo, in 1908, she found an able helper in Miss Knowles. With her knowledge of the Licbens considerably enhanced by this Clare Island work Miss Knowles undertook a more intensive study, largely ecological, of the marine and maritime species as represented on the promontory of Howth, near Dublin. The results were embodied in a valuable paper in the 'Scientific Proceedings of the Royal Dublin Society' (xiv. (n. s.) no. 6, pp. 79-143, 1913); she then planned a more ambitious scheme—the working up of a complete list of Irish Licbens on a topographical basis, adopting for this purpose the forty "divisions" into which the country had been partitioned in 'Irish Topographical Botany' and a number of subsequent botanical and zoological papers. Lichen-study in Ireland had previously been concentrated on only a few areas, where the attractiveness of the flora or the presence of resident botanists had resulted in fairly full lists of species. For over half the Irish divisions the recorded Lichen flora was very small—for some, indeed, nil! Miss Knowles, working almost single-handed, raised the average flora of the forty divisions to 186, adding over 100 species to the Irish flora, and five new species. The whole, including an admirable Introduction and a Bibliography, was issued by the Royal Irish Academy, 1929*. The material for a Supplement had, at the time of her death, reached considerable dimensions.

Miss Knowles was an accurate and energetic botanist, a charming companion, and a wise and trusty friend. She will be missed by a circle much wider than that which she had created by her long-continued botanical activities.

She was born in Co. Antrim, January 31, 1864, and died in Dublin on April 27, 1933.—R. L. Praeger.

**ABSTRACTS OF PAPERS OF INTEREST TO STUDENTS OF THE BRITISH FLORA.**

a number of interesting floristic and systematic notes on plants collected by Swiss botanists in the years 1930 and 1931. He also quotes a number of recent monographs and revisions of various genera. Some of these are in rather out-of-the-way publications, and are liable to be overlooked. Under Pteridophyta the name Asplenium Bregni Rez. takes the place of A. germanicum auct. vix. Weis. Under Coniferae the author quotes under Juniperus, R. Pilger, 'Die Gattung Juniperus' L. in Mitt. Deutsch. Dendrolog. Ges. xili. (1931), 255-260. Among the notes on Monocotyledons under the genus Avena, A. Saint-Yves, 'Contribution à l'étude des Avena sect. Aveenastrum,' in Candollea, iv. 353-364 (1931), and under Trifolium, C. Flaksberger, 'Eudeticum verschiedener Länder &c.,' in Fedde Repert. xxvii. (1930) 241-253.

Various interesting Orchids are mentioned—Orchis incarnata × latifolia (O. Ascheroniana Hauskn.), Orchis incarnata × maculata (O. ambigua Kerner) are recorded for several localities, and O. latifolia × maculatus (O. Braunii Halayzy) and Ophrys fuciflora × muscifera (O. devenensis Rchb.) from near Aarau, etc. Among the notes on Dicotyledons the student of the Ulmaceae is referred to H. Walter in Kirchner, Loev and Schroeter, 'Lebensgeschichte der Blüttenpflanzen Mitteleuropas,' ii. 1 Abt. (1931) 601-764. Under Veronica E. Lehmann's 'Geschichte und Geographie der Veronica Gruppe Megasperma,' in Bibl. Bot. 99 (1930), is quoted. The forms of Plantago Coronopus L. and its allies have been revised by R. Pilger in Fedde Repert. xxviii. (1930), 262-322.

Botanists interested in recent floristic and systematic work in Switzerland should consult the original paper.—E. G. B.

DEVONSHIRE ASSOCIATION.—The Report and Transactions of the Association for 1932 contain the 24th Botany Report, edited by the Recorder, Mr. G. T. Harris, a Second Report of the Botanical Section by the Hon. Sec., Mr. F. A. Brokenshire, an account of the Sea-weeds of South Devon by Mr. G. F. Tregelles, and a Supplementary Glossary of Devonshire Plant Names by Mr. R. Pears. Cope.

The Botany Report gives a large number of fresh stations for various plants, chiefly Phanerogams and Fungi, and a list of new county records. As in previous years the identification of a few of the Phanerogams seems to require confirmation by a competent botanist. The occurrence of Peucedanum officinale and Cephalanthera rubra as native species in Devon would be of considerable interest. Mr. Tregelles' list of sea-weeds is a full one, and likely to prove useful; the glossary also is comprehensive, and includes many curious local names. The explanations suggested for some of these names, e. g., Adam-and-Eve, are not always convincing.—H. W. Pugsley.

SHORT NOTES

AN ARMY OF MYOSURUS MINUS.—A few years ago, while strolling in May along the road that leads eastwards from Hereford to Ledbury and a few miles out crosses the marshy valley of the Lugg I made a startling discovery. At one of the many little bridges that span the marsh, to allow for drainage in time of flood, I paused to look over a gate, and my eyes opened wide with astonishment—before me lay a veritable army of little plants, each standing erect like a soldier, about 2-3 inches high, and each ending upwards in a slender tail like the tail of a mouse. It was Myosurus, as I speedily convinced myself by climbing over the gate. But why so many? Hitherto I had seen it only in dozens; but here, as a survey soon proved, there were very many thousands of Mousetails, covering an area as big as a small suburban garden.

The reason was soon seen. During the winter there had been extensive floods, and many banks of silt had been left behind when the waters subsided. It was one of these banks that was overrun by the little plant. But the point of interest was that it formed an almost pure cultivation—only a few small grass-tufts leavened its homogeneity. The seeds had been washed down in thousands, and, germinating quickly, had occupied the ground. Whence had they come?

Next year, and in succeeding years, I revisited the spot every May. The Myosurus still came up, being an annual that produces a great abundance of seed, but every year the number of grass-plants and other common weeds increased, and gradually the army of Mousetails diminished. After about five or six years it had vanished entirely, being smothered by its more vigorous competitors.—W. B. Grove.

SPARTINA TOWNSENDI ON THE PORTISHEAD SALT-MARSHES.—During a field-class held on May 22, 1933, plants of Spartina Townsendi were noticed growing on the lowest zone of the Portishead and Portbury salt-marshes. The district has been kept under observation by the Botany Department of the University of Bristol for some years, and hitherto the plant has not been observed there. A preliminary survey showed about eight plants in all. They were scattered between Portishead and Portbury, but all in the lowest zone of the salt-marsh near the high-water mark of the neap tides.

The occurrence and spread of this plant at Barrow, Somerset, since 1921 has been fully described by H. S. Thompson*. He suggests that the plant was probably introduced from the locality of Kingston Seymour near Clevedon, where it had been planted in 1913 as an experiment for the prevention of coast erosion.

Miss Roper describes the course of this experiment and shows how the plant has apparently been unable to withstand the tidal currents at this spot and has not flourished during the years of the experiment. In 1923 Miss Roper recorded the appearance of Spartina Townsendi at Severn House Farm, near Berkeley, on the Gloucestershire coast.

From records kept of edaphic and physiographic factors of the Portishead marshes since 1924 it may be seen that considerable changes in the slope, and consequently in the frequency of tidal submergence, have occurred in the lowest zone of the marsh. Correlated with these changes is a steady decrease in the number of Salicornia plants in the zone has been observed. It is hoped to start at once a thorough investigation into the nature of these changes, particularly with a view to accounting for the appearance of Spartina Townsendi in a new locality.

Rose Bracher, Department of Botany, University of Bristol.

STRYCHNOS NUX-VOMICA LINN.—In Waterhouse's 'Index Generum Avium' we find recorded the genus Strychnos, which is referred to Brehm, 'Der Vogelfang,' 1836, 35. This was duly recorded by me in the 'Index Animalium,' 1801-1850, with the addition of the specific name as given by Brehm in accordance with the usual practice. In revising the proofs of “S” I went further into the matter, and find that Brehm, in the midst of his birds, prints the plant name in the same type as the bird names, and Waterhouse has copied it inadvertently as a new bird when recording for his Index. A proper note explaining the fact will appear shortly in the 'Index.'—C. D. Sherborn.

REVIEW.


Members of the International Botanical Congress held at Cambridge in 1930 will call to mind an exhibit of a beautiful series of coloured drawings of European orchids, 229 in number, the work of Mrs. Hilda Margaret Godfery. Mrs. Godfery died shortly after the Congress, and a brief appreciation of her work will be found in the November number of this Journal. The present volume is a tribute to the memory of the "wife, companion, and enthusiastic fellow-student of Orchids, by whom this book is illustrated, and without whom it would never have been written." A happy photograph of the artist gathering flowers in a garden accompanies the dedication.

lanthera "enables us to understand how cross-fertilization by the aid of insects could be brought about, before a rostellum had yet been evolved in the Orchidaceae." Later in the book (pp. 53-4) the author describes the experiments by which, after nine years of watching, the actual pollination of C. canariola by a small Hymenopteron was at last detected.

A detailed account is given of pollination, followed by sections on development of the seedling and mycorrhizal symbiosis, and hybridism. A brief section headed "Nomenclature" evinces a natural annoyance at the presumed effect of the Article of the International Rules which places "every name, however widely accepted, at the mercy of anyone who can find an older one, even though still-born [!]," and the confusion arising from the shuffling of Epipactis, Serapias, and Cephalanthera is cited. But the list of names of genera to be conserved does afford some security of tenure. The author shows a lack of acquaintance with the Fathers of Botany when he states (p. 229) that the proposal to replace Ophrys arundinacea by a name O. sphaerosphodes Mill. "from a gardening dictionary (Miller's (1768))" has not been generally adopted. And we note a departure from the use of the capital initial for trivial names in specified cases—Orchis morio, Microstilis rheidii have an unfamiliar look.

Pages 37-243 are devoted to a description of the genera and species. Lindley's tribes are in the main adopted. Forty-seven species are recognized in the twenty-one genera. Keys are given of the genera and, where there is more than one in a genus, of the species. The species are very fully described, and reference is aided by use of cladrendon type for the various organs; full notes on pollination, in which Col. and Mrs. Godfrey took a special interest, are included. General notes on habitat and distribution are also given. Also a limited synonymy. Departures from the type are noted, and recognized varieties are fully treated. The study of variation is a special feature of the monograph. Thus plate 50 depicts twenty-four lip-forms of Orchis maculata; and many recognized varieties are figured, especially in the genera Orchis and Ophrys.

Under Spirrantes Romanzoffiana Col. Godfrey cites the authority of Prof. Oakes Ames and Prof. Fernald, both well acquainted with the species in North America, in favour of regarding the Northern and Southern Irish forms as conspecific. Of Epipactis, of which the author has made a special study, six British species are recognized, including E. leptochila and E. dunensis, both of Godfrey.

Mention should be made of the beautiful stereographic photographs, the subject of four monochrome plates, which are reproduced by permission of Herr P. Pfeiffer-Wellheim of Vienna.

The typography and general production of the work are such as we expect from the Cambridge Press.—A. B. RENDELL.


This is an inexpensive volume dealing with the modern aspects and problems of agriculture as practised in the British colonies of West Africa. It has been "written especially for the candidates for Government service" in those countries, but can safely be recommended to interest a far larger circle of readers whose conception of farming in that part of the Empire is subconsciously affected by the conditions and reactions which obtain at home.

The writers, with the authority of many years' service and much experimental work in Nigeria, correct a number of mistaken ideas which had been promulgated by an earlier generation of agricultural officers; they insist upon the necessity for experimentation, indicate the practical common sense of the native farmer, explain difficulties which have not yet been overcome, and without unnecessary detail provide as much information regarding the climate, soil, local methods, customs and policy, crops and stock as can safely be relied upon.

Such a book has long been needed as a modern and entertaining survey of the subject with no tedious statistical tables, but with an index that renders it a convenient source of reference.—R. H. BUNTING.

In Search of Wild Flowers. By J. F. RAYNER. Sm. 8vo, pp. xiii, 141. With 53 figs. in black and white, and a frontispiece in colours, by MARGARET M. RAY. World of Youth Library, no. 13. Watts & Co.: London, 1933. Price 1s. 6d.

Mr. RAYNER has a good first-hand knowledge of our British Wild Flowers; and in this little volume he is trying to interest young people in the study of the plants to be found respectively in woodlands, banks and hedges, pastures and meadows, pools and streams, heaths, bogs and sea-shores—to quote some of the headings of his eight chapters. Miss Ray's black and white drawings will help in their identification and tell something of their salient characters.

The book is written in a chatty style, and should answer its purpose of arousing interest in our more common wild plants.

Occasionally popular language involves inaccuracy. For instance, under Furze we are told that the leaves "pass into spines" and that the nodules on the roots "are said to be caused by a kind of fungus" which "is able to make salts out of the soil." And why call a male flower a "false" flower? Self-examination is encouraged by a series of questions at the end of each chapter.
NOTES ON SELAGINELLA.

IV. A REVISION OF LIEBMANN'S MEXICAN SELAGINELLA.

BY A. H. G. ALSTON, British Museum (Natural History).

Recently Dr. C. Christensen very kindly sent me the Copenhagen set of Liebmann's Selaginellas for revision.

The botanist Frederik Michael Liebmann, accompanied by the gardener Rathsack, landed at Vera Cruz on Feb. 7, 1841, and travelled northwards through the low country of this province parallel to the coast, passing Santa Barbara (March 1841), Yecocalt (March), and Colipa (March), to Xicaltepe (April), where his companion, the Russian naturalist Baron von Warwinsky, left him. He then turned south through Misantla (April), Barana de Huitzimalo (May), Hacienda de Jovo (May), Papantla (June), and established himself at the Hacienda de Mirador, on the east side of Mt. Orizaba, a farm which belonged to the botanist Sartorius. Liebmann ascended Mt. Orizaba accompanied by the Belgian botanist Ghiesbrecht in September 1841, and stayed several days in the Vaqueria del Jacial at 3000 m. He visited Huatusco (September), Sta. Maria Alpatlahu (June), Zacapa (November), Consolata (October), Dos Puentes (August) (all in the state of Vera Cruz) from Mirador. Later he crossed the Cordilleras near Cumbre de Azulingo and went south-west to Tehuacan. From thence he returned to Mirador and sent Rathsack home with the specimens. He left Mirador again in April 1842, and traversed the states of Puebla and Oaxaca, collecting at Tehuacan in Puebla and Chimalistl, a village on the slopes of Mt. Sempoaltepe; after staying a few days at the Hacienda Yavessa he left Oaxaca in October and travelled south-west to the Pacific coast at Pochuta, where he stayed a few weeks and collected some algae near Plaga de San Augustin. From thence he followed the coast south-east down to Tehuantepec, whence he returned to Mirador, leaving Vera Cruz on 26th March, 1843, for Copenhagen.

Liebmann became professor at Copenhagen, where he occupied himself with Mexican taxonomy till his death in October 1856. Some species of Selaginella are briefly mentioned in Oversigt Kongel. Danske Vid. Selsk. iv. 42-43 (1847), but he evidently intended to publish a separate paper on his Selaginellas, since unpublished descriptions and plates were left. Some of his names were quoted by Fourier and some species were described by J. G. Baker. The types of those described by Baker are at Kew, and have been compared with the Copenhagen specimens revised here. There is an account of Liebmann's life in Christensen's Danske Bot. Hist. i. 363-377, from which and from labels this account has been drawn up.

JOURNAL OF BOTANY.—Vol. 71. [September, 1933.]
Key to Species collected by Liebmann.

Leaves uniform, spirally arranged .......................... 1. S. Sartorii.
Leaves dimorphic.
Leaves tufted.
Lateral leaves reddish beneath ......................... 2. S. lepidophylla.
Lateral leaves pale beneath ....................... 3. S. pallescens.
Leaves not tufted.
Leaves uniform at base of main stem.
Median leaves acuminate ................................. 4. S. oaezacana.
Median leaves acicularate.
Leaves of stem uniform to above first branch; stems straw-coloured ........... 5. S. pulcherrima.
Leaves uniform at base of stem only; stems usually pinkish .......... 6. S. Hoffmannii.
Leaves all unequal, spreading laterally.
Stems sulcate, articulate .............................. 7. S. Galeottii.
Stems terete, not articulate.
Median leaves acuminate ............................. 8. S. succharata.
Median leaves acicularate.
Stems bearing leafy stolons; lateral leaves acute ......................... 9. S. binervis.
Stems bearing naked rhizophores; lateral leaves obtuse.
Lateral leaves denticulate; rhizophores rigid.
Median leaves auriculate ............... 10. S. stenophylla.
Median leaves exauriculate ...................... 11. S. faucium.
Lateral leaves ciliate; rhizophores delicate .............. 12. S. Schiedeana.

1. S. Sartorii Hieron. in Hedw. xxxix. 304, no. 14 (1900).
Vera Cruz: in superficie rugia trachyticorum prope Mirador, 2062. S. extensa Und. is similar in habit, but has dark green leaves with very short terminal setae; S. Sartorii has straw-coloured setae and glaucous leaves.

Puelpa: S. Lorenzo prope Tehuacan, in fissuris rugia calcarorum.

Vera Cruz: in fissuris rugia trachyticis, Baranca de Mirador, 2044; in rugibus trachyticis prope Colipa, 2040; in fissuris rugia prope Sta. Maria Alpatlahua in decivitate montis Orizaba alt. 6000 ft., 2041; inter S. Antonio Huatusco & S. Juan Cosmatepac, alt. 5000 ft., 2042; Dcs Fuentes in fissuris rugia, alt. 4500 ft., 2045; in rugibus trachyticis ad Consquita, alt. 2000 ft., 2043.

Oaxaca : in sylvis umbrosis prope Lecoba, distr. Chintantla, 2051.

I have examined Spring’s type, which was collected at Chintantla by Galeotti (6608 bis), in Herb. Paris. *Ghiesbreghit* 602 from Chiapas is correctly referred to this species by Baker (‘Fern Allies,’ 104). *S. Wendlandii* Hieron. is the same species, judging from a fragment of Bernoulli’s specimen at Kew.


? *S. amoena* Bull. Cat. no. 199, 16 (1884).

Vera Cruz : in declivityatibus sylvaticis prope Hacienda de Jovo, 2061.

This species was compared with *S. pallescens* (Presl) Spring. *S. pallescens* is readily distinguished by its white-margined median leaves and strongly ciliate stem-leaves. Baker (‘Fern Allies,’ 94) referred *S. amoena* Bull to *S. caulescens* (Wall.) Spring, a species distinguished from all others by its winged megaspores. *S. microdendron* Baker from Cuba, *S. Harrieti* Und. & Hieron. from Jamaica and *S. Millepaughii* Hieron. from Yucatan are closely allied.

6. S. Hoffmannii Hieron. in Hedw. xii. 184, no. 11 (1902).


Vera Cruz : in sylvaticis circa Yecotal, prope Colips, prope Missanta, 2075; in sylvis umbrosis circa Hacienda de Mirador, 2050; in sylvis frondosis circa Hacienda de Mirador, 2046.

This species has been collected also at Missanta by Purpus (no. 5935 in Herb. Mus. Brit.).


Vera Cruz : in locis humidis sylvarum prope Yecotla, 2052; in umbrosis humidis sylvarum prope Colips, 2053; in sylvaticis prope Mirador, 2054; Sta. Maria Tapacoyo in sylvaticis humidis, 2055; in Baranca de Mirador, 2056; Potrero de Consquitala, 2057.


Vera Cruz : in ripibus trachyctis apricus prope Mirador, 2068; in ripibus apricus ad Zacapan; in ripibus irrigatis ad Dos Puentes inter Totolal et Hiatuasco, 2064.

Oaxaca : rip. apric. prope Chintantla, 7000 ft., 2065.

*S. delicatissima* Linden of gardens is probably merely a slender form of this species.


Vera Cruz : Dos Puentes, S. Antonio Huatunco in locis humidis, 2035; Sta. Maria Alpatlahua in ripibus irrigatis, 2036.


Vera Cruz : in sylvaticis grahamis prope Missanta, 2071; parasitico in arboribus vetustis sylvarum prope Hacienda de Sta. Barbara, 2058; Baranca de Zacapan in ripibus trachyctis.

*S. macroura* Liebm. was correctly referred to this species by Baker (‘Fern Allies,’ 123).


Vera Cruz : in Baranca de la Hacienda de Jovo in locis umbrosis humidis, 2048; in Baranca de Huitalanco in fundo faucii umbrosorum, 2047; in fundo faucii prope Consquiltla supra rupe, 2049.

I have seen no other collections of this species except those of Liebmann.


Vera Cruz : in terra argillacea sylvarum circa Papantla, 2068; in terra uda umbrosis sylvarum prope Sta. Maria Tapacoyo, 2069; in terra uda umbrassa sylvarum prope Colips, 2070. Liebmann’s plants match well a Schiede and Déppe specimen from Papantla in Herb. Mus. Brit. *S. Liebmanni* Fourn. was correctly referred to this species by Baker (‘Fern Allies,’ 47).
NEW AND RARE SPECIES OF NEW ZEALAND MOSSES.


(Concluded from p. 299.)

Orthotrichum austro-cupulatum Dix. & Sainsb., sp. nov. O. cupulato Hoffm. affine et simile. Calyptra sat dense pilosa; theca omnino exserta, sicca suburceolata, stris 8 longioribus atque 8 brevioribus notata; stomata immersa, numerosa, magna. Precipue per medium thecae partem dispersa; peristomii dentes papillosi, lusci, hac illic proceristomii fragmentis nodosi; processus lati; bene evoluti, trabeculati vel nodosi, superficie nonnamquam inter se conjuncti.


The characters given above will show that this, while near the Palaearctic O. cupulatum, is abundantly distinct both from that and from all the New Zealand species.

Funaria procula (Mitt.) Broth. (op. cit. 370). The first New Zealand station was Auckland (Herb. Cheseeman), and the plant has since been found at Wairoa, Hawkes Bay (E. A. Hodgson, 490). In the latter district the habitat is damp earth, shaded by scrub and grass. Here it grows with F. cuspidata Hk. f. & W., and such was evidently its association at Auckland, because one of the packets contains some stems of that moss and both specimens are sub. nom. F. cuspidata. F. procula is an interesting addition to the Tasmanian element in the New Zealand flora, the species being confined to those countries.

Bryum crassum Hk. f. & W. (op. cit. 212, and "Miscellanea Bryologica," Journ. Bot. 1927, 351). Mr. Allison states that this moss is quite common on rock bordering the Waikato River at Atiamuri, and on exposed hill-tops. It has also been found in quantity at Waihohonu, Mt. Ruapehu (Sainsbury). The habitat there is loose pumice soil amongst scrub.

Bartramia alaris Dix. & Sainsb., sp. nov. Humilis, glaucoviridis; caulis six ultra 1 cm. altus, densifoliolus; folia sicca flexuosa, subrecta, nec stricta nec crispa, 4-5 mm. longa, basi brevissima deltado-triangulari, ab insertione sensim in laminam lanceolato-linearem apice robuste subulato angustata. Margines ubique anguste, arcte reflexi, superne bistratato, fortiter gemitim dein plurifarium spinulosi. Costa 50-60 μ lata, per totum folium subequalis, dorso prominens, apicem versus dorso spinosa. Cellula superiores brevissima rectangularia vel subquadrate, parvae, obscure, dorso grossissule papillosae, inferiores in parte basali dilatata pallide, inanes, anguste lineares, ad margines

breviores, quadratae, ad angulos laiores, alas parvas, distinctas sed male delimitatas instrucent; infimae ad insertionem aurantiaca. [Fructus ignotus.]

Hab. Hillsides, near Havelock North, Hawkes Bay, Jan. 1929; coll. Mrs. Hodgson (563); with Triquetrella curvifolia.

It is difficult to say whether this should be referred to Eu-Brachytrichium or Strictidium, but the leaf form is more of that of the latter section. In any case it is quite distinct. B. strictifolia Tayl. has elongate upper cells.

The margins are reflexed almost to apex, and are in the upper part spinulose in several rows.

Breufella sieberti (Hornsch.) Mitt. (op. cit. 232). Further collections at Maungatapopo, Mt. Ngauruhoe, 4000 ft. (Sainsbury, 493, 494), show that this species is inseparable from B. pendula (Hook.) Mitt., and should consequently be dropped. The specimens show too much variability in the length of the upper cells and the development of the alar cells to justify keeping the two species apart.

B. elongata (Hk. f. & W.) Mitt. (op. cit. 233). As before mentioned this handsome moss is associated with Eucamptodon inflatus on Mt. Moehau, Coromandel, North Island. It has also been found in two other mountainous stations in the North Island, i.e., Mt. Maungapohatu, Urewera Country, 4300 ft. (J. B. Moore, 428), where it is abundant at the summit in Sphagnum bogs and under low scrub, and Waiopuhu, Tararua Mts. (Sainsbury), where it grows on the open summit, 3200 ft., on wet ground with B. pendula and Polytrichum commune. Fruiting plants have not as yet been found in the North Island.

Mittenia plumula (Mitt.) C. M. A Tasmanian species which was first collected in New Zealand by Mr. R. Mundy at Ohakune, 2000 ft., near Mt. Ruapehu (536). It has also been found near Taupo, 1200 ft. (Allison 333). The habitat is usually mounds in forest formed by roots of upturned trees in shaded sandy soil. Fruit is present in the gatherings, but only sparingly, and Mr. Mundy reports that the plant is a shy fruiter.

Polytrichum formosum Hedw. This moss, hitherto unreported in New Zealand, has lately been found twice in the South Island; at Mt. Arthur, Nelson (Sainsbury 577) and Arthur's Pass, Canterbury (J. B. Moore, 288). It has not previously been recorded from the Southern Hemisphere.


Since the publication of B. novae-zelandiae (op. cit. 369) further investigations have been made by Mr. Allison which have

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helped to clear up some of the difficulties. It appears that there are two New Zealand species, viz., the above (B. novae-zelandiae), known by its long, smooth seta, and a second which agrees in every way with the plant of the Northern Hemisphere, including the immersed stomata.

A. Burges has recently described (Proc. Linn. Soc. N.S.W. lxxvii. 242) a new Australian species, B. Cypelaeae. This differs from B. tasmanica mainly in the leaves, which are only rarely toothed, while in B. tasmanica they are described as ciliate; and also in the smooth, shiny seta (1-5-2+ cm.). It seems probable that this may be identical with B. novae-zelandiae, a point which can only be settled by careful comparison of the leaves in both species.


The nerve is a little longer than in the Australian plant and less markedly tapering, but it agrees generally and seems fairly distinct from C. dilatata in the broadly rounded leaves with shorter nerve, tapering at the tip. The leaves in Capt. Hayes's plant are often sharply denticulate.

? **Glyptotheicum alare** Dix. & Sainsb., sp. nov. *G. sciuroides* habitu subimbricis, gracilis, minus, folis siccos erectis, setis appressis. Folia polymorpha, plerumque oblongo-ovalis, perconca, seu cymbiforma, cucullata, apice fortilis reflexo; cuculata; eocastata vel striis binis brevissimis predita, integerrima, perpellucida. Cellulae superiores elongatae, rhombideae-lineares, parietibus tenuibus, conflatis, lavissima, apicem versus breviores, rhombodeae; basin versus subsimila, tenuissima pulchre aurantiacae; alares magne, subquadrate, intestes purpureae, alas majusculas, subinflatae, valde conicopicas formantae. Caules et rami sepe gemmigeri, folia superne magis angustioribus, superiores minus concavis, haud cucullatis, sensim striatas, late acuminatis, apice parce denticulatis, propagulis (filis articulatis pallide longis) promittantia foliorum axillae prope apicem rami densissimae congestis.

Dicium videtur. Folia perichelatica caulisim subimbrica, magis acuminata; seta perbrevis, 4-5 mm. longa, lavis, fusca, leniter flexuosa; theca erecta, oblonga, circa 2 mm. longa, profunde 3-plicata, sat pachyderma. Cellulae exotheci irrugulares, plerumque isodiametricae, subinconspicue, circa 25 μ lata. Peristomium duplex, dentes 16, fiaedii, breviter late lanceolati, apiciibus incanescens, infra rosticulum inserti, ad basin inter se disjuncti, dorso inferne dense transversa striati, superne grossissulco papillosi, pallidi, intus humiliter lamellati. Endostomium membrana, ut videtur, brevissima, processus circa dimidiam longitudinem dentium sequentes, pallidi, leniter papillosi, lanceolati. Operculum, calyptra, spori haud visi.

**Papillaria filifendula** (Hk. f. & W.) Jaeg. *op. cit. 259.* In view of the extreme rarity of fruit in the genus *Papillaria* it is interesting to note that fertile plants of the present species have been collected in several parts of the North Island. In Herb. Petrie there is an unnamned specimen in fruit from Pukenasia, West Taupo County, and similar gatherings are recorded from Rotorua (Allison 160), Fielding, Manawatu (Dr. H. H. Allan 57), and Wairoa County (E. A. Hodgson). The seta is short, about 3 mm., and flexuose. It is sheathed for a great part of its length by the long dense hairs which clothe the vaginula. The capsule is erect, ovoid-oblong, and light brown. The outer peristome teeth are lanceolate, pale, somewhat papillose, and either entire or with median cracks in the upper half. The processes are developed from a low basal membrane and are about three-fifths the length of the teeth; linear, hyaline, and slightly papillose. Operculum with a slanting beak. Calyptra densely hairy. Spores about 16 μ.

**Campiochaeta brachydictya** Dix., sp. nov. Stirps pernotata, habitu potius Homaliarum nonnullarum aut Porotrichi oblongifoli, cujus etiam foliorum formam atque areolationem subimilis habitet. C. pulvinare habitu proxima, sed multo aliena. Folia late oblongo-ovata, uno lateri late inflexo, supra rotundato-obtusa, raro late obtuso-acute, paulum asimetrice, integra breviter bicoastata, ad angulos breviter decurrentia. Cellulae medians breviter rhombideae-lineares, subgymnoides, circa 5-8×1, parietibus firmis, subinconspicue; superfibus breviores, prope apicem latiores, breviores, rhombideae, apiculatae circa 2×1; basales paulo longiores, alares sae numerosae, isodiametricae, opace, alae paras bene notatas decurrentes instroentes.

[Fructus ignotus.]

**Hab.** Banks Peninsula, 1929; coll. A. Meebold, comm. Herzog (81).

The habit is that of C. pulvinare, with the leaves more or less falcate-oblong as in that, but their form and structure is quite different; they are in no way narrowed to the point, but broadly rounded, as in Homalia (rarely very bluntly pointed), and the
short cells in the upper part of the leaf heighten the resemblance to Homalia; the short, double nerve in the present plant of course at once separates it from that genus. In the branch leaves all the cells are even shorter than the proportions given above.

**Ephemeropsis tubidensis** Goeb. An account of the discovery of this remarkable moss at Atiamuri, North Island, by Mr. Allison has been given in this Journal (H. N. Dixon, 1928, 347), with a description of the New Zealand form. It has since been found by Mr. Mundy at Ohakune, North Island, and by Mr. J. H. McMahon in Marlborough, South Island. The habitat in New Zealand is always the bark of twigs and small branches, but it is not confined to the Mannka (*Leptospermum scoparium*) on which the plant was first collected by Mr. Allison. In the Rotorua and Atiamuri districts it has been found by him on shrubs of *Gaultheria* and *Cyathodes*, whilst at Ohakune it grows on, *inter alia*, the formidable prickly vine *Rubus australis*, cynically named by New Zealanders the “lawyer.” At Ohakune the vegetation consists of typical low mountain forest of a dense type, and contrasts strongly with the rather open scrub country of Atiamuri etc. The finding of *Ephemeropsis* in such widely different surroundings, and also in the South Island, justifies the assumption that it may have a fairly wide distribution in New Zealand. Its protonemal gametophyte is, however, practically unrecognizable in the field, and though, according to Mr. Allison, it is nearly always present, the moss is, even in that condition, a very inconspicuous one.

**Eriopus Brownii** Dixon (op. cit. 286). This interesting endemic species has recently been collected in three North Island localities. The original and only finding in the South Island was Port Nicholson Hills near Christchurch. The northern stations are Atiamuri (Allison 199, on rotten wood, c.f.r.); N. K. Welch (Auckland Province), and Marumaru, near Wairoa, Hawkes Bay (Stainesbury, on rotten wood, c.f.r.). As this is a shade-loving plant and a small one it may well have been passed over by collectors, and further findings may be expected.

**Haplophyemenium Huttoni** (Mitt.) Broth. (op. cit. 299). An extension of the distribution of this moss is recorded by its discovery at Mahia Peninsula, Hawkes Bay (Stainesbury 577, on bark). The gap between the Peninsula and the northern localities is a wide one, but the climate of the former is mild and equable for its latitude, and this accounts for the Peninsula being the southern limit also of one of the indigenous hardwood trees, the Puriri (*Vitex lucens*).

