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NOTES ON THE LINNEAN TYPES OF AMERICAN LABIATAE.

By Dr. Carl Epling
(University of California).

It is well known that the plants of the Linnean herbarium do not necessarily represent the historic types of the Species Plantarum*. The types of many species are unknown or are to be found elsewhere; many were based solely upon the published description and drawing of another author. As a result the identity of historic types is frequently a matter of speculation; their determination frequently impossible. I have therefore sought, in connection with monographic studies upon the American Labiatae, to fix upon certain herbarium specimens which may serve as standards, if not always types, in the purely historic sense. While each case has been considered carefully upon its own merits, in the selection of these specimens I have endeavoured to be not wholly arbitrary but consistent in application of a certain method of procedure which may be of general application. Following this method (e.g., *Satureja cinerea*), the plant actually described by Linneo has been determined whenever possible. This true type failing or being obscure, the references cited for the species concerned have been studied and in a majority of cases the plants therein referred to have been consulted. The standard has then been chosen from amongst their number or from the Linnean herbarium according to the circumstances peculiar to each case.

The sources for the species of American Labiatae other than the Linnean herbarium are chiefly seven: the plants of Plukenet's *Almamatarium* (Mus. Brit.), the Morison herbarium (Oxford), the Dillenian

* In his Index to the Linnean Herbarium (Proc. Linn. Soc. 1911-12, Suppl.) Dr. R. D. Jackson has indicated the species that occur in the three enumerations

back in Linneo's handwriting, namely 1753, 1765, and 1767. These are referred to in the following account as the first, second, and third enumeration, respectively.

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herbarium (Oxford), the plants described by Royen (unknown to me),
the Sloane herbarium (Mus. Brit.); the Clayton plants from the
Gronovian herbarium (Mus. Brit.), and the plants of the Hortus
Cliffortianus (Mus. Brit.). Of these, Linné is known to have studied
only the two collections last mentioned, but it is known that he visited
the Sloane, Plenkenet, and Dillen herbaria during his stay in England.
Whenever standards have been chosen in these herbaria in preference
to the Linnean herbarium, the object sought has been solely to gain a
more certain and stable basis for the nomenclature of the species con-
cerned. This would otherwise remain in doubt where the historic type
is wanting or obscure. As a matter of fact, that plant, which often in
the modern sense of the word is the historic type, is often in all
probability to be found either in the Hortus Cliffortianus or in the
Gronovian herbarium. The absence of specific references to herbarium
specimens on the part of Linné and the absence of his handwriting on
all but a few sheets of these herbaria will always leave this question
obscure. However, Britten * and Rendle † have already authoritatively
discussed the relationship of the Hortus Cliffortianus and the
Gronovian plants to the Species Plantarum.

In view of these facts, when a reference was made by Linné to the
Hortus Cliffortianus and a plant corresponding to that reference was
found, that plant has been in most cases accepted by me as the
standard. While it is true that the year 1758 was adopted as the
point of departure for nomenclature, nevertheless the diagnoses and
descriptions of the Hortus Cliffortianus are generally recognized as
constituting the initial publication of the corresponding species of the
Species Plantarum. Comparison of the Viridarium with the Hortus
will demonstrate that the latter is something more than the enumera-
tion of plants growing in a garden, including as it does many species
known to Linné only from dried material. It is really an incomplete
"species plantarum" co-ordinate with the first edition of the Genera
Plantarum.

Secondly, in the absence of a reference to the Hortus Cliffortianus,
when a reference was made by Linné to the Gronovian herbarium and
a plant corresponding to that reference was found, that plant has been
in most cases accepted by me as the standard. There can be no doubt
that Linné not only saw and studied the Clayton plants, and that for
the most part they served as the basis for his actual knowledge of the
species represented, but that he assisted and advised Gronovius in
the publication of the Flora Virginica, the preparation of which was
temporaneous with Linné's residence in Holland. Furthermore,
since the Clayton plants come from a somewhat circumscribed and
definite area in Virginia, it is not difficult to correlate them with indi-
viduals of the present flora. They accordingly are to be preferred to
the Kalm specimens of the Linnean herbarium.

Thirdly, for the same reason, where other considerations are equal,
a plant known to be of spontaneous origin has been preferred to a

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Lycopus virginicus Sp. Pl. 21, 1753.
References: Lycopus folius lanceolatus tenuissime serratis. Gron.
virg. 8, 1759.
Linnean Herbarium: No specimen named by Linnaeus.
Observations: Clayton's plant agrees well with the tips of the
branches of Fernald and Weatherly 265 (Hb. Mus. Brit.).

Ref.: M. capitulis terminalibus, caule obtus-angulo. Hort. ups.
lugub. 313, 1740.
Monarda, Hort. Cliff. 11, 1737.
Origanum fistulosum canadense. Corn. canad. 18, t. 14, 1635.
L. H.: A specimen unannotated by Linnaeus, hence doubtfully
from Hortus Upsalenensis, but present at first enumeration. It is conspecific
with and similar to the plant in Hort. Cliff. A second specimen upon
which Linnaeus has written "Mollissima." Stbl.: Monarda fistulosa, larger specimen in Hort. Cliff.
Obs.: This is a villous plant as interpreted by Robinson *, and is
conspecific with and similar to Biltmore Herb. 652 b (Hb. Mus.
Brit.). As far as one may judge from the description and plate,
Gournet's plant was similar.

Monarda mollis Amoen. Acad. iii. 399, 1756.
Ref.: None, but a rather full description.
L. H.: A specimen filed under M. fistulosa upon which Linnaeus has
written "Mollissima." Present in second enumeration.
Stbl.: The same, doubtless the historical type.
Obs.: The plant is as interpreted by Robinson *.

* Fernald, M. L., Rhodora, iii. 14, 1901.
Monarda didyma Sp. Pl. 22, 1753.
Monarda florib us capitatis verticillatisque, caulif lora acute angulata, foliis lanceolato serratis glabris. Büttn. can. 266, 1750.
L. H.: A garden specimen so labelled by Linné present in first enumeration.
Std.: The same.
Obs.: There is apparently no specimen preserved in the Hort. Cliff. The species is as usually interpreted.

Monarda clinopodia Sp. Pl. 22, 1753.
Ref.: Monarda folii ovato-lanceolatis, verticillis lateralis dichotomy corymbosis, foliis inequaliter serratis. Gron. virg. 9, 1739.
L. H.: A badly damaged plant present in the first enumeration.
Std.: The same.
Obs.: No Clayton plant was found in the general herbarium of the British Museum. The Linnéan plant is conspecific with and similar to J. K. Small, N. Fork Holston R., July 30, 1892 (HB. Mus. Brit.). A similar plant, evidently of garden origin, is found in the Linnéan herbarium labelled “M. clinopodia” by Linné. This is presumably the plant referred to in A. m. 389, 1756, a specimen of medium size. In his copy of the second edition of Grenovius’s Flora Virginica, Linné has written in the margin opposite each species the equivalent binomials. This name is used here opposite the Gronovian description of M. clinopodia, and was evidently considered by Linné as a synonym of that species. It is not improbable that the original name M. clinopodia was a typographical error for M. clinopodia, particularly since it was not capitalized.