**Pseudoleskea americana** (Hk. f. & W.) Broth. (op. cit. 300). The Mahia Peninsula, which is the southern limit of the previous species, is an isolated northern outpost of *Pseudoleskea*, and the only known North Island locality. In the South Island it has been found in Otago and Canterbury. The Mahia plant (Stainesbury 567) grows on limestone boulders and outcrops at the edge of the sea-beach.


**Brachythecium cymbifolium** Dix. & Sainsb., sp. nov. (§*Julacea*). Humile, *rigidissumum*; caules irregularer, subpinнатum divisi, ramis inaequalibus, usque ad 1 cm. longis, turpulit, seco sepe subjuulceae; folia caulina e basi subamplexicaulis leniter decurrente late cordata, peroncava, acute, haud acuminate, apice breviter, late acuta; seco sepe subplicata; margines plani, ubique fere minuissime denticulati. Costa ubique tenuis, circa 2/3 folii longitudinem attingens. Folia ramea subsimilis, paullo autem angustiora, breviter acuminate, paullo fortius denticulata, costa perangusta. Cellulae pellucidae, angustissime, tenere, infime paullo laiores, alares at numerosae, inane, latiusculae.


It is rather remarkable that this moss should have appeared in two such distant stations in the same year, and in both cases growing under somewhat artificial conditions. It is, however, quite distinct from any known species, and is pretty certainly indigenous. It bears a close resemblance to small forms of *Scleropodium purum* (Hedw.), but the sets is quite smooth.

The leaves vary considerably, sometimes being deeply cochleariform, closely appressed and julaceous, at other times less markedly so, with longer and spreading points. In the former case they are plicate when dry.
Scleropodium purum (Hedw.) Limpr. On damp shallow soil on rocks, Mt. Eden, Auckland, July 6, 1930; coll. Miss L. B. Moore (589).]
These are placed in brackets, as they are very doubtfully native. In both cases the habitats were artificial. Neither species has been found in the Southern Hemisphere.—unless the Argentine Hypnum austro-purum C. M. should prove identical with the latter.

Sematophyllum aeculum (C. M.) Dix., sp. nov. (Rhaphidostegium aeculum C. M., MS. in sched.). Dense capitosum, stramineum, subnudum, gracilesece. Folia 1-5 mm. longa, lanceolata, longissimae acuminata; concava, marginibus vel explicatis vel anguste reflexis; secunda, ascendenta; cellulae anguste lineares, pelliculae, alares infales vesiculose, majusculae, supra-alares numerosa, sat magna, inanes, ad margines altissimae ascendentes.
Autoculum. Perichæci folia caulini subsimila, scd latiora, acuminato oblongo denticulato. Seta brevis, 5-6 mm. longa, lavis; theca minutus, deperculata, 5 mm. longa, erecta, ovalis, leptodermica.


The New Zealand specimen in Cheeseman’s collection was labelled “H. homomallum C. M.,” but with a note that Gehheb had seen it and recognized that it was not C. Müller’s species.

It is a fairly well-marked species of the more narrow-leaved forms of the genus, with very narrow areolation, numerous supra-alar hyaline cells, a very short seta, and minute, erect capsule. It is probably frequent in Australia. Dr. Brotherus wrote to me in 1921 that he believed it was an unpublished species. I have not seen C. Müller’s original specimen, but there is some advantage in describing the species from a recognized exsiccate.

Pylaisia australis Dix. & Sainsb., sp. nov. Humilis, condensata; caules prostrati, dense ramosi, ramis erectis, circa 5 mm. longis; sordide viridis. Folia confluentis, madida patentis, sicca patula, brevis, 3 mm. longa, late ovalis, perconconca, breviter acuminata, integerrima, ecutata. Cellulae brevior, anguste rhomboides, subsignotae, ab apice ad basin sensim elongata, alares multae, subquadrate, sepe transverse elongata, obscure, alte ad margines ascendantae.

[Et cetera ignota.]
No species of the genus has hitherto been recorded from the Southern Hemisphere. The leaves are wider and more shortly (though acutely) acuminate than in most of the species.
The generic position cannot be quite certain without fruit, but there is little doubt of its being a Pylaisia.

Hylocomium splendens (Hedw.) Bry. eur. Recently found for the first time in the Southern Hemisphere by Miss L. B. Moore on Mt. Hikurangi, East Coast, North Island (439). Miss Moore reports that the moss grows amongst rocks at and above 4700 ft. No fruiting plants were found.


NEW OR NOTEWORTHY FUNGI.—PART XIII.

BY W. B. GROVE, M.A.

This list of British Fungi is a continuation of that published in the ‘Journal of Botany,’ 1932, vol. lxx. pp. 1-7, 33-38. I have again to acknowledge the valuable assistance given me by the discoveries of Rev. P. G. M. Rhodes and Mr. W. G. Travis.

Though I have left two species of “Diaporthae” still under that name, as they were placed by Saccardo, I wish to record here my belief that Saccardo’s subgenus Chorosate is fully worthy of generic rank as assigned to it by Traverso, and that Diaporthae proper should be confined to his two subgenera Euportae and Tetrastega; and, furthermore, that these two subgenera are not founded upon any real distinction, but are merely states of growth, so that the same species is, in many instances, repeated under two names, one in each section.

ASCOMYCETES.

Perithecia scattered or a few (2-5) together, emerging from just below the surface of the wood as a black knob, but becoming ultimately nearly free (only surrounded by a base of a few of the softened displaced longitudinal fibres), black, ovate on a broad base, 150-200 μ diam., beautifully papillate above; the
peritheciun is shaggy in the lower and middle parts, with numerous short stiff, upstanding brown-black bristles up to 30 μ long, but the broad wart-like papilla is perfectly glabrous, deep black, shining, and rises to a total height of 250 μ; wall thick, opaque, brittle, subcarbonaceous. **Asci** cylindrical, 120-130 × 8 μ, wall thickened at the summit. **Spores** obliquely uniseriate, oval-oblong, faintly laterally compressed, unicellular, 13-17 μ long, 8-9 μ broad (face view), 6 μ broad (side view), at first olivaceous and with a few guttules, at length dark brown-black. **Paraphyses** not numerous, simple, filiform.

On branches of **Quercus**, which were decorticated and lying on the ground in a part of the wood which had been burnt, **Ockeridge Wood, Worcs.; April**.

In **Kirschstein's** description the perithecial hairs are said to be at first covered by a brownish-yellow mass (i.e., gelatinous) up as far as the emergent ostiole, but to become naked later. No sign was seen of this covering, but all the other characters were perfectly correct.

479. **Anastomella Myriace**, sp. nov.

**Perithecia** sparsa, subter epidermidem nigrifcatam immersa, ca. 150 μ diam. **Asci** fasciculati, cylindrici, superne rotundati, inferne breviter pedicellati, 80-130 × 8-9 μ. **Sporidia** 2-8, stricte uniseriata v. interdum oblique monosticha, matura exacte ellipsoidae, utriusque obtusata, at e latere compressa, primo ovoidea, achroea et multi-microguttulata, dein granulosa et pallide olivacea, uni- v. biguttulata, postremo atro-brunnea at non opaca, eguttulata, 12-14 × 5-6 μ, e latere visa vix 3 μ crassa, semper exappendiculata. **Paraphyses** sat numero, filiformes, achroea, septatae, 2 μ crassae, non mucose. (Fig. 1, a.)

**Hab. in ramulo emortuo Myriace Gales, sub Lichhevid, Harlech (Rhodes, no. 4306 D); Aug.**

There was little of this and on only one branch, but its characters seem to be so decided that I venture to describe it. Owing to the black colour of the old peridium the perithecia were all but imperceptible to the naked eye. The paraphyses, when young, had each three or four distinct septa, but very few paraphyses remained when the spores were mature. About half the asci had only four spores, a few had eight, and the rest had various other numbers from two to seven. Even the eight spores did not occupy the whole length of the ascus.

480. **Anastomella Taxi**, sp. nov.

**Perithecia** dense sparsa vel subgregaria, amphigena sed pro maxima parte epiphylla, immersa, scutulo nitido aterre ex epidermidem effractato tecta, usque ad 200 μ diam., subglobosa, procinnamonata, tandem epidermidem ostiolo leviter protuberante rupimentia. **Asci** primo subclavati, dein cylindrici, recti, breviter et obtuse pedicellati, superne obtuse rotundati, 8-80-90 × 9-10 μ. **Sporidia** uniseriata v. partim biseriata, ovalia v. sub-fabiformia, apexus apicis acutus, diu achroea et granulosa, dein saturate fusco-brunnea, guttulis unica aut duabus instructae, 12-14 × 7-8 μ, primo appendice brevii lata achroea mucosa inferne pravita. **Paraphyses** copiosae, filiformes, guttulatae, mucose, ca. 2 μ late. (Fig. 1, b.)

**Hab. in foliis emortuis Taxi baccatae, Hadzor Hall, Worcs. Nov.–Jan., socia Phoma all zostoma Died. cujus forsan status perfectior est.**

When the ascospores are completely formed there is a great deal of epilasm left unused, and part of this remains attached for a time to the lower end of the spore, as happens in several others of the **Anastomellaceae**. **A. Taxi** is allied to **A. Rehmsii**, but the perithecia are more crowded, the spores are different, and the paraphyses do not turn blue on the addition of iodine solution.

481. **Mycosphaerella Rumicis** (Desm.) comb. nov.

**Sphaerella Rumicis** Sacc. Syll. i. 512. Cooke, Handb. 920.

**Stigmata Rumicis** Schröter.

**Venturia Rumicis** Winter.

**Forma nova saulcicola, perithecius in caulibus aggregata.**

**Perithecia** forming small clusters on the stems, occupying the centres of large scorched patches which are 10 mm. or more in length and scarcely paler in the middle.
On stems of Rumex pulcher, Polperro, Cornw. (R. Stolz & Rhodes, no. 4177); July.

The spores are tinged with a greenish colour and do not differ appreciably from those which abound on the leaves of Rumex; nor, indeed, do the asci—for, though they are obovate-oblong and curved and measure about 35 × 10 μ, exactly the same is true of the asci of our leaf-form, which I have never seen tubular or cylindrical as they are described in books.

482. **Mycosphaerella sagedioides** Lindau (sec. Migula).

*Sphaerella sagedioides* Wint. Sacc. Syll. i. 517.

Perithecia very abundant, rather densely scattered over a large area of the stems, covered by the epidermis, black, 100–120 μ diam., depressed-globose, at length bursting the epidermis by the rounded summit; texture membranaceous, parenchymatous, dark brown, subopaque. Asci clustered, clavate-oblong, tapering slightly above, almost sessile, apophalous, 8-spored, 35–42 × 8–10 μ. Spores distichous, subclavate-oblong, more obtuse at the upper end, 1-septate, hardly constricted, colourless, 4-guttulate, 10–15 × 3–3.5 μ or even 16 × 4 μ. (Fig. 2.)

On dead stems and the midribs of the leaves of *Dipsacus silvestris*, Haselor Rough, Evesham (Rhodes, no. 4705); March. With it was *Didymella cauticola* (Moug.) Sacc., which is merely its immature state.

When the epidermis scales off, the perithecia, which are adnate to it, come off with it. The same thing is observed in this as in many of the stem and leaf fungi: though the perithecia are full of spores when gathered, they are found nearly empty after being kept in the herbarium for a year or so.

483. **Diaporthe** (Chor.) *Castanea* Sacc. Syll. i. 624.


Stromata valsoid, surrounded and partly covered by the reddish-brown periderm; perithecia few (3 or 4) in each stroma, ovoid or angular, black, about 300 μ diam.; ostioles gently conicent, blunt, bursting the periderm by a roundish pore. Asci clavate, shortly stipitate, 8-spored, 40–50 × 7–8 μ. Spores biseriate, fusoid, very acute at both ends, nearly straight, 1-septate, hardly constricted, 4-guttulate, 14–15 × 3–3.5 μ. No paraphyses seen.

On thin twigs of *Castanea vesca*, Ockeridge Wood, Worcs (Rhodes, no. 4537 A); June. Closely associated with its *Fuscococcum* stage (*F. castaneum*), the two kinds of spores not seldom occurring within the same conceptacle.

484. **Diaporthe Garryae**, sp. nov.

Perithecia sparsa v. subgregaria, tecta, dein epideridem irregulariter rumpentia, nigra, cortici immersa, epideridem cirrum circa plus minus nigrificata et sepe linea angusta astra circumscripta. Asci fusoides, doorsum attenuati, vertice subangustato, ca. 60 × 10 μ. Sporidia disticha, oblongo-fusoidae, utrinque subobtusa, 1-septata, minime constricta, 4-guttulata, 12–14 × 3.5 μ. (Fig. 3, c.)

Hab. in ramulis emortuis *Garryae ellipticae*, West Kilbride, Ayrshire (Boyd); Aug. 1918. In iidem, Heythrop Park, Oxon (Rhodes & Grove); Jun. 1931.

The *Phomopsis* corresponding to this *Diaporthe* was described in this *Journal*, 1922, p. 43. It is worthy of notice that the spores there mentioned as "B-spores" were so named in error; they were what I have called "C-spores" (in *Kew Bulletin*, 1919, p. 181, f. 4, & p. 425) and what Hahn (in Trans. Brit. Myc. Soc. 1930, xv. p. 46) calls "intermediate" spores. They were fusoid in shape, acuminate at both ends, only slightly curved, and measured 15–17 × 1 μ. The real B-spores were afterwards discovered in the specimen from Heythrop Park above mentioned; they were of the usual hooked shape and measured about 25 × 1 μ.

*Perithecia* aggregated (4–10 together) in scattered compact subvalvoidal clusters, more rarely solitary or in pairs, globoso, immersed in the cortex, surrounded by a black line and by the ruptured epidermis; ostioles long, emergent, cylindrical, rugulose, often curved at the apex, diverging. *Asci* cylindrical or sub-fusoid, 8-spored, 48–64 x 9 μ. *Spores* biseriate, cylindrical or fusoid, obtuse or slightly mucronate, 1-septate, slightly constricted, 4-guttulate, hyaline, usually straight, 12–16 x 4–5.5 μ.

On dead branches of *Hippophaës rhamnoidea*, Polperro, Cornwall. (Rhodes, no. 5154) March.

The original specimens were found in Belgium and were accompanied by *Pisonia concinca* B. R. & S., which, as Dieslie has shown (p. 256), is a *Phomopsis* with both A- and B-spicules, the A-spicules having sporophores subulate and up to 18 μ. long. This *Phomopsis* species should be found in this country also.


*Forma nova foliicola, perithecis in folis innatis.* *Stromata* dispersed widely over the leaf, staining the epidermis black, at first angular and variable in form, 2–3 or even 4 mm. across, afterwards confluent and reaching even 10 mm. in length, flat, dull black outside, with the obtrude ostioles hardly projecting. *Asci* oblong-fusoid, about 50 x 10 μ, 8-spored, ap paraphysete. *Spores* distichous, elongate-ellipsoid, 12–14 x 4 μ, obtuse at both ends, 1-septate, slightly constricted, with four or more rather large guttules, which are very distinct. (Fig. 3, b.)

On fallen leaves of *Mahoniiæ japonica* and possibly of *M. Aquifolium* also, Hadzor Hall, Worcs (Grove & Rhodes); Feb., Mar., 1930.

The fungus, as might be expected, attained greater development on the thick hard leaves of *Mahoniiæ japonica* than on those of *M. Aquifolium*, on which it was not conspicuous. It was accompanied on the same leaves, in both cases, by its pyramidal stage, *Phomopsis Mahoniiæ* Grove, for which Sacc. Journ. of Bat. 1930, 294. All the previous records of the *Diaporthe* that I have seen have been on the stems.


*Perithecia* sunk in the cortex, scattered or in small groups, raising the periderm convexly but scarcely piercing it, up to 1 mm. bread; the bark is hardly at all discoloured, but a black line bounding the stroma-myceum penetrates deeply into the wood. *Asci* clavate-fusoid, 50–55 x 8 μ, ap paraphysete. *Spores* mostly distichous, fusoid, straight, 1-septate, constricted at the middle, 4-guttulate, hyaline, 12–15 x 3–4 μ, often with a minute colourless appendage at each end.

On a thick branch of *Laurus nobilis* (a very old tree) in Mrs. Marshall’s garden, Landaviddy, Polperro; April, 1930. Accompanied by the *Phomopsis*-stage (Phomopsis lauræla Trav.) on the same tree, but on the younger branches. The *Phomopsis* has also been found (without the *Diaporthe*) in Ayrshire, in the Co. Dublin, and in Kew Gardens; see Journ. Bot. 1922, 44.


*Perithecia* few, arranged more or less in lines on oblong blackish-brown spots 1–2.5 mm. long, the surface of the wood below a spot being sometimes stained inky-black, immersed in the cortex, globoso-depressed, very black, slightly protruding by an obtuse papilla. *Asci* elongate clavate-fusoid, tapering much more below than above, not perceptibly bifoveolate, ap paraphysete, 50–60 x 7 μ. *Spores* biseriate, somewhat fusoid, colourless, a little more acute below than above, 4-guttulate, 1-septate, hardly constricted, 12–14 x 3 μ.

On the lower part of dead peduncles of *Orobanche* (major or elator), Warminster, S. Wilts (Rhodes, no. 4733 B); May.

It approaches *D. maculosa* S. & S. in habit, but sometimes the spots are scarcely changed in coloum. On the upper part of the same plants was the corresponding *Phomopsis*, described below. Berlese’s Venetian species is described as having a short neck, which, however, was sometimes elongated-cylindrical and bent. He did not observe the *Phomopsis* in company with it.

489. *Phomopsis Orobancheæ*, sp. nov.

*Pyenia* sparsa, minutissima, immersa, valde imperfecta, haud conspicua, epidermide vix elevata nec nisi leviter inquinata. *Iporuta* elliptico-fusoidæ, utrinque subobtusa v. basi acute, acheres, solito modo biguttulata, 5–9 x 1–3 μ, sporophoris non visis.

*Hab.* in pedunculis emituis *Orobanche* (majoris aut elatoris), Warminster, Wilts (Rhodes, no. 4733 b); May.

The guttules were of the character and position distinctive of *Phomopsis*. The host was probably *O. elator*, since no *Leguminosæ* were observed in the immediate neighbourhood. On the lower part of the same plants was the *Diaporthe*.

490. *Diaporthe Skimmiae*, sp. nov.

sepe altero spicu aut binis acutata, 1-septata, vix constricta, 4-guttulata, hyalina, 12-14 × 3 µ. (Fig. 3, a.)

Hab. in ramulis emortuis Skimmiae japonicae, Heythrop Park, Oxon (Rhodes, no. 4790). In isodem, Harborne Hall, prope Birmingham (Grove & Rhodes); Mar.–Jun. Hic atque illic cum Phomopsi Skimmiae consociata, quam infra descriptam videas.

491. Phomopsis Skimmiae, sp. nov.

Pyenidia sparsa, nigrescentia, usque ad 500 µ diam., primo tecta atque epidermidem acute levantia, tandem eam irregulariter rampentia. Sporulae oblongo-ellipsoidae, raro spicu uno acuti-usculae, biguttulata, hyalina, 7-9 × 2-3 µ, sporophoribus subulatis microguttulatis acutis, 10-18 µ longis, suffultae.

Hab. in ramulis Skimmiae japonicae locis duobus supra commemoratis.


Perithecia somewhat scattered, immersed in the cortex or partly in the wood, globose, brownish-black, 300-450 µ diam.; ostioles short. Aeci cylindric-fusoid, sessile, 8-spored, asparagus, 42-45 × 9-10 µ. Spores oblong-fusoid, rounded obtusely at both ends, straight or nearly so, 1-septate, faintly constricted, 2-4-guttulate, hyaline, 9-15 × 4-5 µ.

On dead branches of Veronica Traversii, Heythrop Park, Oxon (Grove & Rhodes); June. There is sometimes a black line running through the wood, in the usual way. The corresponding pyenidial stage, Phomopsis Veronicae-speciosa Died., has been found several times on dead branches of the cultivated hybrid shrubby Veronica, V. speciosa, etc., in Cornwall; see Journ. Bot. 1930, 206. But the Diaporthe has not yet been seen in that county. In Moravia Petrák reports the occurrence of both forms on that host in hot-houses, the Phomopsis appearing before and, later, in company with the ascophorous stage.


Perithecia subglobose or oblong, up to 250 µ diam., black, scattered singly, immersed, then erumpent by the short black ± cylindrical papillate ostiole, which in the end is rather widely open. Aeci cylindric-clavate, broadly rounded above, 8-spored, 140-150 × 27-30 µ. Spores unis- or biserrate, obovate-oblong, 1-septate, very strongly constricted, pale translucent golden-brown within, 28-32 × 12-15 µ, surrounded by a broad (3 µ) hyaline mucous layer, wall thick (2-2.5 µ), uniform, darker brown. Paraphyses filiform, mucoid, longer than the asc. deorsum breviter attenuati, 8-spore, 150-180 × 15-16 µ, paraphysibus filiformibus copiosissimis hyalinos mucusis aecio sub-longioribus obvallatis. Sporidium uniseriata, oblique monostichus. Spore oblongo-fusoida, dein ovoideo-oblonga, 1-septata, brunnea, 24-26 × 12-16 µ (sine ascend.), interdum inus granulosa, loculo quocum guttula magna instructo, utrinque appendice subhyalina hemisphaerica v. conidea 4-5 µ longa pradita. (Fig. 4, a.)

Hab. in stipites eburnius Spartineae Townsendi, Poole Harbour, Dorset (Rhodes, no. 5241); Jan. 1933.

(To be continued.)

OBITUARY.

CHARLES CARMICHAEL LACAITA
(1853–1933).

The death of Mr. C. C. Lacaita on July 17 at the age of 80 removes a leading British amateur botanist, who was less known in this country than abroad, since his main interest was in the flora of Italy, where from 1877 he regularly visited the family estates.
He was born at Edinburgh on April 5, 1853, the son of Sir James Lacaita, K.C.M.G., "that remarkable Italian who was a friend of Gladstone, was naturalized in England, became a member of the first Italian Legislature, and is remembered as a Dente scholar and editor, and as one who combined the typical culture of his two countries." His mother, a daughter of Sir Thomas Gibson Carmichael, died the year he was born, and he was brought up by Scotch aunts. In 1867 he went to Eton, where he distinguished himself both in school and at games. In 1872 he went to Oxford as an exhibitor of Balliol, taking first classes in mathematical moderations and Greats, Literae Humaniores.

He became a well-read classical and Italian scholar. French and, later, Spanish he spoke and wrote like a native; German and modern Greek he also spoke. His literary interests show in his early article "On the Etymology of the words Cronus and Saffron," an appendix to Mawe's "Monograph of the Genus Cronus" (1886). This characteristically comprehensive account may be compared with his later article on the Jerusalem Artichoke (Kew Bull. 321-330, 1910).

He was called to the Bar by Lincoln's Inn in 1879. In 1885 he became assistant private secretary to Lord Granville, Secretary of State for Foreign Affairs in Gladstone's Ministry, and M.P. for Dundee. He was re-elected at the Home Rule election of 1886, but parliamentary life did not suit his temperament, and he retired the following year.

He had married in 1885, and on retirement from Parliament his energies were turned to the building of his house at Selham (Sussex) and the creation of its fine garden from the natural countryside. From 1877 till his marriage he made botanical collections each year during his visits to the Italian estates at Leucaspute (Taranto) and Ravello (Salerno), and also in the Pyrenees (1878), Switzerland (1881), the Alps maritimes (1882), Spain (1882 and 1884), and Greece (1885), correspondence concerning these collections bringing him into connection with such well-known botanists as Boissier, Willkomm, Reichenbach, Heldreich, and Halacey. These collections were, however, put away in a store-room at Selham, and he settled down to the life and pursuits of a country gentleman. He was a Justice of the Peace on the Midhurst bench, a member of the Midhurst Rural District Council, and a Governor of the Midhurst Grammar School.

In 1895, on the death of his father, he inherited the estate at Leucaspute, which required regular visits, and later, from his aunt, the Ravello estate. But it was not until 1902 that his botanical collecting recommenced as the result of a chance turning out of his old herbarium. From 1906 onwards, except during the war, he collected regularly and seriously during his visits to Italy. The investigation of these collections resulted in a series of notes (nos. 1-44; 1910-1927) entitled "Piante Italiane critico-rari," published in the 'Nuovo Giornale Botanico Italiano.' These are valuable contributions to our knowledge of the various critical groups in which he became interested. Some deal with nomenclature, but only in so far as he was forced to consider it. In 1921 he published a catalogue of the vascular plants of the "ex-principatus Citra" (Bull. Ort. Bot. Nap. vi. 101-256).

In 1913 he visited Sikkim: a list of his collections was published in the 'Journal of the Linnean Society' (xliii. 457); the collection was presented to the British Museum in 1928.

Lacaita was essentially a field-botanist, with strong opinions as to the weaknesses of the so-called "herbarium botanist." His special interest started with plants met in the field, e.g., Micromeria, Thymus, and Statice at Leucaspute; Pulmonaria, Onosma, Echium, Dianthus at Ravello and elsewhere. At Selham he grew critical species for study; he was also keen on introducing species of horticultural value. Pulmonaria intrigued and puzzled him; he grew the species extensively, but never felt that he understood them, and his only note on them was a short one of corrections to Kerner's Monograph of the genus (Nuov. Giorn. Bot. Ital. n.s. xxxiv. 1163-5, 1927).

Occasionally his work brought him into contact with species of interest to British botanists, and a note in the 'Journal of Botany' followed—Astragalus hypoglaucus, 1912; Veronica Buxbaumii, Sagina maritima, and Calamintha nebrodensis, 1917; Crepis minuculis and Leonodon kirtii, 1918; the home of Iaula Helenium, 1920; Cerastium hirsutum, 1922; the caulescense of Bellis perennis, 1923; Salvia controversa, 1927; three Genistas of the Linnean Herbarium, 1929.

Travelling regularly to Italy he was able to visit the collections at Paris and Geneva en route, a facility which resulted in several valuable papers in the Linnean Society's 'Journal' (on Echium, xlv. 364, 1919; xlvii. 175, 1925; on Onosma, xlv. 387, 1924; cf. also Journ. Bot. 1923, 280; on Marrubium, Balada, and Cytisus montanus, xlvii. 135, 1925; short notes on Thymus Stibortii and Crepis rutina, sp. n., xlvii. 125-9, 1919).

His work on Echium took him to Spain with E. G. Baker) in 1923 Echium polycaulum, Journ. Bot. 1923, 250-280, and from then onwards his interest in the botany of that country developed. He made long trips there in 1925, 1926 (with E. Jahandiez), 1927 (with me), and 1928 (with J. Cuatrecasas), each time to clear up some problems and, inevitably, start some new ones. The results were published (in Latin) in 'Cavanillesia' (1928 and 1930: "Novitiae quaedam et notabilia hispantica," and in a short note on "Two rare Spanish Species of Echium (Journ. Linn. Soc. 261 OBITUARY
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xlii. 175–6, 1925). His discovery of the value of Gay’s MSS. descriptions (in Herb. Kew) of the new species in Durieu’s Asturian exsiccata led him to collect and publish them (Journ. Bot. 1929, 107 kc.).

These trips were a severe strain on a man in the middle seventies, especially for one who went as hard as he always did, and his health suffered. In 1931 he met with a motor accident, in which he sustained a bad shaking and bodily damage which forced him to give up his tennis. The next two years he was engaged on a memoir (now in the press) of his father, whose intellectual and social tastes he shared.

When I visited him last May he was very weak, but even then "would like another trip to Spain," drying and identifying the plants which I was to collect. A sudden turn for the worse, an operation in London, and he was gone.

Lacaita quiescent was charming, gracious, and courteous; in action he was the essence of virility—alert, keen, and with a resounding voice which seemed to lend force to his arguments. Formerly he often took part in the discussions at the Linnean Society, which he joined in 1882, speaking clearly and to the point. He was a member of the Society's Council from 1918 to 1922, Vice-President 1921–2. At the Linnean Club he was a lively companion, sometimes almost boisterous in his enjoyment of a good story or a bon mot. Few of his botanical acquaintances of his latest years realised that he had been a Keeper of Rackets at Eton and a winner of the University tennis rackets at Oxford, but he was, in fact, a lifelong devotee of the game, playing regularly up to the time of the accident two years before his death.

He was a great friend of the Department of Botany at South Kensington and took a keen interest in its affairs. To it he gave the Monocolyledons of his herbarium in 1928, and bequeathed the remainder. During the last few years I saw much of him, and it was impossible not to admire his sound outlook on systematic work and his defence of any position he took up. His knowledge was so wide and his mind so logical and legally trained that he was not accustomed to find himself wrong, and was only able to accept an opposite point of view when satisfied that the evidence and research was of the high standard that he appreciated and demanded. I shall miss greatly those forceful and stimulating discussions and his friendly personality.

He was buried at Selham on July 20th. His only son, Capt. F. C. Lacaita, M.C., was killed in action in April 1918. His first wife died in 1924, but he is survived by his second wife (whom he married in 1929), and his daughter, the wife of Lt.-Col. George Windsor-Clive, M.F.—A. J. Wilmott.

Short Notes

Does Juncus trifidus occur in Ireland?—On p. 104 of this Journal (April, 1933) Dr. R. W. Scully refers to my record (Journ. Bot. 1910, 227) of a small patch of Juncus trifidus on the summit of Carrantuohill, Co. Kerry, in July of that year, when in the company of my cousin A. Elliott. And he repeats what he said in his 'Flora of Kerry,' 1916, that before adding this to the Irish Flora "it is better to await actual specimens."

I have informed him that on the whole I now prefer to withdraw the "record," as being too uncertain and because there is as yet no other authentic record for Ireland. We were not collecting plants during those ten days in Co. Kerry except a small Saxifraga or two, and two small bits of the Juncus were put in an envelope and lost before I got to Dublin. I had seen Juncus trifidus growing only in the Alps (including Mte. Santa Maria in the Maritime Alps, and in the Mont Cenis district, as recorded in my 'Liste des Phanérogames, etc.' 1908).

Since Dr. Scully's note appeared I realize that Juncus tenuis is abundant in many places in Co. Kerry, and in his 'Flora of Co. Kerry' he suggests that "the claims of this Rush appear sufficiently strong to entitle it to a place among the native plants both of Cork and Kerry." Though usually a lowland plant he tells me that it was seen by Dr. Praeger at about 900 ft. on Connor Hill and in some parts of Kerry, not far from Carrantuohill, is very abundant.

I did not know this somewhat similar Rush of possible North American origin until it was seen growing about footpaths near Bristol in and after 1915. I tentatively suggest that a plant or two of that species may have been introduced on the top of Ireland's highest mountain by the agency of birds. Juncus trifidus occurs widely in France on high mountains as far south as Provence, and in Spain and the Pyrenees; so there seems no great reason why it should not grow in mountainous S.W. Ireland.

I do not withdraw Cardamine amara from a moorland swamp in the Glencar Valley, S. Kerry, for I already knew that plant so well in the W. Midlands, and though apparently not found in S.W. England beyond W. Gloucester, it grows in Ulster and is widely spread through most of France.—H. S. Thomson.

A Lycoris dioica freak.—A little girl, a keen nature student, brought me yesterday an interesting specimen of Red Campion. This species is exceptionally abundant in this district, and particularly floriferous this year. The freak was one of fourteen stems on a male plant growing amongst nettles outside the garden wall of a cottage. The flowers are of a very clear and even rose-colour and the petals are almost entire. Thirteen of the stems are normal so far as can be seen, but the one in
question bears rose-coloured buds and flowers only on one small branch, pure white flowers and at least one rose-coloured bud nearly ready to open on another, whilst the three other branches bear pure white flowers and probably pure white buds only. I have never met with a Campion like this before, but I found in a hedge near Malpas here in 1931 a male plant with pure white flowers, which I transplanted to the garden, where it flowered so profusely last year that it evidently exhausted its strength and has not appeared this year. I have also seen one other white-flowered plant, but considering the superabundance of the species in this part of the country it is very surprising that there is not more variation. Very richly coloured flowers are common, and pale pink ones by no means rare. I have seen nothing of *Lychnis alba* here yet, even on the Truro refuse-tips, where many unusual wild and garden plants have been found. The soil is practically all acid, and that probably explains the White Campion's absence.—C. NICOLSON, Truro, May 18.