Monarda punctata Sp. Pl. 22, 1753.
Ref.: Monarda floribus verticillatis, corollis punctatis. Hort. ups. 12, 1748.
Clinopodium virginianum angustifolium, quovis verticillo duodecin foliolis rubentibus cineto. Pluk. alm. iii. t. 24. f. 1, 1591.
L. H.: A plant so labelled by Linné has the aspect of a plant found wild. A second plant is obviously a garden specimen. On the sheet is written “fl. verticill. hort. cliff. 495,” but this has been later struck out and “M. punctata” written.
Std.: Plant of Linnaean Herbarium labelled “fl. verticill. hort. cliff. 495.”
Obs.: No specimen of this species was found in Hort. Cliff. It seems not improbable that the garden specimen above referred to was the actual type of Hort. Cliff. It corresponds closely to the diagnosis and to the Clayton and Plukenet plants. It is conspecific with Bilimbea Herbarium 583 a (HB. Mus. Brit.), but is a coarser garden form. The Clayton plant is fragmentary.

Monarda ciliata Sp. Pl. 23, 1753. (Blephilia ciliata Ref.)
Ref.: Monarda spica interrupta, involucris longitudine verticillorum lanceolatis. Gron. virg. 9, 1739.
L. H.: No specimen annotated by Linné or present in the first enumeration.
Obs.: The plants illustrated by Plukenet and Morison are apparently conspecific with that of Clayton. The Morison plant is not preserved, and no corresponding plant was found in Plukenet’s herb. Clayton’s plant is conspecific with and similar to Shuttleworth 412 (HB. Mus. Brit.).

Salvia mexicana Sp. Pl. 25, 1753.
Salvia Mexicana altaissima facia heliotropei, Dill. elth. 330, t. 254, f. 320, 1732.
L. H.: A branch bearing leaves only; present at first enumeration.
Std.: Salvia mexicana in Herb. Dillen. (Oxford).
Obs.: Since no specimen is preserved in Hort. Cliff., Dillen’s plant, which is excellently illustrated and well preserved, seems preferable as the standard.

Salvia hispanica Sp. Pl. 25, 1753.
Habitat in Italia : D. Rathgeb; in Hispanic : Loefling.
L. H.: A specimen, the origin not indicated; first enumeration.
Std.: The same.
Obs.: The species is as usually interpreted; the figure of Taberna- montanus is poor and may or may not represent this species.

Salvia dominica Sp. Pl. 25, 1753. (S. graveolens Vahl.)
L. H.: A specimen of unknown origin; first enumeration; wrongly attributed to Domingo by Linné it was later given the name S. commutata by Bentham, who still later referred this species to synonymy with S. graveolens Vahl, by which name it is known at present.

Salvia eretina Mantissa 25, 1767.
L. H.: A specimen from the Hort. Ups., according to Bentham, but marked as being from Italy; third enumeration. The probable historical type.
Obs.: Ardini pictures Salvia hortensis Vahl. Linné’s diagnosis is not wholly consistent with Ardini’s fairly good figure.
Salvia lyrata Sp. Pl. 23, 1753.
Ref.: Salvia corollarum labio superiore brevior; fauce patente.
Gron. virg. 8, 1739.
Hornum virginianum erectum, urticae foliis, flore minore.
Moris. hist. iii. p. 395, s. 11, t. 13, f. 31, 1699.
L. H.: A specimen from Kalm; first enumeration.
Obs.: Kalm’s plant is conspecific with and similar to Clayton’s.
Both are thinly villous with distinctly lyrate leaves. (The Morison drawing referred to represents Salvia urticaefolia. It was erroneously cited by Linné for fig. 27 on the same page which represents S. lyrata. In the second edition of the Species Plantarum a correction is made.)
The Morisonian plant determined by Vines as Salvia mertieana is not that species, but S. urticaefolia.

Salvia urticaefolia Sp. Pl. 24, 1753.
Ref.: Salvia foliis ovato-oblongis duplicato-seratissimis calycibus triglutatis; laciniis summa tridentatis. Gron. virg. 8, 1739.
Hornum virginianum erectum, urticae foliis, flore minore.
Moris. hist. iii. p. 395, s. 11, t. 13, f. 31, 1699.
L. H.: A plant present in first enumeration conspecific with and similar to Clayton’s plant.
Obs.: See under S. lyrata.

Collinsonia canadensis Sp. Pl. 28, 1753.
L. H.: A specimen from Kalm; first enumeration.
Std.: Collinsonia canadensis in Hort. Cliff.
Obs.: Kalm’s specimen is conspecific with the plant of Hort. Cliff., and both are similar to Clayton’s plant and to a plant collected by Burgess at London, Ontario, Aug. 29, 1884 (Hb. Mus. Brit.).

Teucrium canadense Sp. Pl. 564, 1753.
Ref.: Teucrium foliis lanceolatis serratis petiolatis, floribus solitariis. Gron. virg. 64, 1739.
Chamedyrea canadensis, urticae folio subtus incano. Tourn. inst. 205.
L. H.: A specimen present in first enumeration, without other data.
Std.: The same.
Obs.: The Clayton specimen is an abnormal depaupenate specimen with solitary verticillate flowers, but probably conspecific with the Linnean plant.

Teucrium virginicum Sp. Pl. 584, 1753. (T. canadense L.)
Ref.: Teucrium foliis ovatis inaequaliter serratis, racemis terminalibus. Gron. virg. 64, 1739.
Obs.: No specimens were found either in the Linnean herbarium or in the British Museum; probably T. canadense.
Hysopus nepetoides Sp. Pl. 569, 1753.

Betonica virginiana eliator, folii seropheraria gloribus, florae ochroleuca. Plut. alm. 67, t. 150, f. 3, 1691. Moris. hist. iii. p. 365, s. 11, t. 4, f. 11, 1699.
L. H.: A specimen evidently of horticultural origin, conspecific with Clayton's plant, Pluknet's, and that of Hort. Cliff.

Std.: Hysopus nepetoides in Hort. Cliff.
Obs.: This plant is conspecific with Bush 451 (Hb. Kew.), but the bracts are larger and more conspicuous.

Nepeta virginica Sp. Pl. 571, 1753. (Pyrantherum aristatum Pursh.)
Clinopodium amarum folio, floribuse alba. Plut. alm. 67, t. 96, f. 2, 1691.
Clinopodium, folio albo, ramossis, angustioribus folii gloribus, virginianum. Moris. hist. iii. p. 374, s. 11, t. 8, f. 1609.
L. H.: A plant present in third enumeration.

Obs.: The description in the Hort. Cliff. refers to a specimen from Gronovius. None is preserved in the Hort. Cliff nor, apparently, in the Linnean herbarium. The Clayton plant is conspecific with and similar to Biltmore Herb. 750 b in Herb. Mus. Brit. In Pluknet's figure the calyx-teeth are shown as acute. In his plant, which corresponds very closely to the drawing in habit, the calyx-teeth are aristate; the acute teeth of the drawing were evidently a blunder of the artist.

Mentha canadensis Sp. Pl. 577, 1753.
Ref.: Canada, Kalm.
L. H.: What is presumably Kalm's plant is conspecific with and similar to MacDougall 18, Macabees' ranch (Hb. Kew.).

Std.: The same; probably also the historical type.

Ballota scouleriana Syst. ed. 10, 1100, 1759; Pl. Jam. Pugill. 15, 1759. (Hyrtis scouleri Pott.)
Ref.: Plum. pl. t. 162, 1698. Sloan. Jam. t. 102, f. 2, 1709-25.
L. H.: A specimen from Patrick Browne; third enumeration; the historical type.
Obs.: It is the compact form illustrated by Plumier: H. Plumieri of Pottou.

Clinopodium inebrium Sp. Pl. 588, 1753. (Pyrantherum inebrium Pursh.)
Ref.: Clinopodium folis lanceolatis serratis, verticillis pedunculatis. Roy. lübgl. 313, 1740.

Clinopodium, menthe folio, inebrium et odoratus. Dill. elth. 87, t. 74, f. 55, 1732.
Clinopodium majus virginianum non ramosum, verticillii majoribus, floribus brevioribus corneis. Moris. hist. iii. p. 374, s. 11, t. 8, f. 4, 1699.
L. H.: A specimen labelled "H. W. Kalm"; first enumeration. It is conspecific with Clayton's plant (not cited) and probably with Pluknet's.

Std.: The same.
Obs.: The plants of Pluknet, Dillen, and Morison are conspecific with those of Linne and Gronovius. The latter is not cited. The Linnean plant is conspecific with and similar to Pursh's plant from "Sweet Springs" (Hb. Kew.).

Clinopodium rugosum Sp. Pl. 588, 1753. (Hyrtis rugosa (L.); H. radicata Willd.)
Ref.: Clinopodium rugosum, capitulis scabioso. Dill. elth. 88, t. 75, f. 56, 1732.
Scabiosa affinis, chrysanthem facio, lamii folii, americana. Plut. alm. 395, t. 222, f. 1, 1699.
Mentha americana inodora, folii subincanis. Raj. suppl. 284.
Mentha melissoides americana. Plut. mant. 120, 1700.
Melissa altissima globularia. Plut. spec. 6.
L. H.: No specimen found.

Std.: Clinopodium rugosum in Herb. Dillen. (Oxford).
Obs.: Since this species was probably based solely upon descriptions and figures of previous authors, and since the Dillenian figure and specimen are excellent, and since the Dillenian name was adopted, there seems little question as to the identity of the plant Linne had in mind, particularly in view of the dubious figures of the other citations. The plants of Sloane and Pluknet are Hyrtis capitata Jacq.

Melissa pulegioides Sp. Pl. 593, 1753. (Hedeoma pulegioides Pers.)
Ref.: Melissa floribus verticillatis glomeratis secundum longitudinem caulis, foliis tomentosis. Cron. virg. 107, 1739.
L. H.: A Kalm plant; a plant bearing on the back of the sheet the annotation "Fl. virgin. 66," very like one of the Gronovian plants.

Obs.: In the Gronovian herbarium were three plants: one collected on Staten Island, one grown from Virginian seed, one from Clayton. All are conspecific with each other and with the plants in the Linnean herbarium. The species is as usually interpreted.
Dracocephalum virginianum Sp. Pl. 594, 1753. (Physostegia virginiana Benth.)
Dracocephalum breyn. loc. 38, t. 27, 1739. Hir. act. 1712, p. 276, t. 11.
Dracocephalum angustifolius, folio glabro serrato. Morris. hist. iii. p. 407, s. 11, t. 4, f. 1, 1699.
Pseudodigitalis persicae folis. Boc. Sec. 12, t. 6, f. 3.
Lysimachia gallericulata spicata purpurea canadensis. Barr. loc. 1152, 1714.
L. H.: Two specimens, one evidently of garden origin, a second from Kalm, rather small-flowered, suggesting Dracocephalum brevifolium (Nutt.).
Std.: The garden specimen in Linnean Herbarium.
Obs.: No specimen was found in the Hort. Cliff. Since the garden specimen in Herb. Linnaeus closely corresponds to the published drawings cited by Linnaeus, and to the usual interpretation of this rather well-known horticultural plant, it was selected as the standard, rather than the Kalm plant.

Horminum virginicum Sp. Pl. 596, 1753. (Salvia lyrata L.)
Ref.: Melissa atractionis, pulgula folio. Dill. elth. 219, t. 175, f. 216, 1732.
Sideritis, bugula folio, mariana, floribus purpureis longo tubulo oblongo. Pluk. mant. 171, 1700.
L. H.: A specimen of unknown origin, not present in first enumeration, now under Salvia; labelled by Linnaeus “Horminum virginicum purpureum.”
Std.: The same.
Obs.: Dillen’s plant is conspecific with Salvia obovata Elliott and Salvia lyrata var. obovata Pursh. The plant of the Linnean Herbarium is similar, but the leaves are somewhat lyrate.

Ocimum americanum Amoen. Acad. ir. 276, 1759.
Ref.: America. Miller.
L. H.: A very depauperate specimen present in the second enumeration, corresponding only in a general way to the rather complete description. The actual type was doubtless a plant sent by Miller and since lost, for none was found in Miller’s herbarium.
Std.: The plant in the Linnean herbarium, conspecific with O. americanum Sims.

Trichostema dichotomum Sp. Pl. 598, 1753.
Scutellaria caerulea, majoranae folio, americana. Raj. suppl. 311, 1704.
L. H.: A specimen of unknown origin; first enumeration.

Obs.: No specimen is preserved in the Hort. Cliff. The original description was based upon a plant from Gronovius. The Clayton plant is a better specimen than that in the Linnean herbarium. Both are conspecific with Naas 2452, and Clayton’s plant agrees well with that sheet in Herb. Mus. Brit.

Trichostema brachiatum Sp. Pl. 598, 1753. (Isanthus brachiatus B. S. P.)
L. H.: A specimen of unknown origin; not present in first enumeration.
Std.: The same.
Obs.: The plant of the Linnean herbarium agrees well with Small, Smyth Co., Va., Aug. 8, 1892 (Hb. Kew.).

Scutellaria lateriflora Sp. Pl. 598, 1753.
Ref.: Scutellaria folius cordato-lanceolatus serratis, pedunculis multifloris. Roy. legdb. 311, 1740.
Scutellaria folius ovato-lanceolatus petiolatis, racemis foliosis. Gron. virg. 67, 1739.
L. H.: A quite young garden specimen from Hortus Upsalensis present in first enumeration.
Obs.: Clayton’s plant is conspecific with that of the Linnean herbarium, and is similar to Skeldon, Milton, Mille Lacs Co., Minn., July 1892 (Herb. Mus. Brit.). Morison’s plant is S. nervosa Pursh.

Scutellaria integrifolia Sp. Pl. 599, 1753.
Ref.: Scutellaria folius integerrimus. Gron. virg. 67, 1739.
Scutellaria caerulea virginiana, lamin aut potius teucrii folio, minor. Pluk. alm. 338, t. 313, f. 4, 1696.
Scutellaria, teucrii folio, marilandica. Raj. Suppl. 310, 1704.
L. H.: On the sheet labelled by Linnaeus “Scutellaria integri folia Calum” are two species: a branch of S. nervosa Pursh and a branch conspecific with Clayton 205, which in turn agrees well with Blake 9510 (Herb. Mus. Brit.).
Std.: Clayton 205 ex Gronov. in Herb. Mus. Brit.
Obs.: It is evident that Linnaeus drew his diagnosis “folius sessilibus ovatis; inferioribus obvoleti serratis; superioribus integerrimis” from the Kalm specimens, believing that the branch of S. nervosa represented a basal branch. Plukener’s plant is the type of Scutellaria ovatifolia Pers., and is very similar to Blake 9511 (Herb. Mus. Brit.) as well as Clayton 788 and Bartram (Herb. Mus. Brit.).