**DISTRICT-VALUES IN SOUTH-WEST AFRICA.**—We are indebted to Prof. Dr. Hans Schinz for an excerpt from Petermann's 'Geographischen Mitteilungen,' 1885, p. 390, in which he shows that the "qua" is due to a misunderstanding of the early settlers at the Cape of the declension of the substantive name: an individual was a Namab (male) or Namas (female), a collection of men and women Namam, a Hottentot would never have used Namaqua in designating a race. The territory in question is the more or less arid region between the coast and, south of the Orange River, the western limit of the Calvinia district and the northern limit of the Clanwilliam district, and north of the Orange River, eastwards to the western limit of the Kalahari (longitude 19°) and northwards to 23° latitude. The areas north and south of the river may be distinguished as Great and Little Namaland respectively.

Confusion has also arisen in the name of the Owatherero country, which is spoken of as Hereroland or DamaraLand, while in some cases two distinct geographical areas are implied. The confusion arises from the existence in the same country of two distinct peoples—the Bergdama in the mountains, the Owatherero in the grassy plains. To call an Omuherero (short Herero) Damara would be regarded by him as a deadly insult; this term they reserve for the subjugated and despised Bergdamara. Hence Prof. Schinz suggests the use of the precise term Hereroland in place of the misleading DamaraLand.

**CARNIVOROUS PLANTS.**—Prof. F. E. Lloyd's Presidential Address to the Royal Society of Canada (ser. 3, xxxvii. Appendix A, 1933) forms a readable but critical review of the structure and functions of the insect-traps of the carnivorous plants, a worldwide group comprising 16 genera in five families. The traps are classified as (1) Passive—pitfalls (Pitcher-plants), and the sticky fly-paper type (*Drosophyllum, Roridula, Byblis,*) (2) Active—sticky fly-paper with aggressive movement (*Drosera, Pinguicula,* steel-trap type (*Dionaea, Adromeda,*), and mouse-trap type (*Utricularia, Bioucularia,* and *Polypondyphylla*). This series follows an ascending scale of complexity so far as the mechanism is concerned, and associates groups widely separated taxonomically. The address is a valuable comparative study, but in *Utricularia* Prof. Lloyd is, so to speak, on his native heath. The text is illustrated by a number of clear line drawings and sixteen well-filled photographic plates. The address was illustrated by motion-pictures of *Drosera, Dionaea,* and *Utricularia.*

**ADDITIONS TO THE CAMBRIDGE UNIVERSITY HERBARIUM.**—In the obituary of the late Spencer H. Bickham on p. 202 of this Journal it is stated that he "accumulated a considerable herbarium," but there is no mention of its present location. This herbarium was bequeathed to the University Botany School, Cambridge. It consists of about 20,000 sheets of British plants, beautifully prepared, and from a variety of localities, and thus constitutes an important addition to the University's collections. Unfortunately, Bickham's sheets being larger than the Kew size employed here, it has not been possible to incorporate them with the general British herbarium founded by Babington, but they can be readily consulted. This is the second important collection of British plants acquired in 1933, since earlier in the year Mr. J. E. Little of Hitchin presented his rich and critical herbarium of about 6000 sheets. Other noteworthy recent additions include the herbarium of the Cambridge Forestry School and plants from the Azores, Bulgaria, Czechoslovakia, Asia Minor, Spain, and North America, about 4500 specimens of the last having been obtained by exchange with the New York Botanical Garden, and a set of Californian topotypes from the Dudley herbarium of Leland Stanford University; these usefully supplement the older historic collections and types in the Lindley, Babington, Lemann, Henslow, and Greville herbaria.—W. T. STRAIN.
REVIEWS.


The petaloid Monocotyledons include some of the most beautiful of garden plants, but the group is recognized by the systematic botanist as one of exceptional difficulty. This is partly because of the inadequacy of herbarium specimens, unless very specially prepared, partly because the origin of most cultivated material is unknown, and partly because of complexities, such as vegetative propagation, hybridization, polypleody, and gene and chromosome mutations in the plants themselves. It follows that the revision of such a group as that of the Daffodils by an author who has made a special study of the living plants, the herbarium types, and the literature must command the attention of both horticulturists and botanists.

Mr. Pugsley accepts twenty-seven species in the subgenus, including nine described as new. These are classified into two sections—Cyclaminopsis and Pseudo-Narcissus—the former with two species (one new) and the latter with twenty-five species divided into six series. Concise descriptions in English are given for all the species, synonams, plates, and a somewhat limited number of excisates are quoted. Particularly interesting are the historical details, which indicate much labour, especially in interpreting pro-Linnaean literature. The paper is illustrated by photographs of type-specimens or living plants, reproductions of old figures, and drawings of fruits and flowers. Latin descriptions are affixed to new species and intraspecific units.

An Introduction discusses the botanical history of the subgenus, the taxonomic and morphological characters, and the distribution of the group. There is a useful conspectus of the species, but, unfortunately, no artificial dichotomous key.

British botanists will be interested in the descriptions of Narcissus Pseudo-Narcissus Linn. var. humilis, from Derbyshire and other counties in northern England, and N. Pseudo-Narcissus Linn. var. insignis, from the neighbourhood of Ross in Herefordshire and Dymock in Gloucestershire. Both are named as new varieties.

A hope may be expressed that Mr. Pugsley will have all his living plants examined cytologically. Cytological data would be much more valuable to taxonomists if they were more often based on authenticated material of known wild origin.—W. B. Turville.

ENGLISH NAMES OF OUR COMMONEST WILD FLOWERS 267


Canon Fowler endeavours to meet the difficulty arising from the fact that most of our commonest wild flowers have more than one English name by giving to each plant a standard name. Under the standard name, which is distinguished in his list by capitals, the other names of the plant are given, so that a plant known by any particular or local name can be identified by reference to its standard name. An obvious criticism is that, in the absence of any rules, priority or other, for selecting the standard name, responsibility for the choice is thrown entirely upon the author; a decision must often have been difficult—for example, the selection of Cleavers and not Goose-grass for Galium aparine, or Wild Pansy (is this a genuine popular name?) instead of Heartsease. The practice of prefixing 'Common' to a very generally used English name in order to standardize it seems unnecessary—Dandelion, Chickweed, Bird's-foot Trefoil, Couch, Great Samphire, Honeysuckle, Ragwort, and others have surely strong claims to standardization without the burden of the addition of 'Common.' These become manufactured plant-names which should be taboo. The subject of common English names was one which the late Editor of this Journal, James Britton, was especially competent to deal with, and it is matter for regret that he did not prepare a later edition of the 'Dictionary of British Plant Names,' which, with Robert Holland, he compiled for the English Dialect Society. Unfortunately the volume has long been out of print.

But, apart from differences of opinion and what may be styled lapses from grace in the use of manufactured names, Canon Fisher's book contains much interesting information in a form accessible to lovers of our native flora. We gather from his Preface that it is merely an excerpt from a larger work, 'The English Names of our Wild Flowers,' which the author has in MS., and which includes nearly 17,000 names. As the cost of printing this was prohibitive Canon Fisher has included in the present volume the plants which are found in all the 112 comital districts, and has added the meaning and derivation of the names. We sincerely trust that the Canon will take steps to ensure the preservation of his valuable manuscript list.—A. B. R.


Text-books and monographs on soil are generally addressed primarily to agricultural students, and therefore stress the chemical
aspects of crop cultivation and the use of fertilizers. Academically the subject is a branch of agricultural chemistry, but in research work it is realized that the fundamental properties of soils are best considered not by chemical or physical analyses of the surface soil and subsoil to determine total or available plant-food and water, but through the detailed examination of the vertical soil section. The soil profile forms the natural unit, which expresses by its morphology and by the chemical composition of its successive horizons an integration of the processes involved in the evolution of the soil from its parent geological material under the influence of climate, vegetation, animals, and man. Its proper interpretation should afford the best guide not only to the processes still going on, but to the effects of the soil on the plants it supports. The new soil science, or "pedology," provides material interesting alike to botanist, geologist, chemist, and agriculturist.

Professor Robinson accepts whole-heartedly the modern view-point in the volume under review. He dismisses the definitely agricultural applications and the more purely microbiological and plant-physiological questions quite briefly. After explaining the essential processes of soil formation and emphasizing the importance of the inorganic and organic colloids as the essential weathering complex and the seat of the fundamental reactions in the soil, he describes the major types of soil so far recognized, and discusses the more recent systems of soil classification.

In his chapter on the geography of soils he ranges over the whole world, and throughout the book his illustrations are chosen, often from personal experience, from many parts of the British Empire. The chapters on the methods of soil survey and soil analysis will prove useful to plant ecologists as a critical exposition of the standard methods of soil investigation, many of which were developed by Professor Robinson and his colleagues at Bangor.

The book may be confidently recommended to botanists, and especially to ecologists, as providing precisely those aspects of the subject needed for their own problems without undue dilution with definitely agricultural material.—E. M. CROWTHER.


A NOTICE of the first part of this work (dated 1929) appeared in this Journal in 1932 (p. 254), where the scope of the work was described. Part I. dealt with the Anthocerotales, the Marchantiales, the Anacrogynous Jungermanniales, and the Sphaerocarpales. It was intended in Part II. to deal only with the Acrogynous Jungermanniales, but in order to bring together the Jungermanniales the Anacrogynae and the closely allied order Sphaerocarpales have also been included, and the latter have been brought up to date. Prof. Kashyap records his thanks to Mr. F. Verdoorn for the determination of the Frullaniae in the Punjab herbarium, to Prof. Herzog for that of species of Lejeunea, and to Mr. W. E. Nicholson for that of species of other genera. Also to his Demonstrator, Mr. R. S. Chopra, for help, including the drawings of the diagrams of the Acrogynae.

The small Supplement includes additional information, with a few corrections, on the genera treated in Part I. Part II. follows the plan of Part I.; new species are described, in English only, in the genera Matthea, Scapania, Solenostoma, Jungermannia, and Calypcaria. The long series of clear collotype drawings provides a helpful addition to the descriptions. A Bibliography cites papers dealing exclusively with Indian Liverworts or works of a more general nature in which reference is made to these.

The work, which gives evidence of careful investigation and preparation, should stimulate the study of the Liverworts of North-West India.


Studies of the genetics and cytology of the species of Gossypium "are gradually clearing up taxonomic difficulties, and it is now possible to present a more or less coherent scheme of classification." Two sections are recognized with 26 and 13 chromosome types respectively. These comprise eleven species, but do not provide for some of the species admitted by Watt in his 'Wild and Cultivated Cotton Plants of the World,' which are either incorporated with other species, excluded from the genus, or insufficiently known. Short descriptions of the species admitted are given. Then follows a detailed consideration of the various characters and their behaviour in crossing, grouped under the headings of Plant, Leaf, Flower, Boll,Lint, Seed, and Physiological. The last category comprises resistance to various diseases and to the shedding of flower-buds. A few correlations are discussed, and, in conclusion, a list of the factors so far definitely established is given, followed by a table of the data on linkage relationships so far as published. A list of references is appended.
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The present list includes the entries of previous bibliographies, the last of which was published by W. A. Kellerman in 1896. It has not been considered feasible to annotate many of the references in the present bibliography, and the reader is referred to the former lists for more complete annotations. The plan of Dr. Kellerman’s bibliography has been generally followed—the list includes only such articles as refer particularly to plants that occur in Ohio; articles are arranged chronologically under each author’s name; names of authors follow in alphabetical order. Purely physiological and morphological papers have been excluded. Teratological and plant pathological papers have been included, but not articles relating strictly to horticulture, forestry, or agriculture.

BOOK-NOTES, NEWS, ETC.

National Botanic Gardens of South Africa.—In his Annual Report for 1932 the Director, Prof. R. H. Compton, points out that next year Kirstenbosch will celebrate its coming-of-age. He suggests that the moment is appropriate for a determined effort to place its finances on a stable and adequate basis. By a substantial increase in the Government and Municipal grants and the establishment of an endowment fund it will then be possible to fulfil the various proper functions of the Gardens, which have so far hardly been touched upon. These would include study of the improvement of South African plants for horticultural purposes by means of hybridization and selection, the introduction and trial of plants of economic value, and the establishment of a laboratory for botanical research and a museum and library for botanical study.

Orchid Review.—In the July number Edith Coleman discusses the floral structure and method of pollination in the Australian genus Frasophyllum. The pollinia are removed by small honey-loving beetles which are attracted by nectar-secreting glands on the labellum.

Death has been busy of late among our British botanists. On August 3rd Dr. Otto Stapf, F.R.S., formerly Keeper of the Herbarium and Library at the Royal Botanic Gardens, Kew, and Editor of the recently published "Index Luidinensis," died while on holiday at Innsbruck; and Dr. Eric Drabble, a frequent contributor to our pages of papers on critical British plant genera, died at his home at Moon’s Hill, Isle of Wight. Some account of their work will appear in a later number of this Journal.

THE BACTERIOPHILOUS SPECIES OF PSYCHOTRIA.

By C. E. B. BREMMERKAMP, D.Sc.

The first reference to a bacterial symbiosis in Rubiaceae is found in a paper published in 1902 by A. Zimmermann*. Bacterial nodules were observed by him in the botanical gardens at Buitenzorg, Java, on the leaves of three species of Pavetta and on those of a plant labelled Grumilea mirandula Hieron: as it had neither flowers nor fruits it was impossible at that time to verify this identification. Shortly after his departure, however, it flowered and proved a new species of Pavetta, which Th. Valeton (Icon. Bogorineae, ii. fasc. 2, tab. 143, 1904) described under the name of P. Zimmermanniana.

That bacterial nodules are present, however, in a genus very nearly related to Grumilea, namely in Psychotria, was shown a few years later by Valeton (op. cit. iii. fasc. 3, tab. 37, 1908), when he described a species of that genus cultivated also in the Buitenzorg gardens. It was thought there to have come from the Comores, and as it appeared to be distinct from all other Mascarene species, Valeton regarded it as new and named it Psychotria bacteriophila. Comparison of this plant with the bacteriophilous species of Psychotria in the Kew Herbarium has shown, however, that it is identical with P. punctata Vatke from the coast of tropical East Africa, where it is apparently common. Its occurrence in the Comores, though not quite impossible, seems doubtful, as no other bacteriophilous species of Psychotria occurs in these islands, and it is not included in any of the collections made there.

That bacterial nodules are not confined to this species was shown by Boas†, who described them in two West African species. In one of these they are, like those of P. punctata, more or less circular in outline and irregularly scattered over the whole surface of the leaf, whereas in the other they are linear and arranged in a double file along the midrib. The presence of bacterial nodules in a third genus of Rubiaceae is very probable. Zimmermann (l.c.) pointed out that the postules on the shoots and leaves of Heterophylla punctata Hook. f. (Hindia Fieberii K. Krause), of which a description is found in Solereder’s ‘Systematische Anatomie der Diotyledonen,’ show the same structure as the bacterial nodules of Pavetta. Similar postules are found in Lecanoserpa lycoides Rusby (Bull. Torr. Bot. Club, xx. 420 fig. 1, 1893). Though there is a striking difference in habit between these two plants, they are doubtless very closely related.

Bacterial nodules occur also in a second Dicotyledonous family, the Myrsinaceae, where they were discovered and studied by Miehe * in *Ardisia crispa* A. DC. They are present, however, in every one of the thirty or more species of the subgenus *Cris-
paris* and probably also in the several genera *Amblyanthus* and
*Amblyanthopsis*. The leaves of these Myrsinaceae are crenate, and the nodules are found at the base of the incisions. In the bacteriophilous Rubiaceae, on the other hand, where the leaves are entire, they are either confined to a narrow strip along the midrib, or they are more or less irregularly scattered.

Morphologically entirely different are the bacteriodoma of
*Dioscorea macrorura* Harm., studied by Matthew Young Orr †. The leaves of this plant run out in a fleshy linear appendage, which contains four cylindrical cavities filled with bacteria embedded in slime: four longitudinal slits in the upper surface lead into these cavities. A similar appendage was found by J. R. Junger † in the somewhat smaller leaves of an unnamed species, which may have been *Dioscorea Welwitschii* Rendle: in that species at any rate the appendage is also present.

That in the Myrsinaceae the presence of bacterial nodules is a character of taxonomic importance can hardly be doubted: the nodules are confined to a single subgenus of *Ardisia* and to the genera *Amblyanthus* and *Amblyanthopsis*, which are evidently closely allied to *Ardisia*. In the Rubiaceae, however, the situation is less simple. The South American genera *Hetero-
phylla* and *Lecanoseperma* have several ovoids in the ovary cells and, therefore, widely separated from *Pavetta* and *Psychotria*, and, though the latter are doubtless related, they are by no means very near allies: in both genera, moreover, groups of species are included which are always entirely free from bacteria. In my revision of the South African species of *Pavetta* (Ann. Transvaal Mus. xiii. 182, 1929) I have shown that in that genus form and distribution of the nodules are of taxonomic importance; in my monograph of the genus I will discuss this question more fully: now, however, I will confine myself to the genus *Psychotria*.

Bacterial symbiosis is comparatively rare in the genus *Psychotria*, though much more common than one would have expected. So far this condition has been described in three species only, but the list appended to this paper contains 42 names, and the number will doubtless increase. All these species occur on the African continent; in America, the Mascarene Islands, and Asia they are unknown. They belong to the genus *Psychotria* as it is now generally understood, not a single one belongs to the genera *Chasalia* and *Grunovia*, which were formerly often included in *Psychotria*. In the subdivision of the genus proposed by Schumann in his monograph of the Rubiaceae in Engl. and Prantl's *Natürliche Pflanzenfamilien*, they all fall in the subgenus *Eupychotria*. Even of the African representatives of this subgenus, however, only a small part are bacteriophilous. Free from nodules, for instance, are the species which Schumann includes in Müller Argau's section *Inundatae*, and which form a well-defined group characterized by very peculiar large bicaudate and alate stigmas, a russet indumentum, large bracts, and costate pyrenes. The classification of the remaining species offers considerable difficulties. A number of thin-leaved forms might be grouped round *P. abrupta* Hiern, and a number of small undershrubs round *P. amboniana* K. Sch.: the species belonging to these two groups also are always free from symbiotic bacteria. Among the rest the bacteriophilous species form the most important group with the following characters.

They are small shrubs, 1–6 feet high, forming part of the undergrowth of bush or forest. The leaves are usually heartshaped and of moderate size: the blade is contracted at the base; the lateral nerves are alternate or subopposite, and the smaller veins few and inconspicuous; the bacterial nodules are either more or less circular in outline and irregularly scattered, showing no definite relation to the veins, or they are linear and arranged in a double file along the midrib; bundles of raphides are present, though sometimes difficult to see; acaridomata or tufts of hair in the axil of the lateral nerves are absent. The stigmas are either bicuspitate or bicaudate, and as a rule caducous. The inflorescence is terminal, pedunculate, and either paniculate or more often corymbose or contracted in a simple umbel; the bracts are minute and caducous. The white or greenish-white flowers are shortly pedicelled, tetrameres or more often pentameres, and heterostylous. The calyx varies from very shortly denticulate to deeply lobed with narrowly triangular segments. The corolla is hypocrateriform, its throat hairy or, rarely, glabrous. The stamens are inserted about midway in the tube; their filaments are glabrous and the anthers dorsifixied. The disc is annular and thick. The style is glabrous: the stigmatic lobes spreading or slightly reflexed. The ovary is two-celled, with a solitary erect ovule in each cell. The fruit is a red drupe with a very thin endocarp, and one or two pyrenes, which are usually smooth, rarely slightly ribbed; the seeds

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are either smooth or wrinkled, and, on the ventral side, provided with an intrusion of the testa, which penetrates usually as far as the centre of the seed, where it widens into a disc. The embryo is small and its radicle inferior. The species are all African.

The nearest approach to these characters is found in the species related to *P. amboniana* K. Sch. These resemble the smaller species of the bacteriophilous group; they have, moreover, bundles of raphides in the mesophyll; their seeds show the ventral intrusion of the testa; and they too are confined to the African continent. In contradistinction with the species of the bacteriophilous group they are, however, always provided with acaridomata and with tufts of hair in the axil of the lateral nerves. This difference is doubtless small, and it is questionable whether it is of sufficient importance to justify a separation of these two groups. As the presence of the nodules enables us, however, to isolate a considerable number of species, and as the nodules themselves are on the whole easily recognizable, the character has doubtless a practical value.

Difficulties in the recognition of the nodules may arise when the leaves are very hairy, or in the case of herbarium specimens when they are very dark. In hairy leaves it will sometimes be found necessary to remove the indumentum, and very dark leaves will have to be made more transparent by boiling; this treatment causes, moreover, a swelling of the nodules. In those species in which the latter follow the midrib, it is usually necessary to remove the epidermis: the nodules appear in that case as black strips between the greenish mesophyll and the white tissue of the midrib.

On the other hand, it should not be forgotten that a black dot on a leaf is not necessarily a bacterial nodule. Such dots are sometimes caused by parasitic fungi. The type-specimen of *Psychotria subpentada* Hiern, for instance, shows on the lower side of the leaf the black fructification of a fungus, which has been described as *Microthyrium Psychotria* (Masse in Journ. Bot. xxxv. 152, 1896): similar fungi are found on the leaves of numerous other plants including several species of *Psychotria*. Even without the aid of a microscope these fructifications are, as a rule, easily distinguishable from bacterial nodules; the latter extend from the upper to the lower face of the leaf, and as they do not burst through the epidermis, their outline is less sharply defined; they are, moreover, as a rule present in every leaf. Other markings are due to the presence of secretions: as, for instance, in several Massearenean species, where the lower side of the leaf is finely marbled.

The bacteriophilous species fall naturally into three groups. In the first the bacterial nodules follow the midrib, in the second and third they are irregularly scattered; the species of the second group have a ring of hairs at the insertion of the stamens, whereas in those of the third group the corolla-tube is glabrous inside. The first group is confined to the ciesequatorial part of tropical West Africa, the third to East Africa; of the species of the second and largest group a few with tetramerous corollas are found in the same region as the species of the first group, whereas the far more numerous species with pentamerous corollas occur in East Africa, Rhodesia, the Congo, and Angola.

**Key to the Bacteriophilous Species of Psychotria.**

Group I.—Nodules along the midrib.

- Leaves elliptic; stipules bicaudately pubescent.
- Leaves glaucous
- Leaves green
- Leaves lanceolate; stipules bicaudate.
- Tips of the stipules straight
- Tips of the stipules recurved

1. *P. calva*
2. *P. kieniense*
3. *P. umbellata*
4. *P. recurva*

Group II.—Nodules scattered; a ring of hairs at the insertion of the stamens.

- Flowers 4-merous; inflorescence a many-flowered panicle.
- Leaves small, ± 6-nerved
- Leaves large, 11-18-nerved.
- Calyx denticulate; shoots always green.
- Leaves glabrous
- Leaves pubescent beneath
- Calyx shortly lobed; shoots at first rufous.

5. *P. Verschoorii*
6. *P. setacea*
7. *P. kimmermuelleri*
8. *P. carpophylloidea*

Group III.—Nodules forming a narrow ring.

- Inflorescence a many-flowered panicle.
- Calyx denticulate; leaves lanceolate, glabrous
- Calyx shortly lobed or subtruncate; leaves elliptic.
- Leaves glabrous
- Leaves pubescent
- Inflor socence corymbosum or umbellate.
- Calyx dentate or dentilicate; inflorescence corymbosa.
- Stipules bicaudate; leaves glabrous or pubescent.
- Leaves ovate or obovate.
- Leaves obovate; inflorescence reflexed.
- Leaves ovate; inflorescence not reflexed.
- Leaves abruptly acuminate, with ± 10 pairs of rather faint nerves, glabrous.
- Leaves not abruptly acuminate.

9. *P. Fleurus*
10. *P. fasciculata*
11. *P. griseola*
12. *P. refrectiflora*
13. *P. stigmatophylla*
14. *P. Swynnertoni*
15. *P. Wieliczkii*
The Bacteriophilous Species of Psychotria

Leaves densely pubescent or tomentose.
Leaves green on both sides, nerves in 4 pairs
Leaves grey tomentose beneath, nerves in 6-7 pairs
Calyx lobes narrow and long
Group III—Nodules scattered; corolla-tube glabrous inside.
Leaves ±8 cm. long; midrib white
Leaves ±4 cm. long; midrib red

List of the Bacteriophilous Species of Psychotria.

The Bacteriophilous Species of Psychotria

5-meri. **Calyx** cupularis, 5-dentatus. **Corolla** albo-viridis, hypocrateriformis, lobis tubo fere aquilongis, tubo intus ad medium, ubi stamina inserta sunt, barbat. **Drupa** monopyrena an bipyrena, endocarpio tenui; semen corrugatum, facie ventrali sulco profundo testae, ad centrum seminis dilatato, intrusum. 

Hab. Kenya, Nairobi, W. J. Douson 490 (type); ibidem, Dümmer 2021; ibidem, Miss E. R. Napier 565; Machalos distr., Garner 2172. Tanganyika, Mbulu distr., Burt 2294 (flowers 4-meros); Eastern Kilimandjaro, Haarer 690 p.p. All in Herb. Kew.

Related to the preceding and to the following species, but easily recognizable by the wavy border of its leaves. In the neighbourhood of Nairobi apparently common.

28. **P. marginata**, sp. nov. **Folium** parva, glabra, ramis novellis pinnatis, cauliflori, nervis bracteis aequalibus, bracteis eineri, petalum oblongo, 3-4 cm. longo, 1-2 cm. latu, subauriculatae, sec. proceris facie inferiori pallida, margine albidum, incassata, recurvata et undulata, apice acuta, basi cuneata, nervis laterribus utroque latere costa 6, infra prominentibus, albidum; petalibus brevis annullus. Stipulae breviter bicandatae, subpersistentes, pallide, intus parte inferiore sericeo-villoso. **Inflorescencia** longe pedunculata, trichotome corymbosa, ramulis pilosis in axillis bracteis parvarum, decidunt. **Calyx** cupularis, irregulariter 5-dentatus. **Corolla** alba, hypocrateriformis, lobis tubo fere aquilongis, tubo intus ad insertionem staminum barbatum. 

Hab. Tanganyika, Kondoa distr., near Kolo, Burt 1258. 

Herb. Kew.

Very near to the preceding species, but at once recognizable by its pallid white-margined leaves and by the transversely cracked bark of its twigs.


St. Thomas.


**P. bacteriophila** Val. Icones Bogor. iii. fase. 3, tab. 271 (1904).

Apparently common along the coast of tropical East Africa from South Somaliland southward, also on the islands near the coast; usually on the dunes, but also on coral rock.


33. **P. Muchonata** Hier. l. c. 211. Country of the Djuir; Cameroons (Ledermann 1946, Herb. Berol.).


Cameroons.

35. **P. Collingola** K. Sch. op. cit. xxxiii. 364 (1903). 

Tanganyika.
37. P. KIRKEI H. ex, i. c. 206. P. kirkella Olivi. in Trans. Linn. Soc. ser. ii. 336 (1887). P. subhirochella K. Sch. in Engl. Pflanzenw. Ost-Afrikas C. 390 (1895). It is not impossible that P. pubifolia also belongs to this species: the differences are so very small that they may fall within the range of variability. Tanganyika, Nyasaland, Northern and Southern Rhodesia, Southern Congo.
38. P. VOLKENSII K. Sch. i, c. Tanganyika.
39. P. TARABASSICA, sp. nov. Fruticosus, 1-8 m. alta, partibus annominis pilosis, ramis veteribus cortice griseo obtectis, striatis. Polia elliptico-lanceolata, 5-8 cm. longa, 1-5-2.5 cm. lata, apice acuta, basi in petiolum contracta, supra viridia et pilis sparsis post scabrida, subbasis griseo-tomentosa, nervis lateralisibus utroque face acus conspicus, albus, utroque lateris costae circ. 7. Stipulae longae, bicaudatae, mox brunnescentes et deindecidentes. Inflorescentia trichotome corymbosa. Flores 5-meri. Calyx breviter 5-lobatus. Corolla alba. Drupa rubra, dipyrrena; semina levia, facie ventrali sulco profundio teste intrusa.
Nearly related to the three preceding species, but at once recognizable by the grey tomentose lower side of the leaf.
I wish to thank the Keeper of the Herbarium at Kew, the Keeper of the Herbarium of the British Museum, the Director of the Herbarium at Brussels, and the Director of the Herbarium at Berlin-Dahlem for the opportunity to study the material entrusted to their care, and the Director of the Herbarium at Copenhagen for the gift of a photograph of the type-specimen of Psychotria umbellata Thon.

NEW OR NOTEWORTHY FUNGI.—PART XIII.

BY W. B. GROVE, M.A.

(Concluded from p. 259.)

Perithecia in dense crowds, punctiform, 120-130 μ diam., subglobose or lens-shaped, dark-brown, immersed. Aci in close fascicles, somewhat clavato, about 50×10 μ. Spores triseriate, linear-oblong, attaining nearly 30×3-4 μ, yellow, trisepitate, the second cell sometimes slightly swollen. No paraphyses seen.
On a dead leaf of Acorus Calamus, Harvington Hall, Wores (Rhodes, no. 4466); March.
There can be little doubt that this is merely a young state of Bresadola’s species. The spores were immature, for they could not be induced to quit the ascus. The aseci were united at the base in a fascicle, and could with difficulty be separated from one another.

Perithecia scattered or in short rows, globose, papillate, at first immersed, then erumpent by the papilla, black, ca. 120 μ diam. Aci broadly clavate-fusoid, 55-65×10-11 μ, rounded above, shortly pedicellate, 8-spored, surrounded by abundant filiform mucous paraphyses. Spores distichous or subdistichous, fusoid, obtuse at both ends, 5-septate, hardly constricted, 22-25×3-5-5 μ, with only a faint tinge of colour.
On dead peduncles of Luzula maxima, Ribbesford Wood, Wores; March.
There can be little doubt that this, though technically a Mutisiae in these specimens, is merely a young state of the Leptosphaeria; the whole appearance of the aseci etc. suggested immaturity.

NEW OR NOTEWORTHY FUNGI—PART XIII.

BY W. B. GROVE, M.A.

(Concluded from p. 259.)

Perithecia in dense crowds, punctiform, 120-130 μ diam., subglobose or lens-shaped, dark-brown, immersed. Aci in close fascicles, somewhat clavato, about 50×10 μ. Spores triseriate, linear-oblong, attaining nearly 30×3-4 μ, yellow,

Fig. 5.—Leptosphaeria Obiones f. evolution; an ascus with spores, also one young and three mature spores, × 600.

Forma nova evolution, sporidiis septis usque ad 5-6 instructis. Perithecia subgregarious, black, depressed-globose, 240-260 μ diam., covered, then erumpent by a short obtuse papilla which is pierced at the apex by a distinct pore. Aci crowded,
subclavate or subcylindrical, 80–85×14 μ, with a short knotted pedicel. Spores obovoid, rounded at both ends, mostly straight, rarely slightly curved, with 3, then 5–6 septa, biserrate (but when seen from the side obliquely uniseriate), hardly constricted at the septa, yellowish, 17–18×5–5.5 μ (or even 20×7 μ), each loculus provided with one or two guttules. Paraphyses few, filiform, gelatinous. (Fig. 5.)

On dead stems of Obione portulacoides, Sandplace, near Looe, Cornwall (Rhodes & Rilstone, no. 4203 b); July, 1929; accompanied by Coniothyrium Obiones Jaap (Rhodes & Rilstone, no. 4204 c).

This fungus seems to be a more developed form of L. Obiones Sacc. The texture of the pycnidium is thick and opaque; the spores, when 3-septate, measure about 14×4 μ; when 5-septate and 17–18 μ long or more, they have the third loculus occasionally slightly swollen, but scarcely become torulosas as stated by Saccardo.


Var. nov. major, omnibus partibus major.

Perithecia in dense groups, immersed, then erumpent by the upper half, prominent, globose, hardly papillate, 400–500 μ diam., fulvous-brown, opaque, smooth; texture of minute, fuliginous-chestnut cells. Asci remarkably clavate, rounded above with a thin wall, about 150×25 μ. Sporidia bi-triseriate, elongate-fusoid, obustate at both ends, often gently curved, as first 1-septate in the middle and there distinctly constricted, then 7-septate, dark olivaceous-brown, the terminal cells roundish-ellipsoid and paler, the other cells discoid and each of them provided with a large central guttule, 50–55×8–10 μ. Paraphyses very abundant, thin, filiform, colourless, gelatinous, about as long as the asci. (Fig. 4, b, p. 259.)