Scutellaria hysopifolia Sp. Pl. 599, 1753.
Cassida mariana, hysopifolia. Pat. act. angl.
L. H.: A specimen from Kalm; first enumeration.
Std.: Kalm in Linnean herbarium.
SOME BRITISH ALCHEMILLAS.

By C. E. SALMON, F.L.S.

With his customary kindness, Dr. F. Jaquet, of Fribourg, has determined—or confirmed the naming of—several gatherings of this fascinating genus made by friends or myself during recent years.

These results are tabulated below, and it will be seen that our British list is enriched to the extent of two new species, *Alchemilla heteropoda* Bus., discovered by Mrs. Corstorphine, and *A. aconitoides* Bus., gathered by Miss I. M. Roper. I have marked with an asterisk new county records, and aliens with a dagger.

A. CURTILORA BUS. (see Journ. Bot. 1925, 222). This close ally of *A. pratensis* may now be reckoned as an inhabitant of *Elgin, v.c. 69*, where it was found at Longmorn by Miss K. D. Little in 1927.

A. SALMONIANA Jaquet (Journ. Bot. 1926, 280). I am pleased to be able to add another county to that of Cumberland, from which the species was originally reported, viz. *Westmorland, v.c. 69*. Helvellyn! July 1921. L. B. Hall. It may prove to be, like *Myosotis brevifolia*, a plant with its headquarters in the Lake District.

A. TENENS BUS. (Journ. Bot. 1925, 225). Mr. J. E. Little kindly lent me the specimen from Box Wood, Stevenage (Herts, v.c. 20) gathered in 1911, to which reference has been made in Rep. H.E.C. 1926, 119. Upon close examination the plant did not appear to show the characters of the group *Heteropoda*, and seemed better placed under *A. minor* Huds. Dr. Jaquet has confirmed this view.

It will, however, be satisfactory to Hertfordshire botanists to know that this species may yet be included as a native of their county, as Mr. L. B. Hall discovered it near Chipperfield in 1916.

A. HETEROPODA Bus. This extremely interesting member of the group *Heteropoda* (the second found in our islands, the other being *A. tenens*) has been added to the British list of Alchemillas by Mrs. M. Corstorphine, who discovered it in August 1915 at Caenlochuan, Forfar, v.c. 90.

It was originally described by Buser in Ber. Schweiz. Bot. Ges. iv. 73 (1894), of which the following is a translation:—*Alchemilla heteropoda* Buser.—Medium-sized plant, ugly and coarse, sombre and dirty dark-green, becoming dark reddish-brown in the sun towards maturity; shoots of different kinds, i.e. the first petioles and shoots are smooth, the later ones patenty hairy; with glabrous, crowded, capitulate flowers. *Rhizome* strong, very fibrous, rather near the surface. Leaves 9-lobed (in small plants the outermost pair a little reduced), rounded-reniform, the later ones with a broad notch, which is often right-angled, narrowed rapidly towards the stalk. Leaves of the spring leaves very thin, flattened, acute, ± truncate, \( \frac{1}{2} \) radius, those of the mid-season subobovate, those of the summer leaves broadly triangular and acute, \( \frac{1}{2} \) radius, spreading; all are serrate round the edge. *Serrations* 6–8, not very deep and rather broad, obviously unequal, those of the lower leaves semi-oval, with hair-points, those of the upper leaves acute and protruding. Leaves in the fresh state wavy, when dried having the undulations folded and creased, rather hard and firm, ± thick; in the fresh state with the upper surface dirty dark-green and somewhat shining, as if covered with a dirty membranous, in the dry state matt, greyish-brown; brighter below, not glaucous, the summer leaves sometimes somewhat whitish-green; with very transparent reticulate nervation, in the dried leaves obviously impressed above and slightly prominent below. Spring leaves, with the exception of the nerves, quite glabrous, the leaves following them hairy along the folds on the upper side and on the nerves below, the large midsummer leaves sparsely covered with long, laxly adpressed hairs on both sides, the hairs being dirty yellowish-white in the dry state. The first (2–3) *petioles* entirely glabrous or the uppermost with a few very sparse hairs, the curved or straight stalks of the midsummer leaves patently subvillous or villous. *Stipules* rather broad, forming a firm tuft, greenish or whitish, rarely slightly violet; forming oblong to obovate-triangular ears. Stem curved, upright or with a curved base, usually about half as long again as the longest petiole, more rarely 3–4 times longer than it, but on account of its curvature the stem does not exceed the tuft of leaves, or only very slightly; stem dull green, ugly and thick, the twigs forking almost at right-angles, thinly patently villose as far as the axil of the 2nd or 3rd branch, the lowest internodes thinly hairy. *Stem-leaves* relatively large, shallowly lobed, with broad sheathing stipules; stipules broadly, shortly, and few-toothed. *Inflorescence* moderately developed, usually beginning below the middle of the
stem, forming a poor coryst, one branch much more advanced than the other. Circainni somewhat uncoiled, stalks squarrose, patent, and so on account of their shortness, the flowers are not coiled up. **Flowers** in all parts short, broad, and thick; calyx-tubes at flowering-time broadly funnel-shaped, as broad as long, gradually broadening into the limb which is equally long, the lower ones towards maturity turbinate, or the upper truncate-spherical in fruit often ventricose, basin-shaped, with the nerves marked as darkish lines. Sepals broadly triangular to truncate-cordate, glabrous or with a few hairs on the back, after flowering-time elongated, covering the style. Outer calyx-segments rather broadened, lanceolate, elliptic to ovate. The somewhat thick pedicel is as long as, or slightly shorter than, the calyx-tube. Leaves 3-12 cm x 2.7-10.5 cm. Stem 9-35 cm. Petioles 3.5-4 cm. Flowers 2-3 mm long, 3.4 mm broad. Calyx-tube and limb 1-1.5 mm. Pedicels 2-3 mm long... This is the ugliest of all our Alchemillas. The colouring is dark and dirty, the leaves have an upper surface resembling the skin on dirty water; the inflorescence is ugly, the flowers thick and coarse. The plant seems as if it came from the coarse alpine localities where pigs were to be found. This should also explain its absence from collections because we have ample opportunity to put into the herbarium more beautiful and inviting forms... The hairiness, especially that of the stems, is on the whole rather strong; such plants, by their greater stration, recall oseba and erinina. The hereditary is more pronounced in this plant than in most of the other species; the first petals of the spring leaves are quite glabrous. Often under the normal hairy pedicel is inserted one which is glabrous, except for a few hairs.

A. acuminatidens Bus. This species, holding a position between A. acutidens and A. alpestris, I have long been seeking, and it was a great pleasure to find that an example gathered by Miss I. M. Roper by the Spey, at Aviemore, Eastern, e. c. 69, in 1927, and which I queried as this plant, was confirmed by Dr. Jaquet. It was described by Buser in Bull. Herb. Bois. ser. 2, ii. 624-6 (1902) as follows. "A. acuminatidens Bus., sp. n.— Quand l'A. acuti-
dens Bus. est bien développé, c'est alors une des formes les plus faciles à saisir et à caractériser. Mais à côté de la forme typique, on voit assez souvent des spécimens moins précis, embarrassants par leur degré amoindri de différenciations. Ayant reçu dernièrement de M. Firman Jaquet, mon précieux correspondant dans les Alpes fribourgeoises, un lot de plantes de cette espèce, dont le nombre et la parfaite identité garantissant la constance, je les ai soumis à une comparaison minutieuse avec le type du Jura et suis arrivé à la conclusion que les deux formes sont à séparer spécifiquement. Au lieu du donner une description de la forme nouvelle qui, nécessairement, reviendrait au long coin qui est commun aux deux, je préfère les mettre en opposition pour leurs seules différences.