On a very old thick dead stem of Lippia (Aloysia) citriodora, in a garden, Landeviddy, Polperro, Cornwall (Rilstone); March.

fragoso’s species was found on the same host in a garden at Seville; it was evidently very similar to the variety here described, but measured about half as large in every dimension (perith. 250 μ; asci 75–90×12–14 μ; sp. 25–30×6–7 μ). But the likenesses are too many to permit one to regard them as distinct species; the difference may possibly be due to the superior humidity of the Cornish habitat. The spores of the British specimen, when mature, break apart easily at the median septum; they present somewhat of a resemblance to the spores of Coryneum Kunzei.


Perithecia rather densely gregarious, carbonaceous, globose-conical, black, 250–300 μ diam., the base sunken in the wood, apex then emerging with a distinctly papilliform obtuse glabrous shining ostiole, which is pierced by a round pore, but at length opens widely. Asci clavate, at first thick-walled, obtusely rounded above, shortly pedicellate below, 120–150×20–22 μ, 8-spored, surrounded by a crowd of gelatinous paraphyses. Spores distichous, fusoid, somewhat clavate above, when mature usually 7–8-septate (6–9, Sacc.), slightly constricted at the middle septum, olivaceous, at length ±fuliginous, 30–40×8–10 μ, the upper locules tending to be shorter and broader than the lower ones, each locule with a rather large guttule, the terminal locules paler than the intermediate ones. (Fig. 6, a.)

On the bare wood of an old decorticated branch of Quercus, Lathom Park, Lathom, S. Lancs (W. G. Travis, no. 371); July 1929.


Perithecia scattered, forming a conical protuberance in the periderm, not for a long time bursting it at the summit, black within, about 1 mm. diam. Asci clavate, obtusely rounded above, pedicellate below, 80–90×12–13 μ (100×15–16 μ, Rhodes). Spores distichous, obovoid, faintly curved in side view, obtuse at both ends or slightly attenuated, smooth, 3-septate, granular-guttulate within, quite colourless, gently constricted when mature, 21–23×6–7 μ (up to 27 μ long, Rhodes), surrounded by a thin mucous layer; no paraphyses seen. (Fig. 7.)
On thin dead twigs of a branch of *Alnus glutinosa*, placed to obstruct a gateway of a field, midway between Builth and Llandrindod Wells, Radnor; and also at Fenni Fach near Brecon (Grove & Rhodes); May 1929.

On the numerous twigs of this branch there were present also *Diotella diotica* Schröt., *Cryptosporium Nesiisi* Cord., and *Stenogybe byssacea*. The diagnosis of this species given by Saccardo, though incomplete, is sufficient to identify it, but its brevity has led Henning to rename a specimen of it *M. Ploettneriana*. The Radnorshire specimens exactly combine all the characters of both, except for a trifling difference in the breadth of the spores and asci, in which Henning may have made an error; he gives the spores as 8–10 µ wide, while Saccardo says 5 µ wide.


*Perithecia* scattered or collected here and there in loose clusters, immersed in the cortex, at first covered by the epidermis, then protruding the broad ostiole or becoming superficial as the epidermis secedes, globose, black, glabrous, up to 480 µ diam. Asci subcylindrical, 100–120 x 10 µ, 8-spored. Spores subdistant, elongate-fusoid, straight or rarely somewhat curved, soon 1-septate in the middle, then 3-septate, distinctly constricted at each septum, hyaline, 5–6-guttulate, 26–28 x 5 µ; paraphyses numerous, very delicate, filiform. (Fig. 6, b.)

On dead stems of *Spiraea Aruncus*, Oscott College Grounds (Rhodes & Grove); Oct.

The middle septum is formed early, and each loculus then becomes inflated and sharply swollen on each side of the septum and close to it, thus leaving a deep constriction at that point, with a large guttule adjoining the septum on each side and usually two other smaller ones in each cell. Then a constriction arises about the middle of each loculus, and finally the two other septa are formed as shown in the figure. The terminal guttules, when there are five or six, always remain very small, and seem never to be cut off by a septum. When free from the ascus, the spores often take on an olive-green tint, and the guttules may disappear. This species is very similar to *M. rupicola* Sacc. (Fung. Ital. pl. 282), on dead stems of *Acuminus*, but the peritheciun is much larger, and the asci are distinctly narrower.


*Perithecia* scattered or loosely gregarious, nearly superficial or sunken at the base in the wood a little, subglobose, then conoid, glabrous, 250–330 µ diam., very black, somewhat shining, carbonaceous, with a short papillate pycnoecium ostiole. Asci cylindrical, shortly stipitate, 100–110 x 9–10 µ, 8-spored, surrounded by numerous filiform paraphyses. Spores ± mono-

stichous, occasionally subdistichous, fusoid, straight or faintly curved, 27–28 (25–31, *Travis*) x 6–7 µ, subacute at both ends, with a row of six conspicuous highly refringent guttules, colourless, at length 5-septate.

On a bare chip of slightly decayed wood, Limbo Lane, Irby, Cheshire (*Travis*, no. 390); March.

The peritheciun can be seen to originate in the soft wood just below the surface, and then to force their way upwards and become nearly superficial (but some could be seen to be still covered over at the sides by loose adhering fibres). Ostiolum bluntly conical and rather broad. The guttules of the spores are large and clear, especially the two middle ones; the septa are exactly delicate, and difficult to see except in the maturest spores. Migula describes the spores as only 3-septate.


*Forma nov. cauleola*, sporidiis fuscis, monostichios.

No spots. *Perithecia* like those of *Pleospora herbarum*, mostly scattered or rather crowded at times, subglobose, black, up to 500 µ diam., immersed, then raising and cracking the epidermis, at last erumpent by the convex vertex or a faintly papilliform ostiole. Asci cylindrical, 150–170 µ x 10–12 µ, rounded at apex, 8-spored. Spores at first strictly monostichous, or later obliquely so, oblong, rounded but slightly tapering at each end, most often not quite straight but bent and faintly constricted at the middle septum, when young 3-septate pale brownish, then dingy-brownish and at length gradually 5–7-septate, with the 4–6 middle loculi each divided by a longitudinal septum, 22–28 x 6–8 µ, the upper half being often a little broader than the lower; the three primary septa always remain more distinctly marked than the others; paraphyses few, filiform, subglandulatius.

On small dead twigs of *Euonymus europaeus*. Sneyd's Coppice, Wores; May.

This seems to be quite distinct from any form that could be fairly called *Pleospora herbarum*, not only by its habitat, but also by the total absence of any trace of a yellow or amber colour in its spores, as well as by their shape, monostichous arrangement, etc. The ascus is at first remarkably cylindrical, and the spores are in a straight line.


*Perithecia* subgregarious, on a dusky black spot, wholly or partially immersed, oval, black, 400–500 µ diam., with a
narrow protruding compressed truncate or convexly rounded ostiole. 

Ascii clavate, narrowed below, 90–100×10–12 μ, 8-spored. 

*Spordia* biseriate, fusoid, slightly curved like a bow, 

20–22×4–5–5 μ, 5-septate, constricted at the middle septum only, 

the loculus above the middle sometimes swollen, olivaceous-

brownish, provided at each end with an acute colourless appendage,

which is turned obliquely so as to form a part of the curve of 

the spore. 

Ascii surrounded by numerous colourless filiform paraphyses, about as long as themselves. (Fig. 8.) 

On an old dead decorticated stem of *Lavatera arborea*, 

Perelle, Guernsey (Rhodes, no. 4981); Sept. 1931.

Saccardo records numerous forms on herbaceous stems 

belonging to many different families. Whether this species

is what Cooke called *L. bicuspida*, and referred with hesitation 

to Currey, Linn. Soc. Trans. xxii, p. 321, pl. 58, f. 64, is doubtful, 

for he describes occasional "transverse" (i.e., longitudinal) 

septa such as no one else seems to have met with; but it is 

undoubtedly like his var. β, on dead *Clematis Vitalba*. It is 

remarkable that neither Saccardo nor Cooke makes any mention 

of the copious paraphyses which surround and embed the ascii 

of this species. It is probable that *bicuspida* is one of those 

more advanced forms, developing longitudinal septa in special 

circumstances, of which many instances are now known, e.g., 

* Pleospora erulina* Passer. (See my notes in Journ. Bot. 1919, 

p. 210; 1925, p. 355; 1930, p. 100.)


Syll. ix. 1059. 

Var. nov. major, sporidiis evolutioribus. 

Perithecia scattered, round, rather flat, dimidiate, 300–400 μ 

diam., black, easily seceding; texture in the middle, of small 

dark parenchymatous cells irregularly arranged, but all round 

these, towards the circumference, of paler narrow-linear radiating 

cells (2 μ broad); margin finely and elegantly fimbriate, nearly 

colourless. 

Ascii numerous, subclavate-oblong, rounded above,

shortly pedicellate below, 8-spored, 70–80×7–8 μ. 

Spores 

obliquely monosporiaceous, or biseriate above and uniseriate below 

(according to the angle of view), oval-oblong, obtuse at both 

ends, colourless, biguttulate; ? ultimately uniseptate, 14–15× 

4–5 μ. 

Paraphyses very abundant, as long as the asci, filiform, 

rarely branched (apparently), hyaline, sometimes slightly 

thickened at the summit.

On outer surface of the rolled-in dead leaves of *Psammia arenaria*, Sandwich Bay, Kent; Aug. 1929.

The lower proliferous stratum of the perithecia was thin 

and dark olivaceous. The spores were not seen with an absolutely 

inubitable septum, but there were sufficient indications that they 

would ultimately develop one. The perithecia, at first sight, 

reminded one of the cast-off sporangia of *Pilobolus* such as are 

often found attached to grass-stems and leaves in suitable places.

The type-form of *M. gramineum* was found at Osten, on leaves of 

*Psammia arenaria*, but it is described as having much shorter 

asci (27–30 μ) and smaller 3-guttulate spores (9×3 μ).

507. *Microthyrium Rhododendri*, sp. nov. 

Perithecia solitaria, longe secundum ramulos sparsa, nigra, 

rotundata v. oblonga, usque ad 400 μ longa, 200 μ lata, dimidiate, 

juniora applanata, seniora convexa atque medio in modum jugi 

formata, rima dehiscentia, seta fragilissima, contextu prescero-

chymatico radiante mediana parte opaco marginem versus 

membranaceam dilatatam subtranslucentem olivaceam sensim 

tenuior. 

Ascii globose-pyriformes, apice obtussissimi, infere 

in pedicellum abruptum attenuati, sporidii 8–8 foetii, 35–40 × 

20–25 μ. 

*Spordia* tristicha v. stipata, ovali-oblonga, utrinque 

rotundata, acroca, infra medium 1-septata, ad septum 

constricta, loculo quoque magna guttula unicus predito, 20–24 

(25) × 9–10 (11) μ; paraphyses nullis visis.

Hab. in ramulis emortuis v. semimortuis vetustissimorum 

*Rhododendri* culorum, Caerleon prope Barmouth, Mer., 

Mart. 1933.

The attacked branches were mostly about one-quarter inch 

or less in diameter; the loose spores in some of the perithecia 

which were old (exolete) had assumed, by decay, an olivaceous tint.


729. Mig. 862. 


Apothecia gregarious, on extensive pallescent spots, at first 

closed, immersed, then raising the epidermis, tearing it into 

laciniae, and disclosing the disc, which is roundish, marginate, 

cinereous-blackish, and flat, externally blackish-brown, 200– 

500 μ diam. 

Ascii cylindric, rounded above, shortly pedicellate, 

40–45×7–8 μ, 8-spored, surrounded by a few filiform paraphyses.

*Spores* oval, usually provided with a large central oil-guttule, 

which is of a pale yellowish-green colour, 8–9×4 μ.
On the under side of dry fallen leaves of *Viburnum Tinus*, Hadzor Hall, Wores; January.

This is a convenient opportunity to record an interesting fact, bearing upon this genus *Trockila*. In the *Journal of Botany* for 1912, p. 53, I recorded a new species of *Gloeosporium*, *G. phacidium*, on living leaves of *Prunus Laurocerasus*, and at the same time suggested, on the grounds of its *Phacidium*-like form and its occurrence in company with *Trockila Laurocerasus*, that it was the pseudoecial stage of that Discomycete. Just lately I have received a communication from Dr. Mary J. F. Gregor, of the Mycological Department, University of Edinburgh, stating that she had reared from a pure culture of a single ascospore of the *Trockila* a *Gloeosporium* stage. By examination of the type-specimen of *G. phacidium* from my herbarium, she has now ascertained that it agrees in all essential respects with the culture-stage which she had obtained.

BRITISH ASSOCIATION.

The Annual Meeting of the British Association was held at Leicester from September 6 to 13, with an attendance of about 2000 members. In his address the President, Sir Frederick Gowland Hopkins, Pres. R.S., reviewed the advances in recent years of our knowledge of biochemistry, and emphasized the precision which had been attained in the determination of the molecular structure of the activating substances by which vital processes are initiated. An illustration of progress was the increase in our knowledge of hormones and the closely related vitamins. We have already, he said, exact knowledge of the actual molecular structure of not a few of these, and are justified in believing that within a few years such knowledge will be extensive enough to allow a wide view of correlation between molecular structure and physiological activity.

In the latter part of his address the President discussed the relation of biology to human welfare, its bearing on which is increasingly evident. The need for recognizing biological truth as a necessary guide to individual conduct, to statecraft, and social policy is emphatic.

The botanical section (Section K) deliberated under the presidency of an overseas botanist, Prof. F. E. Lloyd, of the McGill University, Montreal. Prof. Lloyd introduced a striking innovation into his address which he gave in a picture theatre, and illustrated by a long series of lantern-slides and motion pictures. By this means a highly specialized and technical subject was made to provide an hour and a half’s instructive entertainment to a large and appreciative audience. The subject—"The Types of Entrance Mechanisms of the Trap of *Utricularia* (including *Polypondophyly*)"—depicted the variety and the minuteness of structure and behaviour of the door, or valve, and its contactual parts, particularly the threshold, of some 75 species of Bladderworts, which should be sufficiently representative of the 250 known species. The species may be grouped as floating, such as *U. vulgaris*, or so-called "terrestrial," such as *U. reniformis* and *U. coerulea*. The structure of the bladders or traps, is remarkably uniform in the submerged forms, but the contrary is true of the terrestrial; the difference can scarcely be due to lack of uniformity of environment in the latter, as these grow in a very wet substratum and are usually as much submerged as the floating forms.

The action of opening and closing of the door is extremely sudden, and falls within the limits of 1/16 second. The side-walls of the trap spring out, the shape of the periphery as seen in lateral view alters correspondingly, the door opens and closes, falling into a semi-relaxed position: during the short interval a column of water, carrying with it any small animals, rushes into the interior of the trap. After discharge the trap resists itself within a period of 15 to 30 minutes in *U. vulgaris* or as long as two hours in *U. purpurea*. In this operation water leaves the interior of the trap by diffusion through the walls, thus providing a reduced pressure within; as a result the pressure of the outer water pushes the door in. The energy required for the actuation of the trap on stimulation by contact is derived from the water-pressure plus the outward spring of the walls.

The door is rendered watertight by the velum, a cuticular development from the pavement epithelium of the threshold.

The resuming consists in the close adjustment of the door at all points with the threshold. The resulting posture of the door enables it to resist the even, if considerable, pressure of outside water on it, the watertightness being achieved by the sealing along the door-edge by the velum. The effectiveness of the door-posture depends on the shape of the threshold, which is always slightly funnel-shaped, the sides converging inwardly. In addition, there is a more markedly out-facing ridge or surface against which the middle reach of the door-edge finds application, resisting the inswing of the door.

"The structure of the door is correlated with the function of its various regions. It is composed of two courses of cells, the relative depths of which vary according to the function. While the whole is remarkable in its capacity for bending, we can recognize areas which can bend very freely and through a large arc. This is hinge-tissue, in which one course of cells is thin, the other thick. The thick course always takes the maximum compression. The upper part of the door and the regions around the sides are hinge-tissue. The capacity of compression and extension of the deep cells depends on their bellows structure, their periclinal walls being corrugated, each corrugation being supported by stiffening.
rods in the anticlinal walls. The occurrence of props in the
anticlinal walls is general throughout the door-tissues, so that
the chief characteristic of hinge-tissue is the corrugation of the
periclinal walls (inner and outer). The middle portion of the
lower half (more or less) of the door has cell-courses of equal
thickness very strongly supported by large numerous rods. The
cells themselves become exceedingly small, especially as they
approach the door-edge. The structure is such as to give some
and equal pliability in either direction, combined with con-
siderable rigidity. This is the part of the door which has to
remain in a rigid condition to give the door its footing on the
threshold. The extent of these parts of the door varies with the
species and peculiarities of shape of the entrance-structures.

There are two general classes of trap:

(a) Those in which the threshold is broad (from back to front),
the outer zone bearing a broad velum, the inner zone being
broad also, and the inner zone narrow. The door in such cases
is longer than broad, and is so placed that when the trap is set
the door-edge is held in position by the downthrust of the lateral
hinge, contributing with longitudinal thrust to the firm application
of the door-edge to a more or less upturned surface near the inner
limit of the threshold. The angle made by the plane of the door
with that of the threshold is a small one. The door is devoid
of special organs for actuation, unless sessile or short trichomes
occurred along the upper convex surface of the door may be so
regarded. As a rule, actuations were found only on the application
of sufficient pressure by prey trying to enter to make an initial
dent in the surface. This allows the outside water to exert its
pressure in folding the door lengthwise. The fold, travelling to
the door-edge, releases it from the downward thrust of the sides,
and the door is opened. The action is by no means as vigorous as
in the other kind presently described, nor as easily procured.
But procured it can be, and is vigorous enough to carry in the
intruding prey.

(b) Those in which the threshold is narrow. The outer zone
is relatively broad, and bears an ample velum; the middle zone
is narrow in the middle, widening toward the sides relatively more
than in the class (a), and with an inner zone which is broader.
The surface of application of the door-edge is at the front of the
middle zone along the middle reach; along the lateral reaches
the surface of the door is applied to broader fan-shaped extensions
of the middle zone facing outwards, procuring the funnel-like
shape of the entrance, into which the door is cramped under
pressure of water. Here the velum also is broader and deeper.
The door stands at a large angle to the plane of the threshold.
It is provided with trichomes which constitute a latch-lever for
the actuation of the trap. Contact therewith disturbs the door-
edge sufficiently to allow the pressure of water against it to become
effective in opening the trap and engulfing the prey.

"One cannot boast that all the species fit nicely into one or the
other of the above two categories. Beyond the general statement
as made, each kind of trap demands its own description.

For these reference must be made to the detailed descriptions
in the printed address with their accompanying sketches. These
are arranged under several types. The simplest includes U.
cornuta and U. juncea. New World species; the U. capensis-type
includes a Tasmanian species, U. lateriflora, and an undescribed
species from Ceylon. An Old World type, U. coerulea includes
several African and Ceylon species; U. monanthos is the type of
a group of Australasian species; and U. globulariaefolia represents
a neotropical group. Other types are represented by U. vulgaris,
U. reniformis, and U. purpurea.

The sectional papers were of varied interest. While some
were merely informative, others raised points which called for
discussion. It is to be regretted that, owing to the very full
programme, time was rarely allowed for discussion. The great
value of a meeting which brings together a number of workers
should lie in the opportunity for ventilating and discussing
matters, often of considerable interest, which are put forward.
There is a call for the blue pencil in drawing up the programme.

The section opened with a paper by Prof. Seward on the past
and present floras of the Kerguelen Archipelago. A general
account of the geological and physical features of the Archipelago
was given, and the main features and geographical relationships
of the present forms were discussed.

The ferns, which include fragments of ferns, angiosperms, and
other plants are believed to be of Tertiary age. Impressions recently
collected by Dr. de la Rée represent foliage and cone-scalles of
Araceae, apparently allied to A. ruellii. The present distribution
of this genus, which is not adapted for dispersal over ocean species
is difficult to explain other than by some theory of continental drift.

Morphology and anatomy were well represented, thus justi-
fying the encomium of the President in his speech at the Sectional
Dinner on the importance of the work of the English school in
this somewhat neglected branch of the Science. The carpel is
always with us. Dr. Hamshaw Thomas, in his paper on the
nature and origin of the stigma, reiterated his rejection of the
origin of the carpel from a folded leaf, and claimed that this
theory did not allow an intelligible explanation of the origin of
the stigma, especially in relation to the passage of the pollen-tube
into the ovule. He suggested that the stigma represented an
upward extension of the pollen-tube transmission-tissue in the
wall of the ovary. The origin of the carpel was traced from the
ovule-containing cupule of the pteridospere. A fusion of two
adjoining cupules with their projecting stigmatic appendages
produced a hypothetical arrangement from which the various
types of modern carpel might be derived, and, moreover, explained
the very general presence of two stigmas. Robert Brown’s
observation that each carpel had two stigmas which were lateral
in origin was quoted in support of this view. This hypothesis
would revive the Ranales from pride of place as a primitive
order, but what, after all, do we mean by primitive? A paper
which eloquently called for discussion!

Prof. McLean Thompson eliminated the carpel from the
inferior ovary of a large family of Monocotyledons, the Scitae-
mimineae, in which he has studied the development and morpho-
logy of the inflorescence and flower. He concludes that many
forms of cymose inflorescence have arisen by reduction of branched
cone-bearing strobili, with flowers arranged in spiral order, and
that sub-floral branching is not involved. The final stages in
reduction of the intermediate cymes are simple spikes. The
flowers themselves are considered to have been crateriform, with
vegetative organs displayed in spiral succession on the outer
surface of the crater and with microsporangiophores on and
towards the rim. There were neither carpels nor styles, but the
crater was occupied by megasporangiophores produced in spiral
manner. The latter are the modern ovules. The crater is con-
sidered to have been reduced and its margin to have been curtailed,
so that upper microsporangiophores came to lie on the inner rim.
Here they were sterilised to styles, and their subjacent areas of
support within the crater became the modern placenta. The
acarpous view of the ovary is supported by evidence of pro-
gressive increase of the androstrenum to the style without
involving the organisation of the ovary.

Mr. F. F. Hyde gave a preliminary account of his investigation
of the floral structure of the Campanulaceae, and described the
structure of the flower in a number of genera, with special reference
to the vascular anatomy. Miss M. M. Chattaway, continuing
her studies on the medullary rays, described their development
in the Stereulacaceae, and indicated an arrangement of the genera
by these characters. Prof. Priestley and Miss Scott had extended
their work on the nature of the Dicotyledonous shoot to the
Monocotyledon. *Alstroemeria* supplied an illustration. The
shoot is a jointed structure, and the fact that the first leaf-
primordium encircles the apex determines the nature of the phylo-
taxy—in this genus 5/8. In the development of the leaf-trace
an axial portion precedes the foliar, and the pair of lateral unions
suggest by their relative course earlier phases in development.

Dr. E. M. Thomas, discussing recent work on seedling anatomy,
emphasised the importance of the transition between stem and
root to establish the relation between the collateral and radial
systems of the vascular bundles. One result of the last twenty-
five years' work was the supersession of the types suggested by
Van Tieghem.

Miss E. N. Sparshott described in detail the development
of the tuber in the remarkable South African species *Testudinaria
elephantipes*. The embryo shows no tuberisation. The plumule
remains very short and bears one relatively large leaf. Assimilates
accumulate in the hypocotyl, which rapidly undergoes tuber-
sation. Early thickening results from division and hypertrophy
of existing cells. Tuberisation is continued by secondary growth
mainly from a pericyclic growth zone, but also from successive
phellogen. The growth zone resembles an inverted cup
with a hole in the bottom—i.e., beneath the apex of the tuber.
Apex and base are further developed from the surrounding
meristem and respectively produce a sympodium with reduced
internodes and fibrous roots.

Miss L. M. Wicks gave the results of her work on the vascular
system in the concentric leaves of *Amaryllidaceae* characterised
by an adaxial system of small inverted bundles in addition to a system
of large normally orientated bundles. Three types were found:—

1. *The Ixote type*.—Certain normally orientated bundles in
the bi-facial leaf-base curve round and enter the concentric leaf-
limb as inverted bundles.

2. *The Agave type*.—The inverted bundles are formed by
special branches given off from the normally orientated bundles
in the leaf-base.

3. *The Narcissus type*.—The most marked variation occurs in
*Narcissus*, where the inverted bundles pass down from the leaf-
limb into the upper part of the leaf-base, where they end abruptly
in groups of small tracheids.

According to the Phyllole theory the concentric mono-
cotyledonous leaves are morphologically petioles, the inverted
bundles resulting from the flattening of a petiole with a circle
of vascular bundles as seen in transverse section. It is difficult
to see how such variations as shown in the three types here
enumerated can be made to fit in with the phyllole theory.

The inverted bundles can be considered as secondary structures
developed during the evolution of the primitive monocotyledonous
leaf, possibly to increase the amount of vascular tissue in order to
supply the increased amount of assimilating tissue of the con-
centric leaf.

Miss M. T. Martin illustrated a morphological and anatomical
study of *Sueda maritima* and *S. fruticosa*—the former a small
herbaceous annual inhabiting the lower levels of salt-marshes,
the latter a shrubby perennial characteristic of maritime shingle
banks. An attempt was made to correlate their main features
with environmental conditions, and to point out their bearing
upon the general problems of halophytic vegetation.

Prof. H. S. Holden described a new pteridosperm stem, a link between *Lycopinopteris* and *Heteropteris*; Dr. T. M. Harris
spoke on the reproductive organs of some early Bennettitales;
and Prof. J. Doyle on the nature of heterospory. Prof. R. A.
Fisher gave an explanation of the genetics of ever-sporting stocks.
Physiology was represented by several communications. The President showed an ingenious film which indicated that the secretion of *Borudula* does not entrap insects, since, owing to its resinous nature, it is not soluble in water. He demonstrated the schizogenous apical openings of intercellular canals from which the secretion escapes.

Prof. N. G. Ball described the effect of nocturnal illumination on the subsequent opening of flower-buds. The flowers of species of *Turnera*, *Aegitaria*, and *Ipomoea*, and others, which normally open in the morning, are markedly affected when the buds are subjected to light during the previous night. The petals, although they become elongated, may fail to diverge, and short-lived flowers may become withered without opening. A somewhat similar result is observed when the buds are illuminated two nights before they are due to open, even if this is followed by normal conditions during the second night. In most species where this effect of light has been observed, the failure of the flower to open is correlated with a partial inhibition of the normal hydrolysis of starch in the petals, which is associated with a decrease in the diastatic activity of the cell-sap. When a screen which only transmits the red rays is placed between the light and the plant, the result is the same as it is with white light, but the infra-red rays alone do not have this effect. On the other hand, when buds are exposed during the night to the blue and violet rays only, even when the intensity of the light is considerably increased, they behave in a similar manner to those which have been kept in the dark and open normally.

Dr. B. T. Cromwell found experimental evidence that the alkaloid berberine is a waste product of the metabolism of *Berberis Dornwini*, and that it is produced in largest amounts under conditions favourable to protein breakdown. Accumulation of the alkaloid in the root and stem bark takes place from year to  year. Application of inorganic nitrogenous salts alone does not lead to increased alkaloid production, but if, in addition, glucose is supplied, or organic nitrogenous compounds, such as asparagine, are applied alone, rise in berberine content is observed. Light is an important factor in the synthesis, and all tissues growing in the absence of light show high values. Withdrawal of essential elements leads to variations in yield. Under conditions of nitrogen starvation, alkaloid still accumulates: therefore it does not play the part of a nitrogenous reserve. It is suggested that the alkaloid is synthesised from carbohydrate and protein residues.

Professor F. A. F. C. Went of Utrecht gave an account of recent progress in the study of growth-substance (Auxin) in plants. Auxin was obtained for purpose of his experiments by placing the cut-off tip of an oat seedling on a small block of agar, which takes up the auxin and can then be placed on the organ under experiment. Curvatures produced as a result of this treatment suggest that they are due to an increase in growth on the side to which the auxin-containing block is applied. Another foreign guest of the section, Prof. Nunn of Basel, gave some account of the movements of chlorophyll corpuscles.

An afternoon was devoted to mycology. Dr. B. Barnes discussed on British aquatic fungi, Prof. Dame Helen Gwynne-Vaughan and Mrs. H. S. Williamson described the development of a coprophilous fungus, *Ascomyces Aurora*, and Miss M. Noble the life-history and morphology of *Typhula Trifolii*. A discussion was on the teaching of botany in courses of biology, and the section also took part in joint discussions on genetics.

The programme concluded with a semi-popular lecture by Prof. J. R. Matthews on the British flora and some of its problems. An exposition was given of a number of exhibits which had been arranged in the laboratories of the Department of Biology, University College.

The subject of the address by the Chairman of the Department of Forestry (K*), Major the Hon. Richard Cooke, was "A System of Forestry for the British Isles." He emphasised the need for a system in accordance with nature's methods, while, besides aiming at the production of timber of the utmost commercial value that is possible under the local conditions, has due regard for sporting amenities. Reasons were given for and against planting large blocks of one species only, and for and against uneven-aged mixed woods known as "Jardine" in France. Attention was drawn to the prevalent neglect of encouraging natural regeneration in the British Isles.

Lieut.-Col. E. Pratt discussed the factors affecting the propagation and growth of the cricket-bat willow (*Salix coculae*), and Dr. M. C. Rayner gave an account of recent experimental work on *Mycorrhiza*, which indicated a direct causal relation between its presence and satisfactory growth in seedlings of several species of pine. Mr. J. A. B. Macdonald described some results of "shallow-turf" planting on poor *Scirpus* peat moorland, and there were other papers of a technical nature.

The continued summer weather favoured the excursions to Charnwood Forest, Belvoir Castle, and its woodlands, the Peak district, and the woodlands of Rutlandshire; these and the usual social gatherings gave opportunity for renewing old friendships and making new ones.

Thanks are due for the success of the meeting to the local committee, and for the sectional arrangements to the indefatigable Local Secretary, Dr. E. J. B. Bish, and to our Leicester botanist, Dr. E. W. Miles Thomas.

During the meeting invitations were received by the General Committee from Norwich for 1935, Blackpool for 1936, and Nottingham for 1937. The meeting next year will be held in Aberdeen, with Sir William Bate Hardy, F.R.S., as President.—A. B. R.
THE JOURNAL OF BOTANY

OBITUARIES.

OTTO STAPF
(1857–1933).

The death of Dr. Otto Stapf while on holiday at Innsbruck removes a botanist of world-wide reputation. Stapf was born March 23, 1857, at Ischl in the picturesque Salzkammergut country, the son of Joseph Stapf, Oberbergrat. About two years later the family removed to Hallstadt on the beautiful lake of the same name, where his father was in charge of the salt-springs from which the famous baths at Ischl were fed, and here he spent his boyhood. He was educated at the University of Vienna, studying botany under Prof. Wiener, and after obtaining his Ph.D. became assistant to Prof. Kerner von Marilaun, author of the classic 'Pflanzenleben.' He was also a privat-doent in the University.

His first important piece of work was the editing of the botanical results of the Polak expedition to Persia, 1882; the account was published by the Royal Academy of Sciences in 1885 and 1886 (Denkschr. K. Akad. Wiss. Math.-Naturw. Cl. I, pt. 2, li. pt. 2) and most of the families were elaborated by Stapf. The same volumes contained his "Beitrage zur Flora von Lykien, Carien u. Mesopotamien," an enumeration of the plants collected by Dr. F. Luschak, 1881-3. He was thus well equipped for his journey to Persia in 1885. He gave a sketch of the vegetation of South and Central Persia on his return (Bot. Centralbl. xxvii. 1886), but published no complete enumeration of his collections. His Persian herbarium of 1100 species was purchased by Kew in 1891. There is evidence that his concept of species was modified by the field-work incident to his travels.

The genus Ephedra had especially interested him, and he at once set to work on a monograph "Die Arten derGattung Ephedra," which was published by the Academy in 1889 (lxi. Abt. 2). It is marked by the care and thoroughness of detail which characterise his work. In its preparation he had visited important European herbaria and had come into touch with the authorities at Kew, and in 1891 he was offered and accepted the post of Assistant for India in the Kew Herbarium, previously held by Hemsley, whom Stapf followed successively as Principal Assistant (1899) and Keeper of the Herbarium and Library (1909). He retired under the age-limit in 1922.

In the Kew Herbarium he proved a worthy successor to Oliver, Baker, and Hemsley in the production of floristic and monographic work. From 1891 onwards he published descriptions of new species in the 'Kew Bulletin' and Hooker's 'Icones Plantarum,' almost yearly up to the time of his death. His most important taxonomic contribution was on the Gramineae, with Hackel's generic revision of which he did not always find himself in agreement. Here, as generally, his work was marked by an exhaustive thoroughness and a certain independence of view—the status quo as such had no appeal for him. He assisted Hooker in the elaboration of the family in the 'Flora of British India.' His revision of the Grasses for the 'Flora Capensis' is a monumental piece of work, and it is to be regretted that other interests prevented his completion of the corresponding part of the 'Flora of Tropical Africa.' He also contributed to these Floras accounts of the Apocynaceae, Lentiulariaceae, and several other families; and elaborated the Pedaliaceae and Martyniaceae for the 'Pflanzenfamilien' (1895). His floristic work included determinations of important collections received at Kew; a notable one was 'The Flora of Mt. Kinabalu' based on Dr. Haviland's collections and published by the Linnean Society (Trans. Linn. Soc., Dec. 1894).

Stapf was not a 'mere taxonomist'; the morphology of the flowering plant appealed to him, and his 'Morphological and Anatomical Study of the Fruit of Melocanna bambusoides' (Trans. Linn. Soc. 1904) and the account of the 'Structure of the Female Flower and Fruit of Sararanga sinuosa' (Journ. Linn. Soc. 1896) are good pieces of work.

The painstaking thoroughness evinced in his early monograph of the Ephedras was more than upheld in his work on 'The Aconites of India,' one of the handsome and profusely illustrated volumes of the 'Annals of the Royal Botanic Gardens, Calcutta' (p. 2, 1905).

His contribution to the 'Festband' of Engler's Botanische Jahrbücher (1914) on the Southern Element in the British Flora represented an incursion into the field of plant geography; this was supplemented by a cartographic study published in the 'Proceedings of the Linnean Society' (1916-17). Other papers of interest to students of the British flora are those on Sparrta Township (Gard. Chron. ser. 3, xl. 1908, and Proc. Bournemouth Nat. Sci. Soc. v. 1914) and his separation of Aconitum anglicum as a new species distinct from the continental A. Nepdus (Bot. Mag. t. 9088, 1926).

A facility in drawing was a great asset in his taxonomic work. The sketches with which he enriched the subjects of his study in the herbarium must be the envy of the conscientious taxonomist in their clear illustration of form and proportion.

Stapf's reputation with botanists is assured by his systematic work, which added much to our knowledge of the floras, especially of India, Malaya, and Africa. This is perhaps overshadowed by what the writer of his obituary in 'The Times' describes—in a sense, no doubt, rightly—as the chief work of his life, the editing of the 'Index Londinensis.'
A more competent authority will doubtless write of his official work in association with the great herbarium at Kew for more than thirty years. But I may be allowed some personal reference to a long-standing friendship.

I first met Stapf shortly after his arrival at Kew, when he came up to the Museum to look at the Ephedras, of which I was nominally in charge. I thought him shy and uncommunicative, but this was obviously due to his lack of knowledge of colloquial English; this he soon remedied, but though he wrote well the language of his adoption he never quite mastered its articulation. Better acquaintance revealed a genuinely kind heart and unselfish nature, ready to take endless trouble to help. In his homeland, in Vienna, where he attended the International Botanical Congress in 1905, he was a charming companion and I have pleasant memories of a holiday in the Salzkammergut spent under his direction after the Congress. He was my travelling companion in 1910, when, after the Brussels Congress, we attended the house-warming celebration of the new botanical garden at Dahlem, visiting on the way out and home Lippe-Detmold, the Harz Mts., and some of the old historic German towns. He had everything arranged with meticulous care, one simply followed and enjoyed. In 1924 he attended the Toronto meeting of the British Association, and keenly enjoyed camping out in the Niagara Gorge and the trip to Lake Timagami.

In his home-life the ill-health of his wife, who survives him, and to whom we extend our sympathy, had been a source of anxiety, and latterly his own health had not been of the best, and a somewhat haggard look suggested that he might be working under pressure. But he did not complain, and when visiting Prof. Schinz and his family on his way to Innsbruck in July he cheerfully refuted any suggestion of ill-health. He passed away after a short illness on August 3. Requiescat in pace!—A. B. Rendle.

WILLIAM GRANT CRAIB (1882–1933).

The untimely death of Professor Craib removes an admirable and efficient teacher and, what is a rara avis in our Universities, an investigator and exponent of systematic botany. In this he had carried on the tradition of Aberdeen, which, under the late Prof. Trail, was a recognised centre for the training of students in this old-fashioned but increasingly important department of Botany.

Craib was born on March 10, 1882, at Banff. After a preliminary education at Banff and Fordyce Academies, he entered Aberdeen University on the Arts side. Eye-trouble interrupted
his studies for a time and he served as an engineer on board ship, but was able later to return to Aberdeen, graduate as M.A., and study for the B.Sc. degree. A temporary appointment as Curator of the Calcutta Herbarium in 1908 again interrupted his University career. While in India he collected extensively in the North Cachar Hills.

In 1909 he accepted the post of Assistant for India at Kew. At this time Dr. Kerr was sending large consignments of specimens from Siam, and Craib’s interest in the flora of this botanically little-known area was excited. In the ‘Kew Bulletin’ from 1911 onwards he published, under the title “Contributions to the Flora of Siam,” descriptions of numerous novelties. In 1925 appeared the first part of his ‘Flora Siamesis Enumeratio,’ a list of the plants known from Siam, with records of their occurrence. Other parts were issued at intervals, the last, in 1932, carried the account of the Dicotyledons to the end of Rubiaceae. We trust that the untimely death of the author will not prevent the completion of a much-needed Flora.

His ‘Flora of Banffshire,’ a list of the species of flowering plants and ferns with their local distribution, appeared as a paper in the ‘Transactions of the Banffshire Field Club’ in 1912.

Craib had left Kew in 1915 on the invitation of Bayley Balfour to become Lecturer in Forest Botany and Indian Trees at Edinburgh University. Here he published a series of papers on the “Regional Spread of Moisture in the Wood of Trees.”

In 1920 he was appointed to the Regius Professorship of Botany at Aberdeen, and entered enthusiastically on the work of teaching and the training of research students. Unfortunately a serious accident during the Edinburgh meeting of the British Association in 1921, resulting in the loss of a leg, prevented an active life. His energy during term and vacation alike was concentrated on his work, and neglect of relaxation doubtless impaired his health. For some years it had been his custom to spend part of his long vacation at Kew working at his Flora of Siam, and it was while thus engaged that he died with almost tragic suddenness as the result of a cerebral tumour.

He was a Fellow of the Royal Society of Edinburgh, and had been a Fellow of the Linnean Society since 1920.

To quote from an appreciative article in ‘The Times’ of September 2, “His botanical colleagues mourn the loss of a distinguished systematist, always willing to give help and valuable advice, and his students a teacher of rare merit, who taught by drawing out to the full their powers of observation and deduction.

Our sympathy is extended to his wife, the daughter of the late Mr. James Turner of Acton, whom he married in 1917.—A. B. Rendle.

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**REVIEW.**


This volume marks a departure from previous volumes in that chemical, zoological, and anthropological papers are included. The majority, however, are in continuation of the investigations described in previous volumes on the motile and conducting mechanisms of plants. In an introductory chapter the editor summarizes the results. Definite conducting channels for the excitatory impulse in the leaf of sensitive plants have been demonstrated between the central and peripheral ends of the leaf. New results have been obtained on the combined effects of direct and indirect stimulation; and the existence of special impulse-conducting strands in the petiole of *Mimosa* has been demonstrated. That environment as well as habitat will modify the activity of the organism is demonstrated by experiments with a native water plant, *Neptunia oleracea.* Other investigations show that an isotropic organ is rendered anisotropic by differential action of stimulus on its opposite sides; and that the growth of plants undergoes modification under different methods of external stimulation. These results are embodied in a series of seven papers by B. K. Dutt, S. C. Das, U. C. Sen, and A. Guha-Thakurta. N. C. Nag and H. N. Bannerjee, continuing their work on the proteolytic enzymes of *Curcuma Papaya,* find that commercial papain will also yield, as does the juice of unripe papaw fruit, two distinct proteolytic enzymes, peptic and ereptic, of which the former is the more predominant.

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**BOOK-NOTES, NEWS, ETC.**

**BOTANY OF HONG KONG.**—Supplement No. 2 of the ‘Hong Kong Naturalist’ contains two useful contributions. H. N. Dixon supplies a list of the Mosses based on recent collections by Dr. Herklots and other records, and including also species from parts of the mainland. The list is a critical one and a number of new species are described. W. A. Satchell continues his discussion of the Sargasso-weeds of the Hong Kong area, further experience and study of which are required before settled determinations can be given. The eighteen plates which illustrate this discussion include excellent line-drawings showing the characters of species and varieties.

In Vol. iv. no. 1 of the ‘Journal’ (April 1933) Dr. Herklots continues his description of the flowering shrubs and trees of Hong Kong, dealing with *Illicium, Uvaria, Melastoma,* and *Schoepfia.*
Société Royale de Botanique de Belgique.—Volume xv. Fasc. 1 & 2 (1932–33) contain a preliminary note by P. Martens on the origin of the “crochet” in the Ascomycetes; an anatomical study of the leaf of Dyschoriste linearis Gray, a Mexican medicinal plant, by M. F. Sternot, which in the author’s opinion confirms the position assigned to it in the tribe Euclidieae of the family Asclepiadaceae; and a critique on the methods of study of cellular permeability by Marcel V. Homès. A biographical notice of Raymond Naveau, Vice-President of the Society, is accompanied by a photograph and a list of his botanical works. J. Conoloua discusses the geographical distribution of the species of Cotinus in Languedoc; H. J. van Langendonck describes the ecology of the “Schorres” of the Zwyn and Philippine districts on the Belgian Coast; and V. Lathouwers gives some botanical impressions of a recent trip to the Belgian Congo. G. Verplancke describes inoculation experiments with the virus of the mosaic and yellow disease of the Beets; he finds that numerous species of common weeds may act as hosts for these diseases. A list of botanical works published in Belgium by Belgian botanists in 1930 and 1931 includes 531 entries; by error two entries from the Journal of Botany are included—a new genus of Conneraceae from Tanganyika by Baker and Exell, and the “Novitates Africanae,” which are said to contain notes on new species from the Belgian Congo, but are all South African, mainly from the Cape Province.

Botany of the Belgian Congo.—The ‘Bulletin du Jardin Botanique de l’Étak,’ Brussels, vol. ix, fasc. 3, contains contributions to the study of the flora of the Belgian Congo. R. P. H. Vanderyst’s collections of the freshwater Algae are described by l’abbé P. Frémy; his list contains 46 species of Myxophyceae and 20 of Isokontae; new species are described and new records for equatorial Africa are noted. J. Ghesquière gives a revision of the African species of Cattis of the section Chamaecrista Bentham of the sixteen species included four are new, and a number of new varieties are also described. Dr. W. Robyns enumerates some new grasses in the tribe Panicae from the Belgian Congo and Ruanda Urundi, and also records certain changes in nomenclature.

Journal of the Washington Academy of Sciences.—Recent botanical papers in vol. xcviii include the description of a new genus (Orinosa) of grasses from Kashmir, allied to Leptochloa, by A. S. Hitchcock, some accounts by C. Drehler of the morphological diversity among fungi that capture and destroy nematodes and amoebae, and a description of a new fungal disease of Dahlia, Macrophomina Phaseli Ashby. Seido Fndo records the occurrence of fruiting species of the eastern North American Juglans cinerea in the Upper Pliocene of Japan. It is also known as a fossil from the Pliocene of Europe and from Siberia.

The Euphrasias of Iceland and the Faroes.

By H. W. Pugsley, B.A., F.L.S.

I have recently had the opportunity of examining the Ephuphasias from these islands (and also from Greenland) in the collection of the Botanical Museum at the University of Copenhagen. The set (excluding Greenland material) comprises about 200 gatherings, and affords an interesting comparison with Bebb’s Shetland Eyebright and Col. Johnston’s specimens from the Orkneys. Many of the examples have been named by Wettstein, Townsend, or Ostenfeld. A notable feature of the collection is the divergence which it shows between the floras of the two island groups, only two species, E. frigida Pugl. (E. latifolia Pursh ex Wettst.) and E. curta (Fr.) Wettst. being common to both.

The prevalent species of Iceland is evidently E. frigida, using the name proposed in Journ. Linn. Soc. (Bot.) xlviii, 490 (1930), to replace the homonym E. latifolia Pursh ex Wettst. It may be mentioned in this connection that there are two original Faroes specimens here of E. arctica Lange ex Rostrup (Bot. Tidsskr. iv. 47 (1870)), another name identified with E. latifolia but rejected in my “Revision of British Euphrasiae.” One of these examples is labelled, in Rostrup’s handwriting, “E. arctica L. Msp. Sandyford, Strömø. 31. 8. 67. E. Rostrup”; the other, in a different hand, “E. officinalis L. officinalis L. Thorshavn, Stromø. 31. 8. 67. C. A. Feilberg og E. Rostrup.”

The first specimen bears Ostenfeld’s determination (undated): “E. latifolia Pursh.”; the second was seen in 1890 by Wettstein, who named it “E. borealis (Bom.) Wettst.” The two plants are clearly conspecific, although their rather large flowers are not equally well shown, and Wettstein’s determination (E. borealis) appears to be correct, albeit the specimens are a condensed form, and if glandular (which cannot readily be seen) may be crossed with E. frigida. From their broad and very obtuse foliage and subsapitute in florescence they appear to be the material on which Rostrup’s account of E. arctica is based, and as they resemble E. borealis rather than E. frigida, and the description does not definitely indicate either of these species, there seems good reason for the rejection of Lange’s MS. name as a “nomen dubium.” Lange’s later plate of E. officinalis v. latifolia (Pursh) (Fl. Dan. t. 2910) shows five plants which differ considerably from Rostrup’s specimens and appear referable to E. frigida, but unfortunately the characteristic capsules are not shown and the lower cauline leaves and cotyledons are missing.

† In the September number of ‘Rhodora’ Prof. Fernald deals at length with the nomenclature of this species. The points which he raises are mainly answered in this paper.
In Iceland *E. frigida* is polymorphic, and widely different Icelandic forms have been labelled "*E. latifolia" by Wettstein. The stiff, erect plant, with very long lower internodes, and large, densely imbricated floral leaves, which is actually that described in Wettstein's Monograph, though not well represented by his figures, seems to occur less frequently than some other forms. This erect plant appears from herbarium material to be the prevalent form of Labrador and Greenland, and, as it now becomes necessary to distinguish other states of the species, it will be treated as typical *E. frigida*. A Greenland specimen of this character (with foliage glandular as well as hisrate), cited by Wettstein in his Monograph, is shown below as the specific type. In Jørgensen’s ‘Euphrasia-Arten Norwegens’ five varieties of *E. frigida* are distinguished, and a great many examples of the species are figured in his plates. Hardly any of these, however, depict the typical species as defined above, and it appears from the excellent material in Herb. Mus. Brit. that this type is not common in Scandinavia. The Scottish plant, which lacks the peculiar habit of the type, closely resembles much of the Scandinavian material, and similar exsiccate from Iceland and the Faroes, accepted as *E. latifolia* by Wettstein, are present in this collection. The same form also grows in South Greenland. In general aspect these plants are very distinct from the typical species, and they appear from their different habit to constitute a well-marked variety. Another very hisrate form, found in several Iceland stations, seemingly agrees with the description and figures of Jørgensen’s variety *subcurta* of Northern Norway. In Northern Island a reduced simple form occurs, which grows also in Greenland. This has the facies of *E. minima* Jacq., but examination shows that its indumentum is that of *E. frigida*, to which also its leaf-cutting at times approximates. Another local form in Iceland, of comparatively tall growth, seems worthy of varietal distinction on account of its peculiarly long, attenuate capsules. In addition to these varying forms, the collection includes a few specimens of large, much branched plants, with luxuriant foliage, which, though not gathered early in the season, are without flowers and fruits. Wettstein has referred some of these examples to *E. latifolia*, though they are certainly not of aestival habit, and it is difficult from their immature condition to determine their real status. Two such forms recall *E. Marshallii* Pugs. but are much less hisrate.

The remaining Icelandic species appear relatively scarce. Typical *E. curta* is included in the collection from two stations, and the diminutive variety *picota* (Towns.) Pugs., sometimes unusually glabrate, is known from the Reykir and Geysir districts. An example from Kjalraun (Jónsson no. 50) resembles the form peculiar to the Faroes. Another specimen, consisting of four individuals collected at Búðhraun by H. Jónsson in late July 1897, when just beginning to flower, seems referable to *E. rotundilfolio* Pugs. of North Scotland and the Shetlands. But the most remarkable form is one, gathered in good and mature condition in 1900 by O. Davidsson at Reykjalag i Frijóvkadal and referred to *E. stricta* Host. The name was evidently suggested by the leaf-cutting, but the foliage is densely hisrate, the flowers minute, and the capsules broad; and as this *ensemble* of characters does not seem to indicate hybridity between any known Icelandic forms, the plant is described as a new species. Two glandular species, *E. brevipila* B. & G. and *E. tenuis* (Brenn.) Wettst., also figure among the Iceland exsiccate. The first was found by B. Steffansson in 1890 at Reykir and Skeggjsbrekkukardur in a fairly typical form; the latter at Hraun in 1903 by O. Davidsson. The presence of these two plants in Iceland is somewhat unexpected, and they may possibly be of recent introduction.

The Euphrasias of the Faroes are dealt with in some detail by Ostenfeld in ‘Botany of the Faroes,’ i, p. 55 (1901), where six species are admitted, viz. — *E. atropurpurea* (Rostrup) (E. fuleaenis Towns.), *E. borealis*, *E. curta*, *E. gracilis* Fr. (*E. microantha* Rchb.), *E. latifolia*, and *E. scotica* Wettst., the author remarking: ‘*E. latifolia* merges on the one hand into *E. atropurpurea* and on the other into *E. curta*; and *E. scotica* is difficult to distinguish from *E. gracilis*, while it also tends towards *E. atropurpurea*.’ At a later date Ostenfeld changed his views on these plants and referred all the specimens of *E. atropurpurea*, *E. gracilis*, *E. latifolia*, and *E. scotica* in Herb. Haun. to *E. minima* Jacq. I have not yet seen any boreal examples of *Euphrasia* that I should identify with this Central European species.

The Copenhagen collection indicates that the predominant species of the Faroes are *E. scotica* and *E. borealis*, both unknown in Iceland. The former of these is widely spread in the islands, and is often much more typical than in the Orkneys and Shetlands. Many of the specimens were named by Townsend. The variety *purpurascens* Pugs. occurs in Stromó. *E. borealis* also is often typical, but tends to produce large, line-tinted flowers, thus approaching the Shetland variety *speciosum* Pugs. None of the specimens resembles the more compact var. *soluta* Pugs., which is common both in Orkney and Shetland. One gathering from Sandó, with very small flowers, named ‘f. parviflora’ by Ostenfeld, is perhaps a hybrid with *E. frigida*. *E. minima*, which Ostenfeld regards as a plant ‘of fairly dry ground,’ appears to be scarce, although distributed over different islands of the group. The collection includes only six satisfactory gatherings, but there may possibly be more, for it seems not easy to separate dried material of this plant from *E. scotica*. *E. frigida*, considered a plant of rock-ledges by Ostenfeld, also seems uncommon, but it is found in most of the islands. The typical plant grows in Videróó, but the majority of the specimens belong to the lax form seen in Scotland and Scandinavia. In addition, a curious condensed form, which is well represented

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**THE EUPHRASIAS OF ICELAND AND THE FAROES** 305
in the collection, occurs in Stromó. Of *E. foulaensis*, which is stated by Ostenfeld to grow on rock-ledges like *E. frigida*, but which is shown on some of his labels as inhabiting grassy slopes, there are several almost uniform gatherings, differing but little from the Shetland type. No specimens like *I. condensata* Pugsl. so frequent on the cliffs of Orkney, are present. The specimens of *E. curta* were mostly collected by Ostenfeld on the islands of Stromó, Österö, and Víðarö. They are fairly uniform and somewhat intermediate between the typical species and *E. frigida*. Their leaf-cutting seems sufficiently distinct to warrant varietal rank, and it is proposed to commemorate Ostenfeld in naming them.

Besides the species recorded by Ostenfeld there are three fairly typical gatherings of *E. confusa* Pugsl. Two of these are from Österö and one from Syderö. The former were labelled by Wettstein "*E. foulaensis*" and "*E. foulaensis* f. *ramposa*," but Townsend referred both of them to *E. scotica* as unusual forms, remarking in one case:—"*E. scotica* or hybrid? A very unusual form, possibly a hybrid with *E. scotica* as one of the parents." The Syderö plant was named *E. minima* by Ostenfeld. This is an interesting extension of the range of a British plant which is frequent in Orkney and is known to occur in Shetland. A few specimens from the Faroes labelled "*E. borealis*" appear from their flexuous habit and small foliage to be hybrids with *E. confusa*.

Throughout the collection a small proportion of specimens exhibits intermediate characters which may be due to hybridity.

The following groups are mostly new:—

**Euphrasia frigida** Pugsl. in Journ. Linn. Soc. (Bot.) xlviii, 490 (1880); *E. latifolia* Pursh ex Wettst. Mon. 156 and auct. mult., non Linn.


The typical species is fairly represented in Wettstein's tab. xi, f. 11, and in Journ. Bot. tab. 375 (as *E. latifolia*). The plants shown in Fl. Danica, t. 2910, are varying forms of *E. frigida*; nos. 1 and 2 recall var. laxa.


*Icon. Jørgensen, l. c. tab. viii, ff. k–o.*

*Exsec. Sørensen, Myvatn, N. Iceland, 1928, in Hb. Haun.*

**γ laxa**, var. nov.

*Icon. Pugsl. l. c. pl. 27, ff. a–e.*


**δ attenuata**, var. nov.


Caulis strictus, graecis, internodis inferioribus longissimis parce ramosus. Folia suberecta, floralia basi rotundata, hauf alte dentata (utrinque ad 7 dentibus). Capsula anguste oblonga (ad 8 mm. longa), superno attenuata, subtruncata nec emarginata, calycis dentes plano superans.

**ε stromóensis**, var. nov.


**ζ pusilla**, var. nov.

*Icon. Wettst. l. c. tab. xi, f. 12.*

Planta erecta, nana, ad 6 cm. alta, caule simplici internodisque relative longis, et foliorn pare primo ad quarto (sepissime secundo) florens. Folia floralia suborbicularia, obtusa, basi breviter cuneata, utrinque bi-vel tri-dentata. Corolla 5-6 mm. longa, labii superioris lobis porrectis subintegris, inferioris paulo longioribus angustis retusis. Capsula oblongo-elliptica, emarginata.

Of these varieties x subcuta is a boreal form, apparently confined to Northern Norway and Iceland; var. laza is the Scottish form of the species and seems to be common in Norway, growing also in Sweden and Lapland, as well as Greenland, Iceland, and the Faroes; var. attenuata has been seen only from a few localities in Iceland; var. stromaophora is from the island of Stromø, in the Faroes, but a somewhat similar plant has been seen from a single station in Greenland; var. pusilla is a high arctic form of Iceland and especially of Greenland.

Euphrasia Curta (Fr.) Wettst. var. Ostenfeldii, var. nov.


Caulis satius robustus, ad 10 cm. altus, et foliorn pare quinto vel sexto (raro quarto) florens, simplex vel parce ramosus. Folia caulina superiores quam in typo angustiora, utrinque obtusa tridentata, florali subacuta, utrinque 4 dentibus acutis crassulis. Corolla quam typi minor. Capsula quam in typo latior, emarginata, calycis dentes subaequans vel parum superans.

This variety, characterized by narrow, bluntly toothed foliages and broad emarginate fruits, has been seen from the islands of Stromø, Osterø, and Viderø, in the Faroes, and also from one station in Iceland.

Euphrasia Davidssoni, sp. nov.

E. O. Davidsson, Reykjafjall, Friðvikadal, Iceland, 1900, in Hb. Haun., as E. stricta.

Caulis erectus, satius robustus, 10-15 cm. altus, fuscescens, pilis longis crispulis deflexis albidis ad basim densae vestitus; foliis caulitis internodis brevissimis superantibus, florulis vis imbricatis internodis semipius alterne longiores brevioresque subaequansib vel superantibus; vulgo et foliorn pare quinto florens; nonnumquam basi paucis ramis subaequans praditus. Folia majuscula (ad 10 mm. longa), lata, erecto-patentia, sub-opposita, tenuis, inferioris facile caduca; caulina relative parva, oblonga ad ovata (inima cuneata), utrinque 1-3 dentibus subacutis obtusis; florula inferiora subhombioidea, utrinque 4-5 dentibus acutis obtusis, superiors rhomboido-deltoidae utrinque 5-7 dentibus patulis longis acuminitis vel aristatis mucro-

nata; omnia in utrque pagina pilis brevibus ad longis undulatis dense hirsuta. Spica longa, multiflora. Calyx ut folia pilosus, dentibus longis aristatis, fructifer vix aceretis sed subflabulis. Corolla minima, dorso 4-5 mm. longa, externe aliquanto villosa, verisimiliiter sine striis coloratis albidis, in labio inferiore luteo-maculata; labio superiore lobis parvis subintegris; labio inferiore vis longiore, lobis angustis retusis tribolato. Capsula latiuscula, circa 4-5 mm. longa, oblongo-elliptica, retusa, longe eiliata et superne pilosa, calycis dentes subaequans.

This remarkable plant is represented in Herb. Haun. by a solitary Icelantic gathering, consisting of nine apparently normal individuals, showing good floral leaves, flowers, and fruits, but with most of the cauline leaves already fallen. The spreading aristate teeth of the floral leaves recall the foliage of E. stricta Host., and no doubt accounted for the original identification, but the plant presents no other feature indicating that species. Its short lower internodes and consequent basal branching produce a somewhat late-summer habit, but it flowers from a rather early node and the few branches that are thrown up are but slightly developed. Its long spikes of tiny flowers, subtended by large floral leaves, strongly hirsute and in shape subhomboid, with spreading and aristate teeth, are unlike those of any known species; and its small broad capsules also seem to be characteristic. On the whole, it is perhaps most closely allied to E. curta, from which it differs chiefly in the shape, texture, and toothiness of its leaves, its very small, nearly equally lipped corollas, and its broad retuse fruits. It may possibly be of hybrid origin, with E. curta or E. frigida as one parent, but this in no way obvious. A peculiar feature is the occurrence in the spikes of occasional contracted internodes, each bringing two pairs of the subopposite leaves into close juxtaposition. The plant seems best placed in the Series Nemerosae between E. Marshallii and E. curta.

The species of the four island groups, so far as at present known, are shown in the subjoined table. In Greenland only one species, E. frigida, can be recorded with certainty:

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<th>Shetlands</th>
<th>Orkneys</th>
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<td>E. scotia</td>
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<td>E. foulaensis</td>
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<td>E. brevipila</td>
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THE GENUS POSKEA VATKE.

BY G. TAYLOR.

Up to the present the genus Poskea has been considered to be a monotypic member of the Boraginaceae and limited to British Somaliland. The type-collection made by Hildebrandt is represented in the British Museum Herbarium at Kew. These specimens were examined by Dr. Ivan M. Johnston in the course of his studies in the Boraginaceae, and he expressed the opinion that the genus Poskea did not belong to the family. It was a matter of interest to determine the proper taxonomic position of the plant and the following investigation resulted.

Vatke, in his original description of the genus (based on the single species, *P. africana*), gave the following characters: "Stamina 5 vel aborta, pauciora" and "Ovarium indivitum biloculare (vel forte adultum 4-loculare)." In the absence of fruiting specimens he was apparently in some doubt as to the affinity of his new genus, but he referred it to Boraginaceae, though pointing out that it differed from all known members of that family in the form of the anthers. Dissection of flowers from Hildebrandt's type-collection shows that Vatke's interpretation of the structure must have been erroneous. The flower is zygomorphic with four stamens, and the ovary is unicellular with a single pendulous ovule. These characters suggest Globulariaceae, and search in that family reveals that *Poskea* certainly belongs there, and is apparently congeneric with the genus *Cockburnia* Balf. f., which was founded a year later than *Poskea*.

In his enumeration of the plants collected in Socotra, Bayley Balfour described the genus *Cockburnia*, regarding it as a member of the Selagineae (Selagineae) with the single species *C. socotrana* Balf. f. In a later publication *C. socotrana* was figured, and the dissections of the flower as portrayed correspond very closely with those of *Poskea*. No figure was given of the ovary, but in his description he described it as "1-loculare, 1-ovulatum." The pendulous condition of the ovule is apparent on dissection, and confirms the generic identity of *Cockburnia* and *Poskea*.

A further species, *C. somalensis* Chiov., was described ("Flora Somalis," 271 [1929]) from the north-east coast of Italian Somaliland, and an examination of the type of this species has shown that it is unquestionably conspecific with *C. socotrana*. The presence of *C. socotrana* in Somaliland was first recorded by Engler (in Engl. & Drude, Veg. Erde, ix. 213) in 1910, but the basis of the record was not stated.

The genus, so far as recorded, is restricted to British and Italian Somaliland and the island of Socotra. The distribution and approximate locality of each species is shown in the accompanying map. *P. africana* is apparently confined to British Somaliland, while the other species is found in Italian Somaliland and Socotra.


Species 2, confined to British and Italian Somaliland and Socotra. Type-species: *P. africana* Vatke.

[Map of Socotra with the adjacent coasts of Arabia and Africa, showing the localities of the two species of *Poskea*.]

- ■ *P. africana*;
- ○ *P. socotrana*.

**Key to the Species.**

Flowers arranged in elongated terminal or axillary spikes, up to about 5 cm. in length; calyx-tube 1 mm. long, calyx-teeth about 1 mm. long; corolla densely pubescent outside, about 4 mm. long; suborbicular or elliptic to ovate or obovate, rounded, obtuse, mucronulate or emarginate at the apex, cuneate at the base, up to 1.2 cm long (including the petiole) and up to 1.0 cm. broad; on both surfaces more or less densely pubescent with short spreading hairs; branches densely and shortly pubescent with spreading (apparently glandular) hairs .................. 1. *africana*.

Flowers aggregated in dense terminal (occasionally branched at the base) spikes, up to almost 6 cm. in length; calyx-tube 2-6 mm. long, calyx-teeth 1.5-2.0 mm. long; corolla very sparingly pubescent outside, 5 mm. long; leaves obovate or oblanceolate, subacute, rounded, obtuse or emarginate at the apex, cuneate at the base, up to about 4 cm. long (including the petiole) and up to 1.5 cm. broad, sparingly and mi-
similar to *P. praeclara* in general facies and characters, but the gynoeceum consists of a greater number of carpels (hence the epithet *pleiocarpa*), while the flowers are larger and have more numerous tepals. In *P. praeclara* the carpels are only two or three in number and the tepals nine.

I am indebted to the Forest Botanical Officers at Dehra Dun (United Provinces) and Shillong (Assam) for the opportunity of studying material of the new species and for additional information concerning it.

*Pachylarnax pleiocarpa* Dandy, sp. nov. Arbor magna, sempervirens, omnino glabra; cortex asper, sulcis longitudinalibus notatus; ramuli juveniles fusco-virides. *Folia* ad ramulorum apices aggregata; lamina elliptico-ad oblongo-oblonga, basi cuneata attenuata interdum paulum inaequalis, apice rotundata ad obtusa vel rarius subacuminata sepe leviter emarginata, usque ad c. 23 cm. longa et 7-5 cm. lata, coriacea, super nitida, subtus pallidior costa prominenti, in sicco utrinque (preretim infra) laxo reticulata, nervis lateralisibus utrinceus c. 10-18 parum conspicuius; petiolus crassus, usque ad c. 3 cm. longus, supera subplanus haud canaliculatus. *Flores* fragrances; alabastrum lanceoloidico-vulvi angustae ovoido-oblongum, initio in bracteis spathoidis 1-3 inclusum, bracteae superiores (vel solitarii) in pedunculo interno brevi sub florae inserta; pedunculorum percrassus, c. 2-3 cm. longus. *Tepala* 13-15, 4-5-mera, carnosa, cremea, 4-5 exteriores oblongo-oblonga, 4-5 caulina, 4-5 interiores spathulata intimis minoribus. *Staminis* c. 17-21 mm. longa, connexivo ultra antherae loculos in appendicem brevem acutam producto. *Gynoecium* ellipsoidum; carpella 5-8; ovula in carpellis singulis 4-8. *Fructus* plus minusve ellipsoides, c. 5-5 cm. longis, carpellis crassissime lignosis erosiatis supera per desiccantiam axi conico lignoso absoluit.