A. acutidens Bus. (Bull. Herb. Bois. ii. 102).—Feuilles fortement ondulées, à petites plis dans les angles des lobes sur le sec,
MESEMBRYANTHEMUM AND ALLIED GENERA

MESEMBRYANTHEMUM AND ALLIED GENERA

BY N. E. BROWN, A.L.S.

(Continued from vol. lxxvi. p. 327, 1928.)

CEPHALOPHYLLUM DIVERSIFOLIIUM N. E. Br. (M. diversifolium Haw. Obs. 228. M. diversifolium Haw. Misc. Nat. 38, Synop. 230, and Rev. 108, including varieties; Salm-Dyck, Mes. § 15, f. 2, and 2 β. M. loreum L. Sp. Pl. ed. 2, 694 (1792), as to main description, but not of description in italics of purple-flowered plant, which is C. divaricatum, and M. loreum vars. β & γ only. L. Sp. Pl. 487 (1753); Haw. Obs. 232, Misc. Nat. 38, Synop. 229, and Rev. 108, including var. congestum. C. diversifolium L. Bol. and C. loreum L. Bol. in S. Afr. Gard. 1928, 156, 156, and Mes. 121, as to Haworth's names only, not as to specimens so named nor as to the figure. M. diversifolium Haw. was founded upon Dillenius, Hort. Elth. t. 198, f. 252, and M. loreum Haw. (not of Linn.) upon f. 255, which l and some others regard as being the same species. It has been in cultivation over 200 years, and the Dillenian figure of it is excellent; see also Bradley, Hist. Succ. Pl. Dec. iv. 18, t. 40.)


C. EBRACTEATUM L. Bol. in S. Afr. Gard. 1928, 156, and Mes. 120. (M. ebracteatum Pax in Schultz, Aus Namaland und Kalam., 38, with fig. 683, not of L. Bolus. M. Rangei Engl. in Bot. Jahrb. xiiii. 190, f. 2.)


C. INEQUALE L. Bol. Mes. 149.


C. NAMAQUANUM L. Bol. Mes. 149.

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C. pittieri L. Bol. in S. Afr. Gard. 1928, 156, and Mes. 120, 140.


C. punctatum N. E. Br. (M. punctatum Haw. Obs. 411, and Rev. 107.)


(M. purpureoalbum Haw. in Phil. Mag. 1826, 328; Salm Dyck, Mes. § 15, f. 3.)

C. ramosum N. E. Br. (M. diversifolium L. Bol. in Ann. S.Afr. Mus. ix. 144, partly, not of Haworth. It is not at all like M. diversifolium Haw., and will be described later.)


(M. spongiosum L. Bol. in Ann. Bot. Herb. iv. 74.)


(M. tricolorum Haw. Obs. 283, Misc. Nat. 29, Synops. 232, and Rev. 111; Salm Dyck, Mes. § 15, f. 7; Nicholson, Dict. ii. 360, description only not as to fig. 556; Lubbock, Seelings, ii. 15.


C. trigona N. E. Br. l. c. 171.


C. braunii Schwant. in Zeitschr. f. Sukk. 1928, 279.

This is probably synonymous with C. nelii Schwant.

C. mannii L. Bol. in S. Afr. Gard. 1927, 399, f. 21d (not c as quoted in the text), and Mes. 96, f. 21, and 133.


For descriptions and figures of most of the species belonging to this genus, see Gard. Chron., as above quoted. The following have been described since, but several are not figured, and slight variations of the same plant have been described as distinct species.

C. altivecta Schwant. in Zeitscrh. f. Sukk. 1928, 278.

C. aurea L. Bol. in S. Afr. Gard. 1927, 250, f. 6, and 292 (the description is missing from some copies!), and Mes. 74, f. 6, and 130.

C. baumsii Schwant. in Zeitschr. f. Sukk. 1929, 179.

C. breachi L. Bol. in S. Afr. Gard. 1927, 326, 327, f. 11 a, and Mes. 80, f. 11 a, and 130.


C. derenbergiana Schwant. in Moller's Deutsch. Gart. Zeit. 1927, 158.


C. gilbosa Schick & Tischer in Zeitschr. f. Sukk. 1927, 154, with fig.

C. graesneri Tischer in Zeitschr. f. Sukk. 1928, 351. (C. Schicki Dint. l. c. 276, not of Tischer.)

C. insignis Schwant. in Zeitschr. f. Sukk. 1928, 276, and Tischer, l. c. 360.

C. minima Tischer in Succulenta, 1927, 145.

C. neli Schwant. in Zeitschr. f. Sukk. 1928, 277. Probably C. Braunsii Schwant. is a synonym of this.

C. ollivacea Schwant. in Zeitschr. f. Sukk. 1928, 277. This is probably a synonym of C. Schickiana Tischer.

C. perdecora N. E. Br. (C. robusta L. Bol. in S. Afr. Gard. 1927, 280, 281, f. 9 a, not of N. E. Br.)


C. Schickiana Tischer in Zeitschr. f. Sukk. 1927, 121, with fig. Probably C. insignis Schwant. and C. ollivacea Schwant. are synonyms of this, see Tischer, l. c. 350, 361.

C 2
ABSTRACTS OF PAPERS OF INTEREST TO STUDENTS OF THE BRITISH FLORA.

BOTANICAL SOCIETY AND EXCHANGE CLUB OF THE BRITISH ISLES. REPORT FOR 1927 vol. viii. pts. 3 & 4, August 1928.—Part I, edited by Dr. G. C. Druce, contains many interesting notes and valuable papers upon British botany. Among the "Plant Notes, etc., for 1927" we notice Cardamine imputiens L. var. nov. poterifolia Dr. (p. 301), Alchemilla crinita Bus. var. britannica Jaquet & Druce (p. 305), Solidago Virgareae var. nov. (vel formae) interrupta and dentatafiora Dr. (p. 307), Statice pubescens Sn. var. nov. Wegeri Dr. (p. 309), Scorospharia nodosa L. var. trachelioides Dr. & Wade (p. 313), Mentha spicata var. ciliata Dr. (p. 315), Chenopodium rubrum L. var. nov. Kochiforme Murr. (p. 316), Oreokarpus purpureus Huds. var. nov. pseudomilitaris Dr. (p. 317), and Glyceria procumbens Dum. var. nov. erecta Dr. (p. 322).


Among New County and other records (pp. 384–425) we find Senecio erraticus Bertol. (with plate), Myosotis brevifolia from N.W. Yorkshire, and Stachys alpina from Denbigh.

Lists of Plants from Co. Donegal (F. R. Browning), an account of the Flora of St. Kilda (W. B. Turrill), and an Alien Flora of the Metropolitan area (R. Melville & R. L. Smith) are given, and Dr. Druce contributes a long and interesting account of the British Plants in the Du Bois Herbarium at Oxford and another upon a visit to the Canary Islands.

There are also included articles by the Rev. T. Stephenson (Orchideae), W. P. Benson (Rubi), C. R. M. S. (Hamamelidaceae), and C. E. Britton (Persicaria) and many others of much interest to those working at critical genera.