The above description includes details from a note supplied by the Working Plans Officer, Jorhat, Assam. According to him the timber is very valuable. The species flowers from August to October, and the fruit ripens from the middle of October to the end of November.
THE JOURNAL OF BOTANY

LICHENOLOGICAL NOTES.—VII.

BY W. WATSON, D.SC.

During the past year a fair amount of progress has been made in our knowledge of the distribution of lichens in the British Isles.

In Glamorganshire, Messrs. A. E. Wade, D. A. Jones, and H. H. Knight have been showing that the county possesses a great wealth of lichens. The diversity of the soil and other physical conditions of the county render it very suitable for the development of lichens, though these favourable circumstances are partly discounted by the influence of smoke from the industrial districts. The presence of high hills and deep valleys, the exposure of both siliceous and calcareous rocks, and the occurrence of maritime and moorland associations give favourable habitats for these small plants. Corticolous lichens are less numerous than in purer atmospheres, but a considerable number of the commoner species and a few of the rarer ones have been observed. All these have been submitted to me, and a complete list will be given by Mr. Wade in the projected county history. A few of the more important finds will be mentioned later.

In April the British Bryological Society held its annual meeting on the borders of Somerset and Devon, and, incidentally, a few new vice-county records of lichens were made. Those from South Somerset (v. c. 3) were Ereonia furfuracea from Dunkery, Stereocaulon septata from the Quantocks, and Cetraria viridula from the Blackdown hills. From North Devon (v. c. 4) Rhizocarpon fraxineum var. calcariformis, Platybena glauca var. fallax, Aspicilia lacustris, Squamaria saxicola, Ochrolechia tartarea var. subtartarea, Pertusaria leptospora, Coenoconium ebeneum, and Verrucaria rheithrophiila were obtained on the west side of Bagworthy Water, whilst Biatorina eurybolea was obtained at Watersmeet. During a meeting of the South-Western Naturalists' Union in the Plymstock district Stereocaulon septata, S. bryophila, and Buellia colludens were first recorded for South Devon (v. c. 3). Ecological investigations by Dr. A. S. Watt at Lakenheath, W. Suffolk (v. c. 26), and by myself in the beech woods near East Dean, W. Sussex (v. c. 18) have yielded some interesting lichenological results. From Lakenheath the following were new records for v. c. 26, which had been well worked previously by the Rev. E. N. Bloomfield:—Aspicilia calcaria var. contorta, Plagiodon fulgens, Rhizocarpon coniferoides, Diploschistes scripsus var. bryophila, Lecidea parasitica, Cladina uncialis form adunca, Cladonia fimbriata var. subbiloba, C. grevedi var. pocilla, C. ptyrea and form holopola, C. ochrolechta, C. degenerans var. anomalae, C. rangiformis var. foliosa, C. furcata var. spinosa and palmarum, Peltigera cascii, V. rupestris and var. phyllophora, C. crispa var. otariaeformis, C. bicillata, C. Floerkea and var. racemata, C. coccygera var. asetosa, Peltigera rufescens, Leptogium turgidum, Verrucaria muralis var. submuralis, V. mauroides, and V. maculiformis. It was also of interest to see the true Cladina rangiferina from this locality. An old record for the county existed, but, as in so many other cases of old records, there was some doubt whether confusion with C. sylvatica had occurred. The Sussex Downs woods yielded many lichen records for the incompletely worked vice-county of W. Sussex (v. 13). Some of these are of particular interest and will be dealt with later. Some results obtained by Mr. Knight and myself in this vice-county and in the neighbouring vice-counties 12 (N. Hampshire) and 17 (Surrey) during the British Mycological Society's Foray at Haslemere will be published in due course in the Transactions of the Society.

In September, during a foray in the Isle of Man, many of the plants given by Wheldon and Hartley in "The Lichens of the Isle of Man" ('North-Western Naturalist,' 1927) were seen. In that publication Wilkinson's record of Lecidea discolorea from near Ramsey ('Midland Naturalist,' 1893) is alluded to, and the authors state that "we sought it in vain." They might well do so, as it is obvious from Wilkinson's description of the lichen he found that it was not L. discolorea, but apparently Biotora coarctata. The isidiate form of Parmelia prolixa occurring on the shore at Glen Maye is var. isidiostyla Nyl. (see "Lichenological Notes.—III.," Journ. Bot. 1928). The common form of Cladonia cervicornis is the var. subcervicornis. C. pyxidata form lepidothora and Buellia confluorescens are not included in Wheldon's list. The former is given in the opening notes as occurring on the north Manx coast, whilst the latter is given in the 'Monograph of British Lichens' (1926) from Douglas, where it is frequent. It also occurs at Port Soderick and other places. The scarcity of fruticose lichens was commented on; corticolous Ramalinula, Usnea, or Evernia being rarely seen. During my casual investigations only a few patches of Usnea and a little Evernia prunastri were seen. This might have been expected in an industrial locality, but was surprising for an area in which the humid conditions and pure air gave an environment which seemed favourable to these fruticose species. The presence of salt in the sea breezes may possibly account for their scarcity, though the trees in many maritime districts are often covered by such lichens. In such districts the sea breezes are, however, not continuous, as they are in such a small island as the Isle of Man.

The following additions to the lichen flora were noted:—Usnea ceratina f. incrustans (Tholt-Y-Will), Squamaria gelida (Sulby Glen), Leucanora esculenta and L. comae (Grouville Glen), L. polytrema f. effusa (Saunders), Biatora phasmo, Crocynia aurea, and Solenoporah holophaea (Port Soderick), Biatorina gracilis (Grouville Glen) Microphile diluta (Tholt-Y-Will), Stereocaulon pileatum (Sulby Glen), Chaeotheca melanophaea (Grouville Glen), Verrucaria microporoides, Articryptum halodytes and form tenuicola (Douglas), and Porina lepidata (Grouville Glen).

* Since this was written the results have been published (August).
A few records of plants collected by Messrs. W. G. Travis and H. Britten will be included in the general list. The latter has been collecting lichens in the Goyt Valley area, where a reservoir is being made.

In Ireland, the late Miss Knowles and her willing band of helpers have made further advances in their contributions to Irish lichenology. Lastly, Miss A. Lorrain Smith, by her generous help and advice, has been of great assistance in cases of doubtful determination.

Some uncommon habitats were noted for the following:—\textit{Usnea articulata} is usually found on trees, but a specimen collected by E. J. Moore at Ayre in the Isle of Man, and determined by me, was growing on stones in heathy ground. It is mentioned by Moore in his account of the ecology of the Ayreland of Bride (Journ. Ecol. 1931, 125). \textit{Placodium decipiens} is nearly always saxicolous, but was found on pales at Penarth (v.c. 41, A. E. W. 1). \textit{Pseudophyscia fusca}, another saxicolous lichen, was found on a tree at Reynoldston (41, D. A. J. 1). \textit{Sphaerophorus globosus} was found on the mossy trunk of a tree, 7-8 feet from the base, in the Doone Valley (4). \textit{Coenogonium ebenum} sometimes occurs on trees as at Tyndrum (88). Both \textit{Cladonia parasitica} and \textit{C. caespiticia} are occasionally found on soil. \textit{Evernia prunastri}, \textit{Ramalina fraxinea}, and \textit{R. fusciugata} occur on the wall of a barn at Upper Cheekland, near Taunton (5).

In the general list which follows, the collector’s names are indicated by initials. Their names have been given on previous pages. A note of exclamation indicates that the lichen has been seen by me. The numerals refer to the vice-county, and when starred are new vice-county records. Species or varieties new to the British Isles are indicated by small capitals:—


\textit{U. ceratina} form \textit{incurvescens} Arn. East Dean and Henley (13); Thott-y-Wills (71).


\textit{Alectoria juba} var. \textit{chalybeiformis} (L.) Ach. is not uncommon on Lakenheath Warren (26, A. S. W.). It has been noted previously from the neighbouring Thetford Warren.

\textit{Parmelia cava} \textit{erapa} (Ach.) D. N. Lianhidian (41, D. A. J. 1). It has been noted previously from the neighbouring Thetford Warren.

\textit{P. dubia} var. \textit{ulophylla} (Ach.) Harm. Reynoldston (41, D. A. J. 1).

\textit{Parmeliopsis ambigu} (Wulf.) Nyl. Hillcot Wood (33), Hay Park Woods (36), and Morlais Castle Hill (41 and 42, D. A. J. 1). In Leighton’s ‘Flora,’ Hay Park, near Ludlow, is noted as a locality, but no county is given. Mr. Jones found it there and the locality is definitely in Herefordshire (36).

\textit{Cetraria islandica} f. \textit{minor} Harm. In var. \textit{tenuiifolia} (C. crispa Nyl.) the margins are very spiny and connivent. In the form obtained at Skipworth Common (61) the margins are flatter and the spines much fewer. It has the general appearance of a small \textit{C. islandica} and corresponds to the description by Harmand of his f. \textit{minor} in Lich. de France, “Thalle plus reduit en longueur et en largeur.” It has been placed previously with var. \textit{tenuiifolia}, and one can scarcely say that there is any definite distinction, though all the British specimens of \textit{tenuiifolia}, except one from Braemar, have spiny margins.


\textit{Lecanora intumescens} (Rob.) Krb. Henley (13, with form \textit{geographica} Wats.), Dolgelly (48).

\textit{L. Sambuci} Nyl. Oxwich (41, D. A. J. 1).

\textit{L. Agardhiana} Ach. Oxwich (41, D. A. J. 1). This is usually described as having the epithecium amber-brown, but in the Oxwich specimens it was blue. Apart from this they agreed in external appearance, internal structure, and reactions with authentic specimens, even in regard to the rosaceous tint of the epithecium with nitric acid. The same colour of the epithecium was also shown in \textit{L. crenulata} and \textit{L. Agardhianoides} from the same locality and also in specimens of the latter from Lulworth.

\textit{L. Agardhianoides} Mass. differs from the preceding in the more immersed position of the apothecia which are so sunk in the rock and have the margin so indefinite that the plant resembles a \textit{foveolata Verrucaria} rather than a \textit{Lecanora}. On the fossil trees at Lulworth (89); on Carboniferous Limestone, Oxwich (41), and Sand Bay (86). A specimen collected by Holl at Hartlepool (66) and correctly named as this by Mudd, is in the British Museum.

\textit{L. conizaeoides} Cronb. in Journ. Bot. 1885, 195. This is sometimes referred to \textit{Nylander}, but, although he saw Cronbie’s specimens and suggested the name, I have been unable to find any description in his works. Cronbie’s description reads as follows:—“Subsimilar to \textit{L. conizae} Ach., but with the thallus less yellow (whitish yellow) and the aspores more turgid (0.009-11 mm. long, 0.005-7 mm. thick). On trunks of old beech-trees, near the roots, Epping Forest and New Forest (Crombie); Buxton, Derbyshire (Holl). The Epping Forest and Buxton specimens are not paler than in \textit{L. conizae}, and appear to be identical with \textit{L. ptycca} Brits. (Verhandl. Bot. Ver.
Prov. Brandenburg, 1928), according to a specimen collected and named by Erichsen himself. The New Forest specimens have a thicker thallus, but such specimens often occur with the thicker ones, and Erichsen himself gives a form *tenuis* for his *L. pityrea*. The Brockenhurst (New Forest) specimens, as well as many specimens from other parts of the British Isles, agree well with Erichsen's description of his form *tenuis*. Crombie, in his original description, first refers to the Epping Forest specimen, but in his type-specimens he has put the one from Brockenhurst. *L. conicaoides* is quite common in our islands, and, in addition to the somewhat variable external characters, can be distinguished by the broader spores. In the immature condition they are sometimes as narrow (9–14 x 3–5 µ) as in *L. conica* but, when fully developed, they are distinctly broader (9–14 x 6–7 µ). Crombie's description in his 'British Lichens' (1894) is a fairly complete one, though more emphasis might have been placed on the swollen and sorediate character of the apothecial margin, whilst the spore is sometimes longer than he gives. Wembdon etc. (*54), Edington etc. (*6), Matley (11), East Dean (*13), Culworth (*32), Durdham Downs (*34), Errwood (*56), Skipwith (*61), Greenfield (*63), Sicklinghall etc. (*64), Howth (*Ireland 21, M. C. K., named *L. pityrea* by Erichsen). Wheldon has recorded it from 49, 59, 60, 88, and 89 in his papers. Localities for 36 and 89 are given for *L. pityrea* in Knowles's 'Lich. Ireland.'

*Lecanora epanora* Ach. Sulby Glen (71). Several other localities are given by Wheldon and Hartley.

*L. piniperda* Krb. Cwm Bychan (*48, D. A. J.*). The var. *glauella* Krb. was also found by Mr. Jones at Llanbedr (*48).

*L. inversa* Nyl. On *Ulex* near Minehead (*5*; Oxwich (*41, D. A. J.)).

(To be continued.)

OBITUARIES.


eric drabble

(1877–1933).

By the death of Dr. Eric Drabble at Freshwater on 3rd August last British taxonomic botany has lost another of its devotees who can ill be spared. Drabble was born in 1877 at Herne House, near Chesterfield, and was educated at the local Grammar School. At the age of 22 he proceeded to University College, Sheffield, and subsequently to the Royal College of Science, South Kensington, where he obtained the London B.Sc. degree, with 1st Class Honours in Botany. In 1901 he was appointed Lecturer in Botany at St. Thomas's Hospital Medical School, and in 1903 Lecturer and Senior Demonstrator in Botany at the Royal College of Science. In the same year he became D.Sc. of London: his thesis, "On the Anatomy of the Roots of Palms," was published by the Linnean Society (Trans. Linn. Soc. ser. 2, 1904). After two years' experience at South Kensington he obtained the post of Lecturer in Economic Botany at the University of Liverpool, but in 1908 he returned to London as head of the Botanical Department at the Northern Polytechnic. Here he remained till 1924, when ill-health caused his retirement to the Isle of Wight. Asthma and heart trouble debared him from active service during the War, but he helpfully combined the botanical work of the Birkbeck College with that of the Northern Polytechnic. At Freshwater he recovered sufficiently to undertake the duties of examiner in botany and biology for London and other Universities, and he was able to do a considerable amount of work in taxonomy until the long illness which culminated in his death.

Drabble was a botanist in a broad sense who published physiological articles in the 'Bio-Chemical Journal' and other periodicals, as well as papers on systematic botany. His earliest contributions to this Journal appeared in 1906, when five short notes were printed, one being a record of *Viola carpathica* Borbas for Derbyshire. Other papers followed up to 1916, the most important being "The British Pansies," issued as a Supplement in 1909, and "Notes on the Flora of Derbyshire" in four parts. For ten years after 1916 he seems to have made no further contributions to systematic botany, but in 1926 he resumed writing and in each subsequent year produced papers both in this Journal and in the 'Report of the Botanical Exchange Club.' These papers dealt largely with the British Pansies, with which group his name will be chiefly associated, but latterly he wrote also on *Arenaria serpyllifolia*; *Veronica agristis*; *Ranunculus acris*, *R. bulbosus*, *Crepta*, and *Valeriana officinalis*. In this Journal for 1927 there is an interesting paper from his pen on "Syriphid (Dipteran) Visitors to Certain Flowers."

Drabble was a Fellow of the Linnean Society (elected 1902), and on the death of the late C. E. Salmon was made a referee of the Watson Botanical Exchange Club, to whose annual reports he contributed numerous notes. In his last years he was an enthusiastic worker on British flowering plants, and his pleasant humour and generous help to correspondents brought him a large number of friends. He was not a large collector, however, nor a great traveller, and he was strongly attached to his native county of Derbyshire. His interests were not entirely confined to botany, for he was a lover of English literature and always keenly interested in the Northern Polytechnic Operatic Society. He was a zealous Anglo-Catholic.

His widow, who often collaborated in his botanical work, survives him.—H. W. Pugsley.

Journal of Botany.—Vol. 71. [November 1933.] 2 b
INFORMATION of the death of a former member of the Herbarium staff at Kew has recently been received. Mrs. Wilson Popeneoe, formerly Miss Dorothy K. Hughes, died at Guatemala City on December 31, 1932. Miss Hughes worked in the Herbarium as a temporary technical assistant, 1918-23, mainly aiding the late Dr. Stapf in his work on the Grasses. In 1921 she published a revision of the Australian species of *Stipa* in the 'Kew Bulletin,' and this was followed by other papers chiefly on Australian Grasses. On leaving Kew she worked in the Bureau of Plant Industry at Washington, D.C., and later married Mr. Wilson Popeneoe, who was connected with the same department.

SHORT NOTES.

RECORD OF RE-INTRODUCTION.—*Acorus Calamus*, Chesterfield district, Derbyshire. In April 1918 *Acorus Calamus* occurred only at one locality in the Chesterfield district. It was plentiful in the canal at Chellaston, south of Derby, and there was a colony in the canal (which is part of a distinct system) at Ambergate, midway between Derby and Chesterfield. At Chesterfield it was thoroughly established in a pond close by Fields Farm at Upper Newbold, but it seems probable that it was at some time or other a deliberate introduction. Part of the pond appears to have long constituted a water-garden for an adjoining manor-type of house.

"Cutthorpe near Chesterfield" was noted as a locality for this plant by Pilkington ('Derbyshire, being an Account of the Geology, etc.', 1789), and Linton ('Flora of Derbyshire,' 1903) states that to be the first record for the county. It is undoubtedly the present Fields Farm station, which is near Cutthorpe, that is referred to.

On April 28, 1918, I introduced rhizomes from the Fields Farm pond in the following places:—(1) Somersall Pond; (2) Small pond above Stubbing Great Pond; and (3) Hardwick Wood Pond, Wingerworth. The plants have now (May 1933) become thoroughly established at each of the three sites; large and vigorous colonies exist at localities 2 & 3.—C. S. Garnett.

NEW VARIETY OF PRUNELLA VULGARIS.—While botanising on Kenfig Burrows, Glamorganshire, in August 1932, I collected seed of a low-growing pale-flowered form of *Prunella vulgaris* L. in the dry sandy ground between the church and the castle. Plants from this seed have now flowered and show the same characters as the original plants—namely, small flowers of a pale bluish-mauve colour, the absence of any purple coloration in the calyx and bracts, a low habit of growth, the tallest flowering branch being only about 9 cm. high, and small hairy leaves (1-5-2 cm. long) slightly toothed at the base, with very short petioles (4-5 mm. long).

*Prunella vulgaris* is a very variable species, and if populations from different areas were critically examined, no doubt nearly all the possible combinations of characters could be found. Pending, however, such an examination, it seems worth while to describe this form as a new variety, since the attention of future workers is thereby directed to it. Two other low-growing forms have already been described—namely, *P. parviflora* Poir. Dict. Suppl. i. 711 and *P. vulgaris* var. *dunensis* Druce, Rep. B. E. C. 1916, 748. Both these forms, however, have coloured bracts and calyces and the leaves of the former are described as nearly glabrous.

The following is a Latin description of the Kenfig plant:—

*Prunella vulgaris* L. var. *nov. pallida* Gilmour; a typd habitu humili (usque ad 9 cm. altitutine), foliis parvis (1-5-2 cm. longis), petiolis brevibus (4-5 mm. longis), floribus parvis pallidis, calycibus bracteisque viridibus differt.


THE GERMINATION OF EUPHORBIA CYPARISSIAS L.—*Euphorbia Cyparissias* L. has been known in this country for over 150 years, and is usually believed to be an alien. In the 11th edition of the 'London Catalogue' however, it appears as a native with the census number 7, while in Druce's 'Comital Flora' it is described as an alien, the numbers being for the United Kingdom 34 and for Ireland 3, with a north to south range from Aberdeen to South Devon. It is not recorded from Cornwall, but from South Devon in the west to East Kent and West Norfolk in the east.

I tried unsuccessfully for many years to find its seeds, but, although I knew it in the wild in several English counties, as well as in a good many gardens, I could never discover any. It was, therefore, somewhat of a red-letter day when in July 1931, in the company of Dr. D. H. Scott, who kindly took me there, I saw quantities of it in a lonely part of Hampshire in fine fruit; from the place where it was growing in abundance there was no building of any sort to be seen.

I collected some seeds, which, however, are not, as stated in Hooker's 'Flora,' globose, but ovoid, and I made a sowning early in September and again in the following June. Up to date not a single seedling has resulted from either of these attempts.

In July 1932, Dr. Scott and I again visited the Hampshire locality, and I spent about two hours searching for seedlings. I found none; all the little plants examined, which looked as if they might have been seedlings had developed from underground runners. However, I took another supply of seeds,
and, mindful of past experience with other species, I removed the elaiosome from fifty of them, an operation I had not performed on the 1931 seeds. Probably the service of the ants is in nature in lacerating or removing this bait favours germination by facilitating the irrigation of the embryo; but, however that may be, eight seeds germinated and produced healthy seedlings. This is not a large percentage, but it is proof that in Hampshire the species is capable of reproduction by seed ripened in the wild, and so, whether it be native or not in that county, it may certainly be said to have established itself there as a wild plant.—T. A. Dymes.

RECOMMENDATIONS.


This is an American book by the Assistant Professor of Plant Pathology, University of California. In it “an attempt has been made to present methods which are of use to phytopathologists. Before preparing the manuscript, considerable work was done to develop new experimental methods and to improve techniques described by other workers. The methods described are those which were found to be most satisfactory.”

The book is divided into three parts: Part I. (4 pp.)—Choosing and planning a research project; Part II. (94 pp.)—Experimental methods; and Part III. (5 pp.)—Interpretation of experimental results. The separate chapters of Part II. are on microscopic methods, culture methods, virus studies, and miscellaneous experimental methods. There is a “bibliography” with 950 titles and an index.

The book contains a good deal of useful information, but it is difficult to visualise the class of reader specially catered for. For example, Chapter I. begins: “It is seldom, if ever, advisable to make a final choice of a research project until a thorough study has been made of related literature. On the other hand, it is necessary that a tentative selection of the project be made in order that the volume of related literature to be reviewed may be within practical limits,” and goes on with similar statements, which would suggest that the unguided beginner is the public. Some of the experimental methods are of the most elementary, e.g., “every plant pathologist should learn to cut satisfactory free-hand sections,” giving reasons why. Much of the elementary details could have been omitted by assuming that a student should have some knowledge of botany before taking up research in plant pathology. This would, moreover, allow for an easier treatment of the more advanced methods. As it is, these are often merely referred to by name, and a reference

is given, with the result that the treatment appears very sketchy. It is not suggested that the book does not deal with some matters only to be found in original papers, but rather that the method of presentation is wrong. What is the use of two pages on such a subject as Photomicrography or five pages on Statistics, when research methods are the subject?

A more reasoned account of culture media would have been useful. It is somewhat late in the day to describe merely the constituents of media which have been found useful by different workers when probably every laboratory has its own pet media. What is behind the modifications that are found useful and what determines the choice of one medium rather than another when the culture of a fungus is attempted? It is information of this kind that would be more valuable to research workers than the constituents of a series of media with a series of modifications. And if a series of media are mentioned, why omit Sabouraud, Raulin, and others, whose pioneer work was based on fundamental reasoning?

Almost a third of the book is a “bibliography.” This is the part which will be found most useful, but it would have been well to have given some idea of the contents of some at least of the papers.

The title of the book is somewhat misleading, for the research methods considered deal only with plant pathology.

J. Ramsbottom.


The period covered by Dr. Haberlandt’s autobiographical recollections embraces the most active years of development of German botany. He was born in 1854 in the Schloss of the little Hungarian town, Altenburg, the headquarters of the School of Agriculture, where his father was Professor. Memories of the place, his parents, and his early life are given. An upheaval followed the war of 1866, causing the removal of the family to Gorizia, and in 1872 to Vienna, where the young man’s education was completed. His teacher was Richard Wissler, who was starting, in a humble way, a plant-physiological Institute in the University. But the chief stimulus for the young student was Sachs’s ‘Lehrbuch,’ a study of which led him to Hofmeister, Nägeli, De Bary, and others. The anxieties of his examination for the Ph.D. in 1876 are recalled—his thesis was “On the Winter-colouring of Perennial Leaves.” Next year he went to Tubingen to work under Schwendener, of whose methods of work he gives an interesting account. Schwendener was engaged on his “Mechanische Theorie der Blattstellung,” and
had little leisure to supervise his pupil's investigations. Haberlandt returned to Vienna in 1878 as a Privat-docent in the University, and in 1880 went to Graz, where the largest part of his working life was spent; this forms the subject of his "Second Book." The 'Physiologische Pflanzenanatomie' appeared in 1884 and was widely appreciated. A memorable interlude was a trip to Java, where he spent the winter of 1891-2, gathering material for his 'Botanische Tropenreise,' and enlarged his knowledge of plant-physiology.

The "Third Book" records his life in Berlin, whether he was summoned to take charge of the new Plant-physiological Institute at Dahlem in 1910. He retired in 1924.

In his first instance to interest his near relatives, the book contains much of purely domestic interest, but there is also much to interest the botanist in the author's recollections of German and Austrian botanists and their influence on the development of the science in the last sixty years.


This brochure is one of the series of Indian Forest Records (Silviculture Series) (vol. xvii, part iv.), and embodies the author's thesis for the D.Sc. degree of Edinburgh University. The Deodar (Cedrus Deodara) is the most valuable tree in the North-West Himalaya, and the Sutlej Valley forests are one of the main sources of supply for Northern India. It grows under climatic conditions varying from the heavy monsoon of the outer hills to the arid country behind the main ranges of the Himalaya, where precipitation consists almost entirely of winter snowfall. The associated plants vary greatly between these two extremes, and the author's object has been to trace the relationship between the plant associates of the Deodar and its value as a timber-tree. Chapters are devoted to topography, geology, climate and other ecological factors, and a study in some detail of the botany of the various belts in the moist and dry zones formations, with an ecological analysis of the results. It is found that the habit of growth of the Deodar and its plant associates alter completely between the extremes of its range, and its capacity as a timber-producer varies considerably; these variations have been correlated with the changes in its plant associates.

Dr. Gorrie's report forms an interesting chapter in plant ecology, apart from its technical value to the forester.

Brasilien und seine Säulenakteen. By Dr. E. Werdermann, Custos at the Botanical Museum, Berlin-Dahlem; First President of the Deutschen Kakteen-Gesellschaft. 8vo, pp. vii, 125, map, 4 coloured pls., 89 text-figs. J. Neumann: Neudamm, 1933. Price, paper 6.50 R.M., linen 8.50 R.M.

By the aid of funds from the German Cactus-Society, of which he was President, Dr. Werdermann has been able to travel through a considerable area of North-East Brasil, in the provinces of Pernambuco, Bahia, and Minas Geraes, lying east of the Rio San Francisco. In his attractive little book he gives an account in popular language of his travels, illustrated by small photographs of the scenery, specimens of the Cacti in natural surroundings, incidents during the journey, etc., from which the reader may form an idea of the country and its vegetation, and the difficulties associated with the work of collecting and preserving for future study specimens of the Cactus-flora.

The four coloured plates are reproductions from the author's 'Blühende Kakteen und andre sukkulente Pflanzen.' Three short chapters deal with the geographical distribution of the Cacti in Brazil and their relations to soil and climate, the collecting and transport of living specimens, and the preparation of a Cactus-herbarium.

The second part of the book, pp. 84-120, is a systematic description of the native species of columnar Cacti comprised in the genera Strophocactus, Selenicereus, Cereus, Trichocereus, Harrisia, Leocereus, Acanthocereus, Pilocereus, Pachecoia, and Cephalocereus. Keys to genera and species are included, and adequate descriptions, frequently supplemented by habit photographs, are given. A number of new species are described.


This little volume, one of Blackie's "Technique" series, is a description of the methods of infra-red photography in its present development. With the aid of numerous illustrations, the author indicates the scope of the process and the possibility of its value in scientific investigations.

BOOK-NOTES, NEWS, ETC.

BRITISH MYCOLOGICAL SOCIETY.—The Transactions, vol. xviii, pt. 1 (August 1932) contain accounts of the Spring and Autumn Foreays at Ludlow and Haslemere in 1932, with Miss G. Lister's Presidential Address, entitled "Field Notes on Mycetozoa." Also four original communications. Kathleen Sampson gives the results of work on the systematic infection of Grasses by
Epichloe typhina Tul., and T. Petch continues his "Notes on Entomogenous Fungi," which have involved a detailed examination of the characters and distribution of twenty-seven species, mainly of the genus Cordyceps. B. Barnes describes the abundant development in recent years on dead stems of herbaceous perennials in autumn, in a garden in South-east London, of Helotium ciliatosporum Boudier: the fungus was first recorded for this country in 1918. George Smith describes four new species of Penicillium isolated from cotton goods and mouldy Italian maize.

Gardens' Bulletin, Straits Settlements.—In vol. vii, pt. 2 (May 1933) M. R. Henderson records forty-five species of flowering plants in various families as additions to the flora of the Malay Peninsula: twenty-nine are described as new. A species of Myriophyllum is the first record of the family from the Peninsula, and nine other genera are also first records; four of these are represented in the Philippine Islands, but are unknown in the Malayan Islands. C. F. Symington gives the results of a detailed study of the botany and nomenclature of a number of species of Malayan Shorea; and R. C. Bakhuisen van den Brink an enumeration of the Malayan Ebanecese. The latter author finds no valid grounds for the separation of the genus Maba from Diospyros, and reduces it to the rank of a subgenus. A number of new species are described, and nomenclatorial adjustments are made.

The three papers are well illustrated by thirty-six plates, the value of which would be enhanced by the addition of the name of the species portrayed.

'Sinensia, Contributions from the Metropolitan Museum of Natural History, Academia Sinica.'—Vol. iii. nos. 1–5 (1932) of this Journal are devoted to articles of taxonomic interest, which, with the exception of the first two, on Chinese plant names and botanical terms, are in English. An article by E. H. Walker, "On Chinese Botanical Serials," deprecates the multiplicity of Chinese journals in which botanical papers are to be found—"in the past eleven years about twenty-four new ones have been established." Changes of title, not by any means confined to China, are also deprecated. A list of Chinese serial publications is given, with notes of date and place of issue; some have been short-lived, of others no copies are available. Taxonomic papers comprise a list of Cyperaceae from the Kweichow province by G. Kukenthal, Plante Tsiangiana (Eleocharaceae and Betulaceae) by H. H. Hu, Microstegium bifforme Keng, sp. nov., from Kwangsi, Notes on Chinese Fungi by F. L. Tai and C. T. Wei, Studies of Chinese Ferns VIII. (Woodsi's and Cheilanthsopsis) by Ren-chang Ching, and Notes on Chinese Apocynaceae by Ying Tsiang.

Lichenological Notes.—VII.

By W. Watson, D.Sc.

(Concluded from p. 318.)

Biatra gelatinosa Flk. On ground near Knightwood Oak, New Forest (*11).

B. viridescens (Schrad.) Mann. On ground, Port Soderick (71).

B. paeula (Nyl) comb. nov. On vertical face of rock in gully of stream, Hawkshead (*69).

Lecidea dubia (Sm.) T. & B. Reynoldson (*41, D. A. J. 1).

L. armeniaca var. lutescens (Anzi) Nyl. Snowdon (*49). New for Wales, having previously been noted for the British Isles in Perthshire only.


P. lactescens Mudd. Three species of Pertusaria having darkish spores which become purplish with potash have been recorded from the British Isles. Mudd, in his 'Manual' (1861), described P. lactescens from a specimen from Ayton in Cleveland (62). Nylander, in Bull. Soc. Linn. Norm. (1873), described P. urceolaria from a specimen collected by Larbalestier in Jersey, and in Flora (1881) named a specimen collected by Johnson at Ennerdale in Cumberland (70) P. spilomanthodes. The Ayton and Ennerdale plants have a different external appearance, but were included together as P. lactescens Mudd by Crumbye (1894) and Lorrain Smith (1918). The internal characters of all the three species are sufficiently similar to be included in one species, though the spores, as may be expected, vary in size and in degrees of darkness. If the external appearances are sufficiently constant to be of specific value it seems legitimate to separate P. spilomanthodes from P. lactescens. The late Miss Knowles in 1931 collected some Pertusaria material from a wall near Ballynakill Lake, Connemara (L, 16); part of the material is P. concruda, but other parts she considered to be P. urceolaria and P. lactescens (as used in Br. Lich.). Her P. urceolaria is very similar to Larbalestier's Jersey specimens except for sparse development of papillae. Her P. lactescens is unlike Mudd's specimen but like Johnson's Ennerdale plant which Nylander named P. spilomanthodes, and if the specific distinction between the three species is kept up, should be so named. The occurrence of the species on the same wall and the variability of their external appearances suggests that they are states of one and the same species.
Biatorella campestris Th. Fr. The thallus of this plant is often very evident and has an appearance similar to that of Bacidia flavovirescens or Gongylia viridis. Apothecia rarely appear till the thallus begins to disappear. When the thallus has become almost merged with the substratum numerous flesh-coloured apothecia become dotted over the darkening remains. It seems as if the apothecia develop saprophytically, obtaining the food necessary for their formation from the decaying remains of the thallus. During the earlier stages of apothecial development the walls of the asci are evident, but in the later stages become so thin as to be almost invisible. Because of its peculiar development it is probably often overlooked. Its thallus has been known to me for many years on the soil-cap of a wall near Taunton (*5), but its identity was not established till recently, when apothecia were noticed. Mr. Jones has since noted it at Newent (*34).