Part IV, by the Distributor, Mr. F. Ristow, contains notes upon the 4485 plants contributed by 28 members. These notes are, of course, mainly of value to members, but of general interest are those upon Viola epiphas (p. 565), Galaxopsis Tetrahid (p. 584), Polygonum maculatum (p. 586), Carex tepperi var. bracteata (p. 588), C. E. S.

NOTES ON SPEGULA.—E. Price Evans (Journal of Ecology, vi. p. 394, 1928), in the course of an account of Warburton Moss, gives some interesting notes on the relative abundance, on different types of soil, of the two recognized forms of Spergula—S. sativa and S. arenaria—which occur as weeds of arable land in that district. He assumes that the presence of papilla on the testa of the seed of arenaria is a character of specific value, giving that form a rank distinct from sativa with non-papillate seeds; no forms which could definitely be termed intermediate or hybrid were found. Over 3000 plants were examined in all, the methods adopted being, to pick at random individual plants in all over an area where the soil was more or less uniform or to take handfuls of plants. The gatherings were examined with a pocket lens, as it was found to be impossible to distinguish the two forms in the field at a glance. The results were then tabulated and it was found that S. sativa was the dominant or characteristic form in the district. On light or medium loamy soils, slightly acid in reaction, both were often abundant and nearly equally distributed, but on peaty or on medium to heavy soils S. sativa predominated, while on very heavy land the plant was absent.—Doris Powell.

VARIATION OF THE BELGIAN SPECIES OF OPHRYS.—J. Houzeau de Lehaie (Bull. Soc. Roy. Bot. Belg. lx. 1928, pp. 99–100) records his observations on plants which have been in cultivation since 1925 and states that:

1. In the genus Ophrys each plant assumes a different shape, each flower of the same plant differs from the rest, each year there are as many new forms as there are flowers.

2. All the specific somatic characters observed are shown to be variable. In O. fuciflora Reichb., for example, the variation, extending to twenty-six floral characters and ten vegetative, is practically illimitable.

3. O. apifera L. varies less in Belgium than the other two species. In O. musciformis Huds. the variation is so extensive that it is almost illimitable. Up to the present it has not been possible to arrange the forms of O. fuciflora Reichb., on the contrary, conforms to certain rules; each individual varies fairly narrowly round a type.

4. In O. fuciflora Reichb. several groups of individuals have been delimited according to the shape of the labelum alone. These groups have each a cycle of variations which have remained distinct from those of other groups for three years. The author then gives the characters of the labelum in these groups.

5. The perianth is differently coloured, in certain cases forming distinct races.

6. The lateral petals also vary in shape.

7. Certain characteristics seem to be annual. Examples are given.—E. G. B.
OBITUARIES.

Charlotte Georgiana Trower.

Miss Charlotte Georgiana Trower, daughter of the late Captain Edward Spencer Trower, after much suffering, died at her life-long residence at Stanstead Park, on November 9th, 1828, aged 73.

Keenly interested in country life, she was for many years prominent in the hunting field, and keeper of a successful pedigree herd of Guernseys, and was President of the local V.A.D. and Red Cross. During the war she was a voluntary worker with the Ministry of Pensions, and did excellent service at the Ware Priory Hospital.

Always interested in sketching, about twenty-five years ago she began painting British wild flowers, in which art she became adept. Shortly before Moyle Rogers's death she began what one hoped might be a set of paintings of the British Rubi. Unfortunately, his decease took place when she had finished about thirty, but these are in the very front rank of water-colour paintings; she took Bauer as a model, and they have much of his accuracy and beauty. Deservedly they gained the Grenfell Medal of the Royal Horticultural Society. It was our intention to produce a volume of the British Rubi—an akin to that of Weise and Nees's Rubi Germanici, but owing to the loss of our expert on brambles, the idea was dropped. Miss Trower was kind enough to give these paintings to me, as she afterwards did her large collection of localised British wild flowers, over 1500 in number, contained in 32 volumes. The plants for the great part had been gathered by her surviving sister, and some by myself. Two other Grenfell Medals were earned for these paintings, the Cyperaceae being an especially fine set. At these she worked with meticulous care year by year. About twelve months ago she underwent a severe operation; this led to the loss of her right arm. Much suffering was endured with great bravery till the end came. She was buried in the church belonging to her Park, and the large attendance showed the high estimation in which she was held. She was a delightful companion, and her home with her sister, who also had considerable artistic powers, was one which it was a delight to visit. The sisters had the power of making plants grow, and many and strange species flourished together happily in their old world garden and grounds.

The Trowers had a botanical strain in them, since the Gosselins, of Guernsey, were among their forebears. — G. CLAIRIDGE DUDGE.

Dr. Julius Röll.

The death of Professor Dr. Julius Röll at Aue, Erzgebirge, on November 21, in his eighty-third year, removes one who contributed much to the cause of botany in all countries. In 1888-9 he travelled across the United States, and the botany of his journey were published in Hedwigia in 1890, with supplements in subsequent years. He travelled widely in Europe also, and published important papers on the moss-flora of the Odenwald, Thuringia, the Erzgebirge, Carpathians, etc. He was an expert lichenologist, holding views at variance with those of C. Warnstorf. The contents of his herbarium are described on the back cover of Hedwigia, lvi. Heft. 1-2, 1915. — A. GERP.

REV. DR. SYEN JOHAN ENANDER
(1847-1928).

We learn with regret that this veteran Swedish botanist died suddenly at Victoria, British Columbia, on December 18. Dr. Enander had been touring British North America in continuation of his studies of the Willows, a genus in which he had long been interested. In the course of his studies he had travelled widely in the North Temperate Zone, visiting England in 1905, Nova Zelanda and the Kola Peninsula in 1911 and '12, Russia and Siberia in 1912, '13, and '14, Japan in 1913, North America in 1919, '20, and '21, and Greenland in 1921.

His Studier över Salices i Linneus's Herbarium, published by the University of Uppsala in 1907 (it was communicated by invitation at the "promotion" of doctors in theology), contains an exhaustive description of the specimens in the Linnean herbarium, which he had studied when in London; also an account of a few specimens in the collection of Olof Celsius (1730) which Linnaeus had examined, and a correlation of the species of the genus in Linnaeus's various published works.

His Salices Scandianavice Exsociata were issued in three fascicles of 150 numbers, from 1905-10; the set of specimens, together with the printed 'Schedule,' containing descriptions of the species, hybrids, &c., with critical notes, are a valuable contribution to botany.

Enander was born at Torslunda, Kalmar, Dec. 29, 1847; he studied theology at Uppsala, taking orders in 1888, and becoming subsequently pastor of Lillhärdal. He received the honorary Ph.D. from Lund in 1918, and in 1921 was Linnean Gold Medallist of the Royal Society of Stockholm.

We also record with regret the death of DR. WILLIAM G. SMITH on Dec. 15th. Dr. Smith was one of the earlier workers on the ecological aspect of our flora, and we hope to publish an appreciation of his work in our next number.

We also regret to note the death of Sir William Threlcon-Dyer, K.C.M.G., formerly Director of the Royal Gardens, Kew, which took place on December 23, at his home at Witcombe, Gloucestershire, in his 86th year. Some account of his life and work will appear in our next number.

SHORT NOTES.