Leocania albivariella (Nyl.) Mudd. Brean Down (6), Cheltenham (*33, H. H. K.).


L. prosechoidea var. aeruginascens (Wedd.) Oliv. Sand Bay (*8), Swanbridge (*41). Magnusson, in a recent paper ("New or Interesting Swedish Lichens," VII, Bot. Notiser, 1932), has placed both L. prosechoidea and L. prosechoidea under Leocania helicopsis (Wahl.) Ach., thus reverting to the name used by Leighton (Lich. Flor.).

L. prosechoidea (Nyl.) A. L. Sm. On calcareous rock, Sully Island (*41, A. E. W. !).


Thallidiomma candidum (Web.) Mass. Clifton (*34).

Biatorella prosina (Fr.) Syd. On tree, Castle Neroche (5), Leigh Wood (*6, D. A. J.). On soil, Groulede Glen (*71). This corticicolous species has been recorded previously as occurring on soil (Lich. Notes.—IV, Journ. Bot. 1929, where, by a clerical error, it and B. erysiboides, were put along with the Biatoras given). The connection between the corticicolous and terricolous plants is well shown at Dodhill, near Taunton (5), where the lichen occurs on the bark at the base of the tree and thence spreads on to the surrounding soil.

B. erysiboides (Nyl.) Th. Fr. On soil over decaying bryophytes, Watersmeet (*4). On trees, Leigh Wood (*6) and Blaise Castle Wood (*34, D. A. J.).

Tonia cambrica (Wheld.) comb. nov. Frequent on Snowdon (49). It occurs on volcanic rock which contains some calcium carbonate. The thallus is often without the yellowish tint given in Wheldon's description.

T. caradocensis (Leight.) Lahm. Penzance (*1), Dodhill (5), Chedworth Wood (33, H. H. K.), Seatoller (*70).

T. squamulosa (Deak.) Mudd. Flat Holm (*41, A. E. W. !).


T. mesoidea (Nyl.) Zahl. Mullion Cove (*1), Goodrington (*3), Steep Holm and Brean Down (6).


B. albidocarnea (Nyl.) A. L. Sm. The varieties of this (including chlorotropoides) and B. herbidula seem scarcely separable except for slight differences which are probably due to environmental conditions. A plant growing on the sheltered side of limestone rocks at Brean Down (*6) agrees with var. alboverella (Nyl.) A. L. Sm. A plant found by Mr. Knight associated with Clathroporina calcarea on limestone, Coldwell Rocks (*34) was considered by him to be var. alborubella (Nyl.) A. L. Sm. A plant associated with C. calcarea on calcareous rocks, Hill of Usinach (I. 23, Knowl. Lich. of Ireland), collected by Lloyd Prager and sent to me by Miss Knowles, was considered to be the subspecies chlorotropoides (Nyl.) A. L. Sm. The latter has been found by Mr. Jones at Blaise Castle (*34).

B. sabuletorum B. & R. var. nov. angustispora. Differs a typo sporis angustioribus (20-30 x 4-5 µ). The thallus and apothecia are as in the type, but the mature spores are constantly narrower. Over moss on wall, Park Mill (41, D. A. J.).

Var. viridis, comb. nov. This was given the status of a form in "New, Rare, or Critical Lichens" (Journ. Bot. 1917, 210), differing from the type in "the green and thicker thallus." It has been
found in several other places, and, as the spore is more commonly 3-septate, its status seems to be somewhat higher than that of a form. On soil over rocks or mosses, near Dunster (*55), near Frome (*6), Cardiff (*41, A. E. W. !), Harden Moor (63).


B. effusa (Sm.) Arn. On tree, Clifton (*34, D. A. J. !).


B. flavovirescens (Dicks.) Anzi. Near Brecon (42), Clogwyn (49), Borrowdale and Honister Pass (70), near Ardlui (99).

B. vermicera (Nyl.) Th. Fr. Lecidea umbrina f. corticola Zw., in Letch. Fl., ed. 3, 361, may refer to this.

Lecographe parasita (Fik.) Mass. East Dean (*13), Lakenheath (*26, A. S. W. !).

Placodium cirrhothrum (Ach.) Hepp. Rhossili (*13, D. A. J. !).

P. callosum var. plicatum (Wedd.) Leight. has a deeper coloured form corresponding to the form symplegnum (Ach.) of the type. This is given as form aurantium by Harmand (Lich. de Fr.), and has been noted at Compass Cove (3), Brecon Down (6), and Lulworth (9).


P. medians Nyl. On limestone wall, Weston (*6).

P. xanthoglycum Nyl. Rhossili (*41, D. A. J. !).

Caloplaca lutec-album (Turn.) Mass. The rupestral form of this plant is much commoner than is generally supposed. It often occurs along with C. ochraceum, and, when the latter has its thallus bleached, is not readily distinguishable except by spore-examination. The latter has the spore-loucil widely separated, whereas in C. lutec-album f. rupestre (Nyl.) they are so near together that the spore almost appears to be one-septate. On limestone rocks, Quantoxhead etc. (*5), Weston etc. (*6), Port Eynon (*41, A. E. W. !).

Caloplaca haematites (Chaub.), comb. nov. Aviemore (*96, H. H. K.).

C. rupestre (Scop.) Wats. Lich. Som. On the soil-cap of a mortared wall near Taunton a form is found which seems to correspond to Lecidea rupestris var. terricola Anzi. (Blastenia terricola Lindau, Protoblastenia terricola Lyng), though the spores are somewhat larger than are usually given for terricola. On the hardened mortar of the same wall typical C. rupecstre occurred. The terricolois and saxicolois plants were similar in every respect, both externally and internally, so that the status of terricola is a habitat form.

Physcia melops (Duf.) Nyl. Cefn Llyn (*41, A. E. W. !).

P. lithocephra (Ach.) Nyl. On maritime rocks, Brecon Down (6), Lulworth (*9), Caeran, etc. (*41, A. E. W. !).


Rinodina atrorubra (Dicks.) Krb. Ventnor (*10, leg. H. P. Reader !).

R. Albido-bimosula Harm. Lich. de Fr. 913. A specimen collected by Mr. Travis at Lizard Head (1) agrees with this. It differs from R. atrorubra chiefly in the smaller spores, 14-17 × 7-9 μ as against 18-30 × 10-16 μ. The reaction with calcium hypochlorite is less definite both by itself or when preceded by potassium hydroxide.

R. Bischoffi (Hepp) Krb. On limestone, Clevedon (*6) and Port Eynon (*41).


Buellia praecaventa (Nyl.) A. L. Sm. Henley (*13).

B. aethales (Ach.) Th. Fr. East Dean (*13), Brecon Beacons (*42), Borth (*46), Harlech etc. (*48).


B. stellulata f. dispera (Leight.) A. L. Sm. On shingle, Borth (*46).

B. atrata (Sm.) Mudd. Borth (*46).

B. leptoclinoides (Nyl.) Stein. On surseon stone, Fifield (*7).

B. pyriformata (Leight.) A. L. Sm. On maritime rock, Lizard (*1, H. H. K. !).

B. colluans (Nyl.) Tuck. Cornwood (*3, H. H. K. !), Cwm Bychan (48), Keswick and Thirlmere (70).

B. confervoides Kremp. Lizard (*1, H. H. K. !), Cawsand (*2), Chesil Beach (*9), Blakeney (*27), Borth (*46), Barmouth (*48), Port Soderick (71).
B. alpicola (Wahl.) Kremp. On the rocks of the W. Perth side of the summit of Ben Lui (*87).


B. Adjuncta Th. Fr.; Karschia adjuncta Arn. Parasitic on thallus of Lecanora conizoides, on Asch, near Craig Llanishen and on L. expallens, Cfn-Inn (41, A. E. W. !). On L. conizoides, Errwood! (58, H. B.). As this has not been recorded previously from our islands the following description is appended:—Thallus none. Apothecia small (0-2-6 mm), often separate, but sometimes minute and congregate (five or more together), dark, plane, with a thin proper margin or convex and immarginate; hypothecium and epithecium usually dark brown; hymenium usually tinged with brown; paraphyses somewhat coherent, not distinct at dark apices. Spores 8-næ, dark brown, one-septate, 13-16x6-9 µ. It has been previously collected on the thallus of Lecanora symmicta var. straminca in Finland and Norway.

Rhizocarpon geographicum var. atrovirens (L.) Krb. Sheepstor (*3), Cader Idris (*48), near Keighley (*63, T. Helden!), Eel Crags (*70), Ben Doran (*98).

B. viridiflorum (Flk.) Krb. Gilval, near Penzance (*1), Singleton Forest (*13), Brecon Beacons (*42).


B. distinctum Th. Fr. On rock near Llanberis waterfall (*49).


Pycnothelia papillaria (Ehrh.) Duf. Zennor (*1), Holmesly and form papilliosa Fr. (11), Cwm Bychan with f. papilliosa Fr., var. apoda, Nyl. and var. molariformis Nyl. (48, D. A. J. !).

Cladonia pyxidata var. floccida (Nyl.) Parrique, differs from the type in the granuloso-sorediate margins of the thalline squamules. On wall-tops etc. near Tauntlet (*5) and Cfn-on (*41, A. E. W. !). This and the corresponding variety of C. fimbrifera have, no doubt, often been confused with C. caespiticio. The latter, however, has ascyphous podetia, or the apothecia are sessile on the thalline squamules, or are on such short stalks that the plants mimic Baeomyces rufus with a squamulose thallus.

C. fimbrifera var. flocicida B. de Lesd., Lich. Dunk. p. 85, resembles the previously-mentioned variety of C. pyxidata, but its podetia and scyphi are pulverulent, as in C. fimbrifera. It has been noted on a tree-trunk near Chard (*5) and Goyt Valley (*58). A specimen collected by J. Glover in 1911 from a tree-trunk at Grey Abbey (*1, 38), and labelled C. delicata, is the same variety. A similar condition occurs in C. macilenta at Taxal (*58).

C. crispa var. ceteraformis (Del.) Wain. On heaths, Studland (*9), Holmesly (*11), Lakenheath Warren (*26, A. S. Watt !), Maulin Mt. (*1, 20, teile Sandstedde).

C. squamosa var. multibrachiata Flk. Princetown (*3), Hampton (*38), Cwm Bychan (*48), Cwm-y-glo (*49). Podetia ±scyphigerous with scyphi proliferous, with cortex subcontinuous or in scattered areoles, not or little granulose or squamose, often darkish in colour.

Var. muricella (Del.) Wain. Princetown (*3), Blue Anchor etc. (5), May Hill (*34), Craig Llwyfan (*41, A. E. W. !), near Brecon (*42), Goyt's Quarry (*58), Keighley (*63).

Var. polychaeta Flk. Brecn (*42), Hirwysy (*48), Llanberis (*49), Cleveland (62). Podetia ±decorticate, granulose, ±scyphigerous with proliferous and re-proliferating scyphi, which are usually bordered with many sterile or spongioniferous teeth, often soredioso-farinose in places, not or little squamulose at the base.


C. caespitica (Pers.) Flk. Craig-y-lyn (*41, A. E. W. !).

C. boccilaris (Ach.) Nyl. Holmesly (11), Mynydd Rudy with var. subcoronata (*41, A. E. W. !), Stake Moss etc.* (*58, H. B. !).

C. Flexoidea Fr. The type is commoner than the few records in the Mon. Br. Lich. imply. Many records are given for var. carcarata, which is undoubtedly the common form on our heaths. The type has been noted from Blackdowns (5), Mendip (6) in Lich. Som., Wareham (*39), Lakenheath (*26), Blakeney Pt. (27, Richards, J. of Ecol. 1929), Hartlebury (37, Rhodes), Donats (*41 !, A. E. W. !), Brecon, (*42), Dolgelley (*48), near Aviemore (96, Wh. & Wilson, Journ. Bot. 1908).

Var. intermedius Hepp. On a heaths, Princetown (*3), Blagdon and Brendon Hills (5, Lich. Som.), Wareham (*39), Tynd-y-Groes (*48). Sandstedde has determined plants from Llifey Head (J. 21) and Crochan (I. 39) as this.

Gyrolea truncigena (Ach.) Hepp. Penrice (41, D. A. J. !).

G. Flosovii Krb. Penrice (41 !).

G. carnosolea (Turn.) Boist. Portland (H. K. K.) and Studland (9), Carnforth (60, J. W. Hartley !).

Coenogonium ebenum (Dillw.) A. L. Sm. Near Plymouth (9), Doone Valley (4), Brecon (42), Nant-y-Ffrith (50), Maulin Mt. (41, Stelfox !).

Racodium rupestre Pers. Lynton (4), Hepste Falls (42), Devil’s Bridge (46), Llanberis (49), Keighley (63, T. Hobden), Coniston (69), near Keswick (70), Maulin Mt. (41, Stelfox !).

Crocynia lanuginosa (Ach.) Hue. Penzance (1), Blaise Castle (34), Morlas Hill (41, A. E. W. !), Goyt Valley (58, H. B. !).

C. tephra Hue. On wall, Haslemere (17).

C. superba Hue. On mosses over rocks, Rhossili (41, D. A. J. !), Port Soderick (71). This differs from other species of Crocynia in its manner of attachment to the substratum. Instead of being attached by all the lower surface it is attached here and there only, leaving spaces where it is quite free from the moss.

Leptogium subtile (Schrad.) Nyl. Hayle (1), Pickering (62), L. minutissimum f. intermedium (Harm.) Wats. Lich. Notes. II. In nooks of limestone rocks, Brean Down (6).

L. callosum (Mass.) Harm. On siliceous rocks, Cwm Dyli (49, D. A. J. !). Thallus opaque, dark brown, of granules grouped into small masses, incompletely cellular, distinctly cellular at surface only, with algal cells single or in groups of two or three. Apothecia dark reddish-brown, 0·5 mm. diam., slightly convex, disc with a reddish tint, margin rather indefinite and darker, hypothecium pale, apparently of small “cells,” paraphyses discrete except at brown apices. Spores 8-11 μ, colourless, 5- or more septate and muriform, to 27×10 μ. In a surface-view the thallus presents an appearance as shown in the accompanying figure. Harmand, in Lich. de Fr., records it from calcareous rocks, but there was little or no evidence of a carbonate in the rock from Cwm Dyli.

Collema terrulentum Nyl. On Elder, Blaise Castle (34). This specimen has a similar appearance to the Scotch one in Herb. Brit. Mus., except that the granules are arranged in smaller groups.

Psoroticha lugubris (Somm.) D. T. & S. Near Devil’s Elbow (89, H. K. K. !), Ben Doran (88).

Ephebea hispidula (Ach.) Nyl. Common on boulders above the level of the water in stream, Cwm Bychan (48). The chief characters by which this is distinguished from Ephebe lanata are the minute branchlets on many of the filaments and the presence of paraphyses in the apothecium. Additional information obtained from the examination of specimens is that the paraphyses are septate and the apothecia usually at the outer angles of the bends in the filaments.

Arthromania excipiendi (Nyl.) Cribb. On tree, Tetton Wood, Quantock (s).


Allarthoria lapidicola (Tayl.) Zahl. On limestone, Sand Bay (6).

Lithoarca tesserata (DC.) Nyl. On rocks, Clogwyn-dur-Arddu, Snowdon (49). Recorded from the district previously.


O. betulinia Sm. Trevaylor (s), near Marlborough (8, H. H. K.), Stoborough (9), Cefn Mably and Penrice (41). Stirton’s O. proslienis is best regarded as a form of O. betulinia with shorter apothecia, It occurs mixed with the type on an Elder at Kingston (5, Lich. Som.).


O. zonata Krb. Carbis Bay (s), Harlech (48, D. A. J.).


Chamaotheca melanophaea (Ach.) Zw. On Spruce, Colesborne near Cheltenham (33, H. H. K. !). Joshua found this in the same vicin-county near Cirencester. On Fira, Grouse Glen (71).

Calicium quirinatum var. lenticulare (Ach.) Nyl. On pales, Kingston and Minehead (s).


D. hepaticum (Ach.) Th. Fr. Portland (*9), Pendolyan (*41, A. E. W. !).

D. lachenii (Ach.) A. L. Sm. Candleston (*41, A. E. W. !).

D. insulare (Mass.) Migula. In small insulated patches on calcareous rocks with Lecanora alboacensa (galactina), Placodium callopismum v. plicatum and other lichens, Sand Bay near Weston (*6). Thallus of small roundish brown or chestnut-brown swollen or plane squamules, usually arranged in small island-like patches, ——, with green algae. Perithecia small, black, at first entirely immersed but later with apices emergent; paraphyses none; ascus clavate; hymenial gelatine wine-red with iodide; spores 8–12μ, simple, colourless, oblong-ovate, 9–13×5–6μ. Previously found in similar insulated patches on calcareous rocks at Monte Baldo in Vall' Avesa, Italian Alps. The Sand Bay plant is very similar to the type-specimen in external appearance but has rather longer spores than were given by Massalongo (9×6μ).


V. scotina Wedd. Flat Holm (*41, A. E. W. !).


V. rheithrophila Zsch. On stones in a stream running into Badgworthly Water (*4). When moist the thallus is similar to V. submersa, being olive-green and smooth. The perithecia are more immersed and the spores are smaller, 7–12×5–7μ. Some of the plants listed under V. submersa, in Herb. Brit. Mus., probably belong to this segregate of Zschacke, as "some specimens the spores are persistently smaller" than in V. submersa (Mon. Br. Lich., 1926, 308).


V. mutabilis Borr. On flakes in the beech-woods near East Dean (*13).


V. muralis var. submuralis (Nyl.) Oliv. On chalk stones in the beech-woods near E. Dean (*13). On Carboniferous limestone, Swanbridge etc. (*41, A. E. W. !), Lakenheath (*26, A. S. W. !). Some of the plants from 41 and most of those from 13 belong to the form minor B. de Leis.

Thrombium eratocum, sp. nov. Thallus cinereo-viridis, tenuissimus, effusus, pulvulentus, cum gonidiis minutis (5–6μ) viridis. Perithecia minuta (circa 0.1 mm.), dispersa, nigra, globosa, sessilia vel leviter immersa, integra ut apparent. Asci cylindrici vel cylindrico-clavati, 50–60×12–14μ; paraphyses persistentes, distinctae, capillares, plasminusve erecta sed sepe leviter flexuose vel leviter implicata; hymenium cum iodo coerulescens demum vinoso-rubrum, sine gonidiis. Spora ovoae, simplices, incolores, oblongae, non seriatae sed interdum biseriatae vel rarius uniseriatae, 10–16×5–7μ, utoine obtusa, interdum cum duobus guttulis.

Hab. On chalk stones, beech-woods near East Dean (*13). As on many other chalk stones of the beech-woods and the neighbouring scrub, blue-green algae are sometimes present. Tretopolloid algae sometimes occur as well, but this is what might be expected since Arthopyrenia saxicola is sometimes present on similar stones. Steiner (in K. Akad. Wiss. math-naturw., 1896 & 1898) has described two species of Thrombium from calcareous rock, T. stercorarium from Persia and T. melaspermum from Greece, but both of these have larger asci and spores, besides slight differences in other characters.

Thelidiium immersum (Light.) Mudd. Morlais Hill (*41, A. E. W. !).

T. populare (Fr.) Arn. On rocks near Foxes Path, Cader (*48).

T. sparsulum (Nyl.) A. L. Sm. This is not uncommon on chalk stones in the beech-woods on the S. Downs near E. Dean (13). It was put amongst the doubtful Thelidia in Mon. Brit. Lich. 1926, 327, because Nylander considered the alga to be blue-green. Blue-green algae are not uncommon on the chalk stones in these beech-woods and are present when Verrucaria muralis or another lichen, even Arthopyrenia saxicola, is present whilst T. sparsulum is absent, so that little importance can be attached to their presence. The thallus is certainly scanty, but is more often green than blue-green or red, and the occurrence of algae having either of the two latter colours may be considered incidental. The spores are 3-septate, usually about 26×12μ, and the hymenial gelatine becomes wine-red with iodine.

T. fusidum (Nyl.) Hassl. On siliceous rock in stream, Cwm Idwal (*49). Thallus dark brown or sometimes paler. Perithecia about 0.2–0.3 mm., seated in thalline warts with the rounded black apices emerging, ostiole with darker ring round it;
ascus about 70–80×20–30 μ; spores colourless, 8-ne, one-septate, 20–30×10–13 μ, usually with both ends rounded.

Normandina pulchella (Borr.) Brom. On thatch of barn, Corfe Castle (*9); on mossy trees, Park Mill etc. (*41, D. A. J. !).

Staurotheca succedens (Rehm.) Arn. On rocks near stream at 1000 ft., at the foot of Ben Lui (*88), with Rhizocarpus obscuratum form ferratum. Thallus crustaceous, dark, more or less plectenchymatous. Perithecia 0–4–0.5 mm, sessile, semimmersed or emergent, hymenial alge cylindric, spores 8-ne, colourless, 31–41×17–22 μ, muriform, with 6–9 irregular transverse and 2–4 irregular vertical septa. The thallus is rather browner than in a foreign specimen examined, but this is probably due to the mixture of the Rhizocarpus.

Polyblastia Schroederi (Sm.) A. L. Sm. Durham Downs (*34, D. A. J. !).

P. deminuta Arn. On Carboniferous limestone, Morlais Castle Hill (*41, A. E. W. !).


Gonocylis viridis A. L. Sm. Craig-y-llyn (*41, A. E. W. !). On sandy material of soil-capped rock, Cwm-y-glo (*49). The apothecia are seldom directly on the bright green thallus but always very near to it.

Acrocordia monensis Wheld. On chalk stones, East Dean (*13). The thallus is greener than in Wheldon’s plant, but this is what might be expected, as the habitat was somewhat shaded.

Arthopyrenia saxicola Mass. On chalk stones in the beechwoods of the South Downs near E. Dean (*13). The two chambers of the spores are slightly unequal; the asci are about 40×20 μ.

A. arenicola A. L. Sm. Similar incrustations to those on the sand-dunes near Southport on the sandy “slacks” at Moohras near Harlech (*48), but no apothecia were noticed.

Porina lepta (D. & M.) A. L. Sm. At bases of conifers, Hillock Wood (*33), Blaise Castle (*34, D. A. J.), Penrice (*41, D. A. J. !), Seatoller, etc. (*70), Groudie Glen (*71).

P. leucistisits (Fr.) Zahl. On flint stones on “ride” in beechwoods, Charlton Forest (*13), associated with Verrucaria macrocliformis.


Coriscium viride (Ach.) Zahl. On turf, Blagdon Hill (*5).

Tropical African Leguminosae.

By E. G. Baker.

Crotalaria (Eucrotalaria, § Mecodiocrusatae) Greenway, sp. nov. Herba erecta usque ad 1 metr. et ultra ad C. ivanulescens Welw. accedens. Stipula lineares. Folia trifoliolata petiolata; foliolis pubescentibus anguste cuneato-obovatis 10–20 mm. longis, 5–11 mm. latiss, petioli gracilibus 15–20 mm. longis. Flores parvisculi in racemosos plus minus elongatos et multifloros dispositi; pedicelli 5–6 mm. longi. Calyx in toto ±5 mm. longus dentibus acutis. Vexillum flavum suborbiculare 10–11 mm. latum et longum; alae inaquilateraliter oblonge basi unguiculatae; carina dorso angulo fere recto curvata, rostrum rectum ±9 mm. longum. Legumen cylindricum rectum glabrum, 20–22 mm. longum.


“Annual herb up to 4 ft. tall with yellow flowers, somewhat straggling when solitary but erect when numerous. Should prove to be an excellent cover-crop in Sisal plantations as it smothers all other weeds.” This species differs from C. ivanulescens Welw. by the much smaller flowers etc.

Crotalaria (Eucrotalaria, § Parviflorae) tanganyikensis, sp. nov. Herba annua gracilis erecta ramosa, caulis teretiusculus sparse pubescens. Stipula lanceolata. Folia trifoliolata; foliolis lanceolatis vel oblongo-obovatis superne glabris subitus sparse pilosis 1–5 cm. longis, 4–9 mm. latis, petioli brevibus 2–6 mm. longis. Flores parvisculi in racemos plurifloros et laxiusculos dispositi; inflorescentia 4–5 cm. longa. Calyx 5–6 mm. longus, dentibus subulatis. Vexillum ±6 mm. longum et latum lineis purpureis notatum; carina ±7 mm. longa, dorso angulo fere recto curvata apice in rostrum attenuata, alba linea purpureis notata. Legumen oviforme 12–13 mm. longum, multispermum, sparse pubescens, ±maculatum.


“Herb with white flowers marked with purple veins, growing in dense masses.” An ally of C. Junodiana Schinz.

Crotalaria (Eucrotalaria, § Parviflorae) minutiflora, sp. nov. Planta annua ramosa ad C. senegalensis B. B. accedens. Causae pubescentes. Stipula lineares. Folia trifoliolata; foliolis oblongis vel ellipticis vel elliptico-obovatis, strigoso-pubescentibus, 5–10 mm. longis, 3–4 mm. latiss; petioli 3–10 mm. longis. Flores ±5 mm. longi in racemosus dispositi; pedicelli ±2 mm. longi. Calyx ±3 mm. longus. Vexillum late ovatum
unguiculatum +4 mm. longum, ±5 mm. latum; aee oblonge; carina +5 mm. longa, dorso rotundata apice sursum curvata. *Legumen* oblongum pubescens, 8–9 mm. longum.


"A procumbent perennial herb with lemon-yellow flowers growing in dark volcanic soil in Combretum-Zizyphus Bush Formation, not very common."

The standard is suborbicular, the claw being 2–5 mm. long; the wings are oblong or elliptic-oblong; the keel is rounded on the back, the rostrum short and upturned. It is allied to *C. ukambensis* Vatke and *C. uguenensis* Taub.

**Indigofera** (*Triphora*) *manyoniensis*, sp. nov. *Herba* erecta villosa copiose ramosa ad *I. amba* Schwefelm. accedens. *Stipula* lineares villosa. *Folia* imparipinnata; *follis* 5–7 oblongis vel oblongo-ellipticos, acutis, 9–12 mm. longis, 2–4 mm. latis, glandulosis. *Flores* parvissimi rubri graciliter et longissimis pedicellatis, pedicellis 1–2-floris. *Flores* 4 mm. longi. *Calyx* ±2 mm. dentibus acutis glandulosis. *Vexillum* ±4 mm. longum, suborbicularis dorso hirtum; *carina* ±5 mm. longa, naviculiforme. *Legumen* rectum cylindricum, 10–18 mm. longum ±10-spermatum.


**Indigofera** (*Dissectiflora*) *micropeta*, sp. nov. *Herba* prostrata gracilis, caulis gracilis ramis divaricatis 3–8 cm. longis. *Stipulae* setaceae 6–7 mm. longae. *Folia* 1–5 mm. longa; *follis* 2–4 obovatis apice obtusis supere sparse pubescentibus subitus strigosis 3–9 mm. longis, 2–6 mm. latis. *Flores* minutissimi; pedunculis saepissime 2-floris, ±1 mm. longi. *Calyx* 1–1.5 mm. longus, lobis linearibus apice glandulosis. *Vexillum* obovatum ±2 mm. longum; *follis* 1–5.5 mm. longa; *carina* ±2 mm. longa, apice obtusis. *Legumen* rectum 6–10 mm. longum, 1–1.5 mm. latum, sparse pilosum 3–6-spermatum.


"A prostrate herb with bright green foliage and minute bright red flowers." Allied in some respects to *I. geminata* Baker.

**Indigofera** (*Dissectiflora*) *Hewitii*, sp. nov. *Annuus* gracilis ramosa pubescens. *Stipulae* lineares; *follis* linearibus. *Folia* imparipinnata 3–5-foliolata; *follis* linear-oblongis 10–14 mm. longis, 2–4 mm. latis, subterne glabris subtus pubescentibus. *Pedunculi* striati graculis glandulosi punctiflori 4–7 mm. longi. *Calyx* ±2 mm. longus dentibus acutis tubo papillo longioribus glandulosis. *Vexillum* orbicularium 5 mm. longum; *follis* oblongo-ovatum; *carina* naviculiformis ±5 mm. longa. *Ovarium* lineare ±6-ovulatum sparse hirtum et glandulosum.

*Legumen* ignotum.


Allied to *I. Dyeri* Britten. A slender annual with imparipinnate leaves and slender glandular peduncle comparatively few-flowered.

**Indigofera** (*Tinctoriae*) *gonicarpa*, sp. nov. *Suffrutex* erectus ramosus. *Stipulae* acutes ad basim connatae. *Folia* imparipinnata 5–6 cm. longa; *follis* 4–8, ovalibus vel obovatis, 3–8 mm. longis, 2–5 mm. lat. primum strigoso-canescensibus demum subglabris. *Sporae* 1–2 cm. longi, pluriflori; floribus 5–6 mm. longi, rubri. *Calyx* ±2 mm. longus, strigosis dentibus subulatis tubo parum longioribus. *Vexillum* 5–6 mm. longum late ellipticum unguiculatum dorso pubescens; *follis* 5–6 mm. longum; *carina* 5–6 mm. longa, apice obtusa. *Legumen* 25–42 mm. longum rectum apice acutum tetragonum, 7–8-spermatum, minute strigosum.


Allied in some respects to *I. dimorphyla* Schinz. The stipules are connate at the base between the stem and petiole.

**Tephrosia** *Burttii*, sp. nov. Planta perennis ramosa novellis argenteo-strigosis. *Stipulae* lineares. *Folia* imparipinnata saepissime 7-juga foliolis linearibus vel lineari-oblongels et 8–11 mm. longis ±2 mm. latis. *Flores* parviscuii in racemos dispositi. *Calyx* in toto 4–5 mm. longus dentibus acutis. *Vexillum* orbicularium unguiculatum cum ungue ±8 mm. longum; *follis* anguste oblonge; *carina* naviculiformis graciliter unguiculata.
Legumen lineare 40-50 mm. longum, 3-4 mm. latum, argentostriatum marginibus brunncestriogram.


Allied to T. linearis Pers., T. discolor E. Mey., and T. seminuda Bojer.

Dolleoh zanhibarrensis, sp. nov. Caulis volubilis torcs pubescens. Stipula lanceolate dorso longitudinale striata. Folius trifoliolata longa petiolata, foliolis terminalibus equilateralibus ellipticos vel oblongo-ellipticos 8-10 cm. longis, 4-5 cm. latissimis lateralis inaequalibus, pubescentibus; petiolis 10-15 cm. longis. Flores in racemos laxissimis dispositi. Calyx in toto 9-10 mm. longus, dentibus angustis acutis. Vexillum in sicco flavum suborbiculari cum ungue 12-14 mm. longum; alae angustae; carina dorso rotundata 12-13 mm. longa. [Legumen ignotum.]


A close ally of D. Tauterti Bak. fil., but differs by broader leaflets, etc. Also allied to D. longistipulatus Harms.

Acauta Burtii, sp. nov. Frutex erectus 2-3 m. altus, coriace pallide fulvo ad A. formicarium Harms. invadens. Spina gomma internum in tumorum subglobosum confluentem. Folius pinnata rachi glabrae circ. 3-4 cm. longa, pinnae 1-3-jugis, foliolis plurijugis (5-12) 7-17 mm. longis, 2-5 mm. latissimis, glabris ovato-oblongis usque linearius brunncestriato. Pedunculi dense fasciati, 2-3 cm. longi, involucelo ad basin pedunculi instructi; capitula 15-20 mm. diam. Calyx 2-5-3 mm. longus, glaber. Corolla 0.5 mm. longa glabra, lobis acutis. Stamina 0.5-7 mm. longa. Legumen planum semilunatum umbellatum 1-6-4 cm. longum 1-17 cm. latum glabrum breviter stipitatum cepsius ad l-spermum.

Hab. Tanganyika Territory: Tabora Province, Kachama District, alt. 3800 ft., 4 miles along Ngaya Road, 4500; 6 miles along Shinyanga Road, 4500 (Type); 15 miles along Kachama-Ushirombo Road, 4500, B. D. Burtt, Jan. 1933. Herb. Mus. Brit.


“An erect shrub with pole-like stem 6-10 ft. high, lateral branches short and stubby, giving the plant a columnar appearance; bark yellowish buff, powdery, contrasting strongly with the sienna-red bark of Acauta formicarium. Flowers very large for a tall acacia, glabrous, creamy-white. Fruits kidney-shaped and very characteristic. Leaves broadly pinnode and very distinct from any other tall Acauta. Galls ant-infested, ants having brown thorax and reddish abdomen. Common near Kachama.”

NOTES FROM THE UNIVERSITY HERBARIUM, CAMBRIDGE.

SOME CHINESE SPECIES OF EPIMEDIUM.

BY WILLIAM T. STEARN.

H. Léveillé in his ‘Flora du Kouy-Techeu’—a remarkable but scarcely legible autotyped work published under the stress of the German invasion of France and limited to eighteen copies—records three species of Epimedium, namely, E. Komarovi H. Lév., E. acuminatum Franch., and E. macranthum Morr. & Decaisne, from the Chinese province of Kwêchow*, and distinguishes them as follows:

1. Foliosae stricte lanceolati; flores d'un blanc violet .......................................... E. Komarovi.
2. Foliosae ovales asymétriques; flores non violettas. E. acuminatum.
3. Fleurs roses; éperon pourpre interieur. E. macranthum.

This key is based on trivial and fluctuating characters useless for the distinction of species. By the courtesy of the authorities at the herbaria of Berlin, Breslau, the British Museum, Calcutta, Chicago, Edinburgh, Geneva, Harvard, Kew, Leningrad, New York, Paris, Upsala, Washington, Vienna, and elsewhere, it has been possible to examine the material cited by Léveillé in conjunction with numerous other Chinese collections, including nearly all the types. Léveillé's E. Komarovi, based on Cauverie 954 from Pin-fa (26° 3' N., 106° 30' E.), proves conspecific in the writer's opinion with the earlier E. acuminatum, the type of which also comes from Kwêchow province. Léveillé's E. acuminatum, on the other hand, is very distinct from the true plant of Morren and Decaisne, and is here described as a new species:


Species anomala E. stachyurusii Franch. proxima sed caule florifero sepe monophyllo vel folii caulini inaequaliter evolutis, pubescentibus, sepalis obovato-oblongis minus acuminatis disticta; ab E. macranthum Morr. & Decaisne (E. grandiflorum C. Morr.) foliis tantum 3-foliolatis etc. facile distinguitor.

Planta florivora c. 12-30 cm. alta; Rhizoma elongatum, tenuissimum, c. 1-2 mm. crassum, internodiis ad 20 cm. longis. Folii tantum 3-foliolati (vel radicale raro 1-foliolati), petiolis pilosis; foliola demum subcoriacea, ovata vel anguste ovata,

* "Kwêchow" is the standard spelling of the 'Chinese Postal Guide' adopted in the Royal Geographical Society's 'Second List of Asiatic Names' (1923). A number of variants are used on some maps. There is a town of the same name in Szechwan province.

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nearly adjacent areas suggest their differentiation from the same stock by isolation. The special interest of *E. leptorrhizum* is that it varies in a character usually constant within the genus and so of taxonomic importance. Convergence in one character must not be over-emphasised, however, by ignoring divergence in many others, and, although *E. leptorrhizum* in its usual state belongs technically to the group *Monophyllum* next to *E. macranthum*, phylogenetically it must be regarded as a somewhat anomalous species of the group *Diphyllyum* nearest *E. suchueneense*. Franchet's description of the flowers of the latter is incorrect, the petals being horn-shaped (as in *E. acuminatum*), about 1-5 cm. long, slightly exceeding or as long as the acuminate inner sepals and not "6 mm. longo...sepals fere dimidio breviores"; it would have been impossible to determine other specimens of the species without examination of the type (Farges 1272 in Herb. Mus. Paris).

Another unnamed *Epimedium* of Kweichow province is represented by specimens collected at "Ganchouen" (Anshun) (26° 3' N., 105° 52' E.) by Cavalerie*. This plant is so close to *E. pubescens* Maxim. in its flowers and general habit that it seems best treated as a southern variety or subspecies, distinguished chiefly by its broader inflorescence and sparsely pubescent leaves:

*Epimedium pubescens* Maxim. var. nov. Cavalerie. *Plantas* flores c. 40-60 cm. alta. *Rhizoma* c. 5 mm. crassum. *Folia* 3-foliolata; *foliola* anguste ovata vel lanceolata, longe acuminata, coriacea, suber sparse pubescens, 5-13 cm. longa, 2-4 cm. lata (vel fors an siam usque ad 25 cm. longa, 6 cm. lata; *vide infra*). *Caulis floriferus* diphyllum vel raro triphyllum; *inflorescentia* paniculata, laxa, glabra, multiforma (floribus usque ad 60), c. 10-30 cm. longa, versus basin interdum 12 cm. lata; *pedicelli* c. 1-2-5 cm. longi. *Flores parvi*, c. 1 cm. diam.; *sepalae exteriores* atra; *sepalae interiores* alba, c. 5 mm. longa; *petala* (nectaria) sacata, c. 2 mm. longa.

*Epimedium pubescens* Maxim. var. nov. Cavalerie. *Plantas* flores c. 40-60 cm. alta. *Rhizoma* c. 5 mm. crassum. *Folia* 3-foliolata; *foliola* anguste ovata vel lanceolata, longe acuminata, coriacea, suber sparse pubescens, 5-13 cm. longa, 2-4 cm. lata (vel fors an siam usque ad 25 cm. longa, 6 cm. lata; *vide infra*). *Caulis floriferus* diphyllum vel raro triphyllum; *inflorescentia* paniculata, laxa, glabra, multiforma (floribus usque ad 60), c. 10-30 cm. longa, versus basin interdum 12 cm. lata; *pedicelli* c. 1-2-5 cm. longi. *Flores parvi*, c. 1 cm. diam.; *sepalae exteriores* atra; *sepalae interiores* alba, c. 5 mm. longa; *petala* (nectaria) sacata, c. 2 mm. longa.


Besides the above the Kew Herbarium contains two specimens of an *Epimedium* collected without flowers at "Ganchouen" by Cavalerie, which probably represent its mature leaf-state. On one the leaflets (probably basal) are about 25 cm. long, 6 cm. broad, with the common petiole about 10 cm. long and the petiolaris 5-8 cm. long. On the other the leaflets (certainly cauline) are 18-19 cm. long, 3-4 cm. broad. These unusually large leaflets are papillose and sparsely pubescent beneath.

* Pierre Julien Cavalerie, French missionary and naturalist, born at Roussac in 1869 and sent out to China (Kweichow province) in 1894 by the Missions Etrangères. *Voyages...des Missionnaires naturalistes français*, ii. 101, 100 (1922).
E. pubescens var. 

Cavalricci is comparable to E. sargentatum var. pyramidale *, and, in view of Vavilov's law of homologous series in variation, it is significant that E. pubescens and E. sargentatum (E. sinense) are a pair of closely allied species. The occurrence of large leaflets in E. pubescens is to be expected from the known variation of E. sargentatum. Other "espèces jumelles" of Epimedium are E. pinnatum Fisch. and E. Peraudetanum Cosson; E. Davidii Franck. and E. huanense (Hand. Mazz.); E. leptonrhizum Stearn and E. ochotense Fisch.; E. acuminatum Franck. and E. membranaceum K. Meyer; E. diphylum Lodd. and E. platypetalum K. Meyer; E. alpinum L. and E. pubigerum (DC.) Morr. & Dec.; and possibly E. etatum Morr. & Dec. and E. elongatum Komarov, although these may be unrelated species that have converged and furnish a case similar to that of E. leptonrhizum and E. macranthum.

The three species of Kweichow province may be distinguished as follows:—

Stem bearing usually only one leaf. Inflorescence simple, few (4-8)-flowered. Leaflets pubescent beneath with spreading loose reddish hairs. Flowers large (3-4 cm. across); petals coriaceous, about 2 cm. long, slightly exceeding the inner sepals.

E. leptonrhizum.

Stem bearing two, rarely three, leaves. Inflorescence compound, many (10-60)-flowered.

Leaflets glabrous when young, later at some beneath with appressed short bristle-like hairs. Flowers large (about 2-4 cm. across); petals coriaceous, about 2 cm. long, much exceeding the inner sepals. E. acuminatum.

Leaflets pubescent beneath with spreading loose hairs. Flowers small (about 1 cm. across); petals scarinate, about 2 mm. long, much shorter than the inner sepals. E. pubescens.

E. acuminatum seems to be a heterochromic species, the flowers ranging from rose and pale violet to white and yellow, according to the notes of collectors. E. membranaceum has similar variation. The characters selected by Kurt Meyer to distinguish E. membranaceum from E. acuminatum do not hold, but the two species are nevertheless distinct. E. membranaceum has its leaflets pubescent beneath with lax multicellular hairs of the type usual in the genus. E. acuminatum, like E. sargentatum, is peculiar in developing with age appressed bristle-like hairs formed of a comparatively large upper cell and scarcely noticeable smaller basal cells; these hairs are sometimes obvious to the naked eye; sometimes they are so small, developing late or being suppressed, that they can be detected only with a strong lens, the leaflet then at first sight appearing glabrous beneath. To E. membranaceum belongs the Forrest material (nos. 13888, 16389, 19508) distributed as "E. sargentatum," actually a species with very different flowers. Detailed descriptions, synonymy, and distribution of the plants mentioned here will be given in a forthcoming monograph of Epimedium and allied genera of Berberidaceae. The research on which this paper has been based has been aided by a Government Grant from the Royal Society.

**FRULLANIA TAMARISCI** (L.) DUM. VAR. NOV. SCHIFFNERI.

BY W. E. NICHOLSON.

**FRULLANIA GERMANA** Tayl. was recorded from Cornwall many years ago, and I have been endeavouring for a long time to verify this record, without success. However, in June 1927 I gathered on rocks near the sea at Coverack in the Lizard peninsula a remarkable Frullania, which, while bearing much superficial resemblance to F. germana, appeared on closer examination to have more affinity with F. Tamarisci.

On my submitting this plant to Dr. V. Schiffner of Vienna he admitted that it was a very remarkable form, unlike any with which he was previously acquainted, that it was intermediate in its characters between the two species, and might indeed be described as a variety of either. On account, however, of the frequent presence of a vitta, however imperfect, and the often strongly recurved margins of the auricled underleaves, I have decided to place it under F. Tamarisci, as it would outrage most British hepaticologists to admit a form of F. germana with a vitta.

The following is a diagnosis of the variety:—


**Hab.** Rocks and walls near the sea, Coverack, Caerthillian Valley, Kynance Cove and other places in the Lizard peninsula. Penzance (W. Curnow, 1878).

It may seem rather a bold thing to describe a new variety of this common and widespread species which already has a large number of varieties to its credit, but the present form is so distinct...
and at the same time so liable to be confused with *F. gerdana* that it seems advisable clearly to distinguish it. Dr. Schiffer, one of the greatest living authorities on the hepatics, approves this course and has kindly accepted the dedication of the variety to him.

The variety seems to be very frequent in the Lizard peninsula, and it will probably be found in other parts of Cornwall. It is generally to be distinguished with the naked eye by its large spreading tufts of a dullish colour, less shining than those of typical *F. Tamarisci*, but scarcely so dull as those of *F. gerdana*. The *var. robusta* Lindb. of *F. Tamarisci* resembles the present plant in size and in the frequently imperfect vitta in the stem-leaves, but in all other respects it agrees closely with the type and is not likely to be confused with the new variety.

By the courtesy of Sir William Wright Smith, Regius Keeper of the Royal Botanic Garden, Edinburgh, I have been able to see a specimen gathered by the late Mr. William Curnow near Penzance in 1878 and referred by him to *F. gerdana*, and this plant undoubtedly belongs to the variety above described. It is quite possible that the true *F. gerdana* may occur in Cornwall, but, although it might reasonably be expected to occur there on the ground of its general distribution, the fact which I have investigated seem to render it rather questionable.

**BIBLIOGRAPHICAL NOTES.**

**XCIX. THE MARKWICK MANUSCRIPTS.**

**BY LT.-COL. A. H. WOLLEY-DOD.**

William Markwick was born in 1730 at Catsfield Place (now called The Church House), near Battle, Sussex. His mother before marriage was Mary Eversfield, of Denne Park, Horsham. Markwick succeeded to the Eversfield estates on the death of his aunt in 1803, and in 1807 adopted the name of Eversfield. He married Mary Date, of Southampton, in 1758, and had two sons and three daughters. He died in 1812.

At Catsfield Place Markwick lived the life of a country gentleman, keeping hounds, shooting, and performing such public duties as those of magistrate and deputy county lieutenant. He was much interested in all forms of natural history, and published several papers in the 'Transactions of the Linnean Society' in vols. i-vi on birds and insects. He was a Fellow of the Society.

In addition to his published writings, he wrote a series of books and diaries, of which seventeen were devoted to botany. Most of these manuscript books, forty-six volumes in all, were presented to the Hastings and St. Leonards Natural History Society by Miss Bethune Eversfield in 1922, and have now been placed by the Society on permanent loan in the Hastings Museum.

The botanical books at Hastings are as follows:

I. 'A Calendar of Flora, or Naturalist's Journal, made at Catsfield, near Battle, Sussex, in the year 1768 (or as the case may be), by Wm. Markwick, wherein is set Down the Times some of the most common Trees and Plants did first put forth their Leaves and Blossoms, and also when the Birds of Passage and Insects appeared and disappeared, etc.'

The Calendar is in three leather-bound quarto volumes, each containing a diary or calendar for almost every day of each year from 1768 to 1776, three years in each volume. The earliest entry is not until January 26, 1768, but the later years begin earlier, some on January 1.

The entries give the common English names of the flower, bird, or insect followed by the words "in blossom," "fruit ripe," "first appears," "last seen," and so forth, followed by the binary Latin name, and they are interspersed with remarks on the prevailing weather. The entries are mostly botanical, but birds, insects, reptiles, etc., are also mentioned, and a good index to both the Latin and English names is given at the end of each year, giving a reference to the date on which the entry can be found.

It may be safely assumed that all the plants observed by Markwick were in Sussex, and mostly, though not all, in the neighbourhood of Catsfield, a few being maritime or chalk plants not likely to occur there. There are also garden plants, and when the record is for a plant which may be wild or cultivated it is not always clear which is meant, though in many cases the garden plant is specified as such. Doubtful cases are not credited to the Flora of Sussex at all.

These Calendars for six years provide considerably over 300 early notices for the county of Sussex, almost all being the earliest known for the county, which is deficient in early records, the longest list being that of Mitten in Mrs. Merrifield's 'Natural History of Brighton' (1860), unless those in Forster's 'Flora Tonbridgensis' (1816), in which no distinction is made between Sussex and Kent, are used.

There are a few corrections to the names made by the author, sometimes in the calendar and sometimes in the index, or in both, showing that Markwick, though undoubtedly a very good botanist, made some egregious mistakes at first, but the corrections are fewer in the later years, as his botanical knowledge had improved. It is at least as safe to use his records as those of most of his contemporaries, who also undoubtedly made mistakes, and but for the exclusion of all probable garden plants the list of records would have been longer.

The Calendars for the years 1770 to 1772 are also written in two smaller note-books (the second one containing two years' records) which contain identically the same information as the
larger ones. It is possible that small books were kept for the years 1768 and 1769 also, and that Markwick rewrote them all in the larger books.

Extracts from the Calendars are published in the 'Naturalist's Calendar' at the end of the second edition of 'The Natural History of Selborne,' 1802. This may have given rise to the suggestion that Markwick himself edited this edition, but the statement does not bear investigation, the editor having been J. White, nephew of Gilbert White. The latter died in 1793. The list in "Selborne" purports to cover the years 1768 to 1793, but these may be the dates of White's own records, since no Calendars of Markwick are known of a later date than 1776, though he wrote other works up to 1808. Later Calendars may exist somewhere, but are not known to the Selborne nor the Linnean Societies.

II. 'Centuria prima (or secunda) Plantarum Indigenarum, or a British Herbale containing the Figuree and Descriptions of one Hundred Plants' (each). "Catsfield, July 23, 1779."

These are two leather-bound quarto volumes in which are recorded in manuscript, first, the English and Latin names, followed by the synonymy of Hudson, Hall, Bauhin, Ray, Parkinson, Gerard, etc. Then follow the "Classical Distribution" of Linnaeus, Ray, and Tournefort, and then a detailed description of every part of the plant. These descriptions do not always bring out the special characters by which closely allied species may be distinguished, and there is a suspicion that they were copied from some other botanical work and were not drawn up from the specimens by Markwick himself; since in at least one instance, an Oenanthe, the figure and description differ in important specific characters, proving that they do not belong to the same species.

Opposite the first page of the notes on each species is a beautifully executed full-page pencil or crayon drawing, often with dissections, which for the most part is clearly recognisable without the author's name or description, though, as already remarked, closely allied modern segregates may not always be recognisable either from the figure or the description.

After the description follows paragraphs headed "The Place," "Time," and "Observations," after the manner of the older Herbals, the "Observations" giving first the animals which eat or refuse it, and then brief remarks about its medicinal and other properties. These later are amplified in an Appendix.

The "Place" is only localised in about fifty of the two hundred plants named, though many of the others are marked "common," as indeed most are, but, since some of them admitted to come from other counties, it would not be safe to regard any as being Sussex plants unless they are so specified.

The books are paged and each plant is numbered, but for some unexplained reason the numbers of the figures do not run con-secutively. There is a Latin and an English index to each volume, also a list of over 70 books to which Markwick has made reference.

III. 'Fasciculus Plantarum Indigenarum or a Collection of fifty British Plants described and drawn from Nature by William Markwick, F.L.S., Catsfield.'

There are eight volumes, each containing 50 plants, the dates of completion being:—Vol. 1, November 1st, 1786; Vol. 2, April 5th, 1787; Vol. 3, November 3rd, 1787; Vol. 4, October 3rd, 1788; Vol. 5, November 4th, 1791; Vol. 6, December 31st, 1794; Vol. 7, December 24th, 1801; Vol. 8, May 16th, 1808.

This work is drawn up on the same lines as the 'Centuriae,' but the plates are coloured. They are for the most part excellent, but a few are inferior which I suspect they were not done by Markwick himself. The only substantial difference in the style from that of the 'Centuriae' is that the "Observations" follow the descriptions, instead of being in an Appendix. Only a few species are the same as those in the 'Centuriae.'

In addition to these botanical books there are two folio volumes of 'British Ornithology,' with coloured drawings, largely devoted to Sussex birds, and four others of 'British Zoology' with drawings and descriptions of mammals, birds, fishes, insects, etc., mostly from East Sussex.

There are also two books at the Linnean Society, Burlington House:—

IV. 'Plantae Sussexienses, or a Catalogue of Plants growing wild in the County of Sussex, by Wm. Markwick F.L.S.'

This is a foolscap manuscript of a paper read before the Linnean Society in November and December 1802, but not published in the 'Transactions.' It contains descriptions and notes of over 550 species, giving the relative frequency, ecological habitats, and in some cases the precise stations for each. Many of them have already been named in his former works, but some are new, and in many cases a more modern name has been used, though still there is no more segregation than before.

V. 'Descriptions and Figures of Several Grasses and Rushes drawn from Nature by Wm. Markwick F.L.S. 1800.'

A folio manuscript of 37 beautiful illustrations, coloured in sepia, of the commoner grasses, with two or three of the Cyperaceae, with full descriptions opposite to them, as in the Fasciculi. It is not stated whether they were drawn from Sussex specimens, though there is little doubt that they were so.

In drawing up the above account I have had very valuable assistance from Mr. W. R. Butterfield, the Curator of the Hastings Museum, also from Mr. Mark Webb, the Secretary of the Selborne Society and Mr. S. Savage, the Secretary of the Linnean Society.
SHORT NOTES.

CORRECT BOTANICAL NAME OF THE LUFFA SPONGE.—The determination of the correct Latin name for the Luffa Sponge, or Loofah of commerce, raises an interesting point in nomenclature, and the synonymy is worth stating in full, since my conclusion differs from that of Cogniaux and Harms (in Engl., Pflanzenr. iv, 275, ii. 62, 1924). The latter give the name Luffa cylindrica (L.) Roem., but Roemer never actually made this combination, as he based his Luffa cylindrica on “Momordica cylindrica Lour.” which he took to be different from Momordica cylindrica L. This is made clear by the fact that he kept up the latter name in the genus Momordica, indexing the two epithets cylindrica separately. From this it is evident that the type of Luffa cylindrica Roem. is Loureiro’s specimen, and it cannot by any means be considered that the name is based on Momordica cylindrica L., which was excluded from it by Roemer. It is now generally considered that “Momordica cylindrica Lour.” is taxonomically the same as Momordica cylindrica L., but this remains a matter of identification. By using the name Luffa cylindrica (L.) Roem. there is a fusion of two epithets “cylindrica” each with its own type. The name would have to stand or fall on individual opinion whether these two are taxonomically the same or not. This fatal confusion of taxonomy with nomenclature can only be avoided by rigid application of the principle “One name one type.” Since Luffa cylindrica only dates from Roemer (not from Linnaeus, as Harms and Cogniaux indicate), and by the International Rules prevents the transference of Momordica cylindrica L. to the genus Luffa, the earliest valid name for the species, in the genus Luffa, is Luffa aegyptiaca Mill. Fortunately the species is, if anything, rather better known under this name than under the name Luffa cylindrica, so no confusion can arise.

The relevant synonymy is appended:—


PENTANDROUS FORM OF ORCHIS MUSCULA L.—Mr. Ronald Burn has sent a specimen with remarkably abnormal flowers which he found in Elmsett Park Wood, West Suffolk, on April 23 last. The leaves were normal, much spotted; the spike, 5 cm. long, bore fifteen small flowers shielded by lanceolate-acuminate bracts as long as the flowers, i.e., longer and broader than usual. Mr. Burn describes the appearance as “that of a close-flowered spike eroded and yellow at the top and with flowers nowhere coming out into full bloom, all being rather adpressed as well as confined by the bract.” We are indebted to Col. M. St. L. Simon, who has made a careful drawing of the flower under my direction.

The following is a detailed description:—

Sepals 3, much reduced, connivent at back of column, barely exceeding 1 mm. in length. Petals 2, short, deformed, spreading. Lip deeply emarginate, bearing below the lobe two pollen-sacs; spur reduced to a sac 1.5 mm. long. Column 5 mm. broad, bearing a pair of normal pollen-sacs, the base of the caudicles is protected by the rostellar cap, but no gland is present; on either side is a pair of imperfect pollen-sacs.

![Diagram](attachment:image.png)

Br., bract; O, ovary; P, petal; L, lip, bearing two small closed pollen-sacs; p, lateral imperfect pollen-sacs.

The flower when spread open, as represented in the drawing, is 7 mm. long from the tip of the lip to the top of the column. When growing, Mr. Burn describes the lip as making an angle of barely 90° with the column, which is anterior, as the ovary is not twisted. He describes the petals and lip as crimson-purple, and the pollen-sacs as yellow with dark purple caudicles, except those on the lip which are purple.

The specimen recalls the monstrosity described by W. Zimmermann (Allg. Bot. Zeitschr. 20, 1913) as “Orchis mascula forma anomala apetalata triandra—floribus triandris, perigonii phyllis absentibus seu pane absentibus,” but the spur is shorter in Mr. Burn’s specimen, the lateral petals have no spur, and there is an additional pair of pollen-sacs on the face of the lip.
Diagram of relative position of petals and stamens in the monandrous Orchid flower. P, petals, the median one is the lip; A, a, stamens of outer whorl; A', a', a', a', represented by auricles on the column in O. mascula; a', stamens of inner whorl, normally absent.

Compared with the normal flower there is a development of the anthers at the expense of sepals and petals. The lateral pollen-sacs on the column represent the auricles of the normal flower, that is, the lateral stamens of the inner whorl, a', a', in the diagram. If we regard the pollen-sacs on the lip as representing the lateral stamens, a, a, of the outer whorl, the flower is pentandrous and the position of the anthers on the lip is of interest in view of Darwin's hypothesis, based on the course of the vascular bundles, that the lip of the typical Orchid represents the union of the median petal with the lateral stamens of the outer whorl. It must be remembered, however, that the development of an anther on the lateral petals has also been observed in abnormal flowers.—A. B. Rendle.

REVIEWS.

Watson Botanical Exchange Club.

The Forty-ninth Annual Report (1932–33), edited by the Hon. Sec., Mr. H. Stuart Thompson, shows that the increased work of the Club noticed in last year's report has not been maintained, the number of contributors falling to seventeen, with a total of 2153 specimens sent in. The distribution was again carried out by the Hon. Treasurer, Mr. G. Goode.

A large number of notes on critical plants appear in the Report, which also contains obituary notices, with portraits, of three deceased distinguished members, Messrs. White, Biechmann, and Groves. Among the plant-notes the following seem of more general interest:—

Silene nutans L. var. Smithiana Moss. Origin from seeds of plant on Nottingham Castle rock, its first-known British locality. Grown in my garden at Nottingham for many years past, and collected in June 1932. Sent for comparison with the Derbsyhire S. nutans sent last year.—J. W. Carr. When cultivated this plant evidently increases in luxuriance, and becomes indistinguishable from the reputedly taller form of Dover Cliffs, about which so much confusion has arisen (cide Report, 1930–31, 61, and 1931–32, 113). The account of S. nutans L. in E. B. 465 (1798) was taken from the plant growing at Nottingham, the “Nottingham Catchfly,” and this led to this form being erroneously regarded by British botanists as the typical species. Smith (Fl. Brit. ii. 467 (1800)) introduced in addition S. paradoxa L into the British Flora, as the “Dover Catchfly,” on the strength of a record by Ray, and apparently without any first-hand knowledge of the plant; and no evidence can be traced of the species having ever existed at Dover. The only specimen from Dover in Smith’s herbarium is unname, but it is annotated in Smith's hand “True Dover Catchfly, 1822.”

The specimen is S. nutans var. Smithiana Moss. In 1825 Peete found a different plant at Dover, which he described and figured as S. patens in E. B. S. 2748 (1832). This was subsequently identified with S. nutans Pers., and the original figure was used by Syme to illustrate that species in E. B., ed. 3, 208. No specimen of S. italica, which was confused with typical S. nutans (S. dubia C. E. Salmon) in the “Flora of Kent,” has been seen from Dover, other than Peete’s, although the species still grows in North Kent. I think that one form only grows on the Dover Cliffs, that no real difference exists between the Dover and the Nottingham Catchfly, and that Moss was right in merging them both in one variety Smithiana of S. nutans L.—H. W. Pugsley.

Euphorbia exigua L. var. Mayfield, East Sussex, Oct. 23, 1932.—A. H. Wolley-Dod. These specimens may not deserve the rank of variety, but at least are a very peculiar state, due to their immense size. Each plant formed a tuft 18 inches broad and 6 to 8 inches high; and the dried specimens give no idea of their appearance when growing. I made almost 40 sheets from one plant, with the exception of about half a dozen selected from a second one. The chief feature lies in the broad obliquely truncate base of the leaves, which are usually produced into a lobe on the anterior side. This form is not mentioned in any description known to me. The plants were growing in an old pasture where the turf had recently been removed, and were associated with such things as Linaria Elatine and spuria, both quite rare species near here, but probably brought by birds and found an attractive spot for their germination.—A. H. Wolley-Dod. Not a variety, but the secondary bracts inordinately multiplied at every fork of the inflorescence. I have seen E. Peplus doing this.—J. Fraser.

H. W. P.
by Dr. Dahlgroth—doubtfully welcome additions to our flora at the present juncture; and Hitchin, Herts, continues to provide new *Taraeza*. Full descriptions of the linear-leaved Potamogetons are extracted from Prof. Fernald's recent Monograph of the group, and the volume is reviewed at some length, but the full citation of the author's criticisms of the late Arthur Bennett's work seems hardly necessary.

The Report has been largely compiled by the efforts of numerous members of the Club, who have contributed a variety of articles. Messrs. Wilmott and Gilmour give a set of abstracts of recent papers concerning the British Flora: Mr. P. M. Hall has a long review of Col. Godfrey's new Monograph of our orchids: Mr. Pearse's treatise on *Zanichellia*: Mr. W. D. Miller gives an interesting account of the rare plants of Somerset: Dr. Sprague writes a synopsis of the Rules of Plant Nomenclature, which the botanical members should find most useful; and Mrs. Sandwith supplies a full account of the Adventive Flora of Bristol. These seem to be the outstanding papers, but there are others of interest, and the report as a whole reflects considerable credit on the club.

The second part is the Report of the Exchange Club, occupying 33 pages, and edited by the Distributor, Dr. W. A. Sledge. The number of specimens contributed is 2921, sent in by 22 members—a material decrease even as compared with last year. The decline in the activities of the exchange members, taken in conjunction with the similar symptoms shown by the Watson Club, appears to indicate a diminishing interest in critical taxonomic botany. Dr. Sledge's report, nevertheless, fully maintains the standard of interest of its predecessors.—H. W. P.


This volume, which is issued in two parts, concludes the section on Organic Compounds from Vol. III, a notice of which appeared in this Journal for July (p. 295), and follows the same general plan of treatment. Twenty-six specialists have contributed to the various sections, which deal with amino-acids, amides, proteids, nuclein, alkaloids, enzymes, toxins and antibodies, plant-hormones, and vitamins. The volume concludes with a section on special methods of analysis. As in previous parts the distribution of the various substances among plant families (with indication of species) is given in detail. The treatment of the work is naturally chemical, but with the increasing interest in bio-chemistry it should be a valuable addition to a well-equipped botanical library.
largely have been avoided in a printed work. The citations, for instance, of Brandt's paper on p. 6 and of Klebahn's on p. 30 are travesties of the true titles. The complete absence of French accents is disturbing.—F. E. Fritsch.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At the first General Meeting of the Session, the President, Prof. F. E. Weiss, F.R.S., read the names of those Fellows who had died during the recess, the Fellows present showing their sympathy by rising from their seats. The President stated that during the recess Dr. Alexander Zahlbruckner, F.M.L.S., had celebrated the completion of fifty years' research in Lichenology, having taken his doctor's degree at the University of Vienna in 1888. The President exhibited and gave an account of an example of phylloid in Tropaeolum majus sent by Miss P. M. Taylor, F.L.S. The Botanical Secretary, Mr. J. Ramsbottom, gave an account of some correspondence between C. H. Persoon and James Edward Smith relative to a number of specimens in the possession of the Society which proved to be types of some of Persoon's species of Fungi. At the Meeting on November 9, the President exhibited and commented on a specimen of white-fruited Euonymus europaeus from near Bristol, sent by Mr. H. Stuart Thompson. Mr. A. D. Cotton exhibited balls of the freshwater Alga Cladophora, from Ireland, and described their structure and habit. Mr. C. V. B. Marquand gave an account, illustrated with an excellent series of lantern-slides of the topography and vegetation of the Island of Rum.

THE LATE DR. JOHN BRIQUET.—The 'Journal de Genève,' October 7, gives an account of the inauguration ceremony in the Museum of the Botanic Garden of the bust of Dr. John Briquet, which was presented to the town of Geneva by a committee representing botanists and friends of the late Director.

CANON BULLOCK-WEBSTER'S CHAROPHYTA.—It is much to be regretted that owing to serious illness Canon Bullock-Webster has been unable to continue the work on the Charophytes in which he so admirably partnered the late James Groves. He has recently made a generous distribution of sets from his collection to the Universities of Leeds, Bristol, and Cardiff, and also to Mr. G. O. Allen, whom we are glad to know is carrying on the work in this group.

APPOINTMENT.—We congratulate our contributor Dr. B. F. Barnes, Lecturer in Botany, Birkebeck College, on his appointment to the headship of the Department of Biology, Chelsea Polytechnic, to succeed Mr. H. B. Lacey, who is retiring after many years of service.

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