A BRITISH VERONICA HYBRID.—On October 5th, 1928, I visited Tringford Reservoir, near Tring, Hertfordshire, on the edge of which was growing a great quantity of a smallish prostrate form of Veronica anagallis L., together with a rather smaller quantity of Veronica aquatica L. Both were flowering and producing good fruit. Veronica decumbens L. was also present. It may be worth noting that V. anagallis and V. aquatica were in appearance perfectly distinct in this locality, differing in the following characters:
V. Anagallis:—Flowers blue; pedicels very slender, considerably longer than the bracts and tending to leave the stem at an angle of about 45 degrees; well-developed capsules 3 mm. long by 3-5 mm. broad; leaves lanceolate, sharply narrowed to the base or petiolate, slightly toothed, generally green; an average well-developed leaf measures 2.7 × 1.2 cm.

V. aquatica:—Flowers smaller, pink; pedicels thicker, not, or scarcely, exceeding the bracts, and tending to leave the stem at a broader angle; well-developed capsules 3 mm. long and broad; leaves linear-lanceolate or almost strap-shaped, only slightly narrowed to the base, sessile, sharply toothed, generally rudish; an average well-developed leaf measures 2.9 × 0.7 cm.

These differences are, of course, only meant to apply to the specimens collected by me at this particular locality and on this particular date. It may also be worth mentioning that the Tringford form of V. aquatica bears a varying number of glandular hairs on the inflorescence, but is not densely glandular, as this species sometimes is; and that it is from this same district that V. Anagallis var. montionoides (Boiss.) has been recorded, but that the form of V. Anagallis described above is not Boissier's variety.

Growing among these two plants I found one patch of several specimens, and also two solitary examples, of what seems certainly to be a hybrid between the two. The leaves of these hybrids were perfectly intermediate in shape between those of V. Anagallis and V. aquatica, and measured in a well-developed specimen 2.1 × 0.8 cm., being much narrowed to the base, though scarcely petiolate. The flowers inclined to the blue of V. Anagallis, but were a little smaller, and had a distinct tinge of red in them. The plants were extremely floriferous, some of the inflorescences bearing, or having borne, between thirty and forty flowers, whereas none of the specimens of V. aquatica which I gathered had more than about a dozen, and none of those of V. Anagallis more than about twenty. These hybrid plants were, however, entirely barren, not one of them bearing any capsules at all. Nor could I find any fertile Veronica by this reservoir which was not clearly referable either to Anagallis or to aquatica.

The inference seems clear, therefore, that V. Anagallis L. and V. aquatica Besser. are distinct species, producing a sterile offspring when they cross.

Specimens of each of the three gatherings—the two parents and the hybrid—are being placed in the British Museum Herbarium at South Kensington.

Finally, I must record my thanks to Mr. A.J. Wilmott for the assistance he has given me over this matter as over many others. —I. A. WILLIAMS.

ANDROMEDA POLIFOLIA L. NEAR GOATHLAND, NORTH YORKSHIRE.
—On June 9, 1924, Miss H. V. Medlicott of Partridge Hill, Goathland, discovered a small plant, in flower, growing in a boggy place on the moor near Saltersgate, which Capt. Medlicott named Andromeda polifolia. He sent this specimen in a letter to Mr. Edgar Sykes, at that time the schoolmaster here, who confirmed the identification.

On June 16, 1925, I accompanied Capt. Medlicott to the place where his daughter found Andromeda. We made a careful search, but could not discover any more. Since then several unsuccessful attempts have been made to find more growths. Vaccinium oxyccocos L. is plentiful in this situation.

Unfortunately, Mr. Sykes, now of Scarborough, had misplaced Capt. Medlicott's letter containing the original specimen. However, I urged him to try and find it, and on March 28, 1925, I received both from Mr. Sykes. In order that there might be no doubt about the identity of this plant I sent it to Dr. W. A. S. Slatyer, of Cambridge, who had not the slightest hesitation in naming the specimen Andromeda polifolia. The discovery in this district of Andromeda is important. Baker, in his Flora of North Yorkshire gives two stations only for this plant: one on Strensall Common in No. 1 district, the Ouse and Foss Area, and the other in or near Balderdale in No. 9 district, the West Tees Area. Certainly it would have been better had more specimens been found, but further search will be made, and in the meantime it is desirable that Miss Medlicott's interesting discovery should be recorded. This is only the second record for vice-county 62.—R. J. FLINTOFF, lecorder, Yorkshire Naturalists' Union.

THE ECONOMIC POSSIBILITIES OF RICE GRASS (SPARTINA TOWNSENDI).—Professor E. W. Oliver (Journal of the Ministry of Agriculture, xxvi. p. 709 (1925)) outlines the history of the spread of this remarkable grass from its first recorded appearance in Southampton Water in 1870 up to the present day, when it not only occurs all along the coast from Poole Harbour to Rye, but also across the Channel, growing in practically every estuary between Cherbourg and the Seine, as well as in the River Conche near Etaples, the Slack near Wimereux, and at the mouth of the Elorn at Brest in Brittany. He lays stress on the usefulness which this plant so ably fills for the work of reclaiming the muddy foreshores, and predicts that it will be used in this capacity all over the world wherever the climate is not too extreme. Already cuttings have been exported to Ireland, Holland, Germany, and the Antipodes.

Another use to which Spartina has recently been put is as feed for stock. It was noticed in Poole Harbour that all farm animals ate it readily. It is convenient as a reserve feed because it remains on its roots all the winter and so can be cut as required. The use is now being investigated by the East Anglian Institute of Agriculture at Chulmleigh, which is encouraging local farmers to plant it in the Essex marshes. The Institute is also investigating the chemical composition of the plant and is making detailed feeding experiments.

Spartina was experimented with during the war as a raw material for paper-making. The dried grass was found to contain 40 per cent. of fibre, but there was one serious drawback, that the great expense of bleaching the pulp by the current methods. Professor Oliver thinks
that its use for paper-making is unimportant in comparison with the primary ones indicated above.

Professor Oliver then describes the results of the experimental planting of Spartina in Holland. Dr. J. P. Lotsy, who was attracted by the idea of planting Spartina in connexion with the reclamation of muds and poldering operations which are always in progress in Holland, secured a trial batch of 50 Spartina cuttings which were planted in the tidal mud of the Sloe in May 1924. In subsequent years much larger consignments have been sent to Holland from Poole. This autumn Professor Oliver inspected a number of these plantings, and the photographs illustrating this paper give a good idea of the large scale on which the plantations have been made. Many of the tufts which were planted in 1925 are 6–7 ft. in diameter, and should begin to meadow (i.e., make contact between the units) in 1929 and have meadowed completely by 1930. This means that it will have taken the Dutch five years to accomplish what nature unaided requires from 15 to 20 years to do. The units of the first trial batch of cuttings are now about 10 feet in diameter and they show clearly the way that the mud rises to the tufts. In several localities a rise of 18–30 inches has taken place in two or three years. These facts indicate that Spartina will have an important application in preparing the way for dyking, and Mr. Verhoeven, Maritime Engineer in charge of the reclamation works, on a conservative estimate expects, with its assistance, to accelerate poldering (i.e., reclaiming land from sea or tidal river) by 10 years. This is the first time that it has been demonstrated that a preliminary treatment of bottomless muds by planting is feasible and likely to advance to a notable extent the date at which reclamation will become possible and the ground can be handed over to the farmer.

—Doris Powell.

**Scorzonera humilis** L.—The interesting comparison of the Angiosperm floras of Kent and the Pas de Calais by Mr. R. D'O. Good (Journ. Bot. 1928, 253) contains a strange mis-statement. *Erucastrum Pollichii* (E. gallicum Dr.), *Brassica gallica* (Willd.) Dr.), *Cetraeolus siliculosus* L., and *Scorzonera humilis* L. "have been found once or twice in this country, but always as transitory casuals." Most botanists would agree that two of these are alien to our flora. As a matter of fact, *Brassica gallica* was discovered by A. Irvine as long ago as 1863 (Fl. Surrey). It had the honour of being figured in this *Journ.* (t. xxxi, p. 169, 1865), and Mr. Joshua Clarke was awarded a gold medal of the Royal Horticultural Society for its discovery in Suffolk in 1864; since then it has been found scores of times in Britain, and probably in each successive year; it is fairly constant about Newmarket, and I have given it an asterisk in both editions of my *List*.

*Lotus siliculosus* L. is quite naturalised in Berks, Oxon, Gloucester, and Hampshire. In Berkshire since 1913, in Hampshire when it was recorded as well established (B. E. C. Rept. 1875, 191); ELLMAN (ibid. 1924, 566) says it is permanently established near Bath, and Ridley (Journ. Bot. 1924) argued in favour of its being a native

species. Thus I give an asterisk to it in my *List*, as an established alien.

**Scorzonera** occupies a different position, although it is unquestionably branded as "a transitory casual." So far from that being the case, nothing could be wider of the truth. It was discovered by Mr. Noel Sandwith (see B. E. C. Rept. 1915, 202) in great plenty. I went down to Dorsetshire with him to investigate the surroundings. There we found the plant in a great quantity, and occupying a considerable area of marshy pasture, bordered by heathland, on which there were no signs of adventive species, its associates being Carex stellulata, *C. flava* (agg.), *Hydrocotyle ranunculoides*, *Plantago maritima*, *Plukenetia vulgaris*, *Alpito maritima*, etc. We were told that the pasture had once been under corn-culture, but subsequent and prolonged country timbered the fact that only a small plot on the upper and drier end of the very large field had once had a crop of oats grown on it. After some difficulty, I traced the occupier of that time, and was told that the lower part (as was quite evident) had never been under tillage. The black oats he grew near his house, on a small portion only, at the upper and drier part of the field, were from an English not a continental source; the experiment not proving successful, that part reverted to pasture. Since that time, thirteen years ago, the locality has been visited yearly, and the plant has been seen there continuously. This year it was in abundant flower and fruit. Mr. L. B. Hall has also found it in another but similar habitat. One wonders where the myth of its being a fugitive alien arose. I was once told that the Rev. E. F. Linton scoffed at it, "he had once been in the field and did not see it"; therefore, I suppose he thought it could not be there. Out of flower it is not conspicuous, its leaves might be mistaken by a cursory observer for those of Plantago lanceolata, in flower it might be passed over as *Leontodon*. This observer failed to observe Carum verticillatum, *Chenopodium urbicum*, which is abundant about the entrance to the field, and several other species, so that his search could not have been exhaustive. There can be no reasonable doubt that *Scorzonera* is native in Dorset; it occupies the same kind of habitat and with much the same surrounding vegetation near Le Touquet. Its geographical distribution is all in favour of its being a native, and it will probably be found in other localities. That it is native is the opinion of those botanists who have seen it in situ, and it is therefore to be regretted that such unqualified and incorrect statements should be made, especially when treating of the comparative constituents of a flora, and thus vitiating the deductions the writer of the paper draws that *Scorzonera* is "fighting an unsuccessful battle against prevailing conditions of various kinds." The battle-ground of *Scorzonera* is the same on both sides of the Channel, as are the antagonists.—G. Claridge DuBois.

**Betula pubescens** Ehrh. in Shetland.—While on a trip in Shetland in June, I discovered one small plant of birch, which appears not to have been definitely recorded from Shetland before. It was a small shrub two feet high, growing at the water's edge upon a small
island in one of the many little un-named lochs immediately at the north foot of Ronas Hill in North Roe.

The position is significant, being out of reach of sheep and, in fact, only to be waded to with difficulty. Birch wood, some with the white bark still attached, is common in the peat in Shetland, especially in Yell, but the living tree seemed quite unknown.

J. Edmonston in Ann. Nat. Hist. 1841, 294, mentions "Betula alba, shady banks, not common," and in the same publication for 1907, 233, quotes his father, L. Edmonston, as saying: "no indigenous trees are to be seen, if we except a few dwarf bushes of birch, willow, and mountain ash." He also draws attention to the name Birka Water, which was close to our little un-named loch, and adds: "whether the birch still lingers in Shetland is at present uncertain.

Betula pubescens is recorded from both Yell and Rousay, absent from the Faroes, and probably present in Iceland and Greenland, as the hybrid pubescens × nana (intermedia Thom.) is found in both places. Obviously, sheep are responsible for the gradual disappearance of this last Shetland tree, which now survives only on these small islands in the lochs, perhaps with some other rarities. — W. R. Price.

New Records for Sphagna in Scotland.—Through the courtesy of Mr. E. C. Wallace, I have had the opportunity of working out a small collection of mosses, mostly Sphagna, collected in Arran by Mr. R. Mackenzie. Among them are the following new additions to the flora of Arran, v.c. 100:—Sphagnum Girgensohnii var. robustum Warnst., S. Warnstorfii Russ., S. quinquefurium Warnst., S. teres var. subtères Lindb., Bryum aliforme Hicks.

The specimens are in the British Museum Herbarium. — W. E. Sherrard.


This book is "an outgrowth of a course of lectures which the author has delivered during the past four years to large college courses composed mainly of freshmen. It aims to present, in a somewhat condensed form, a broad view of the vast biological field, with emphasis upon the fundamental principles common to all living things," especially to those students who do not continue their studies beyond the elementary course. It would be interesting to probe the mind of the student who has been through this course. Without doubt a skilful lecturer could develop the chapters into a series of interesting semipopular lectures and leave his hearers with a general idea of some of the principals of biology, but the book as it stands is, in our opinion, far too sketchy and superficial to be helpful to the unassisted reader. Of the twenty-one chapters, twelve deal with the morphology and physiology of plants and animals; some little attention is being given also to their classification, while in the remaining nine "an attempt is made to cover, in an elementary way, some of the more general phases of genetics, ecology, and organic evolution." Bearing in mind that a considerable proportion of the book is occupied with illustrations and that the text is very clearly and accurately printed, it must be evident that the author has attempted to include a great deal of matter in a very small compass, and has no opportunity for developing any part of his subject. A few examples will illustrate the difficulties which will confront a student. In a brief explanation of Taxonomy as one of the phases of biology we are told that "plants and animals are named according to a system of binomial nomenclature" devised by Linnaeus, and a few examples of scientific names are given, but there is now no explanation of the binomial, including the name of the genus, the larger group, and that of the specific grade, the species; genus is not mentioned. Further, "organisms are classified according to their natural relationships into groups called families, orders, &c.," with no further attempt at explanation. How far will this take the student? Chapter V. "The Great Plant-Groups," contains twelve pages, barely three of which are text, the remainder being occupied with illustrations with little or no explanation of members of the different great groups. The stem-structure of the seed-plant is described under two types, "exogenous" and "endogenous," illustrated by figures of cross-sections, which give a very limited idea of the structure, the description of which is dismissed in a few words.

Such criticism might be extended. The author has attempted a task which would seem impossible in the space at his disposal. Some of the chapters in the second half of the book are interesting reading, and assisted by the wealth of illustrations will be suggestive to teachers seeking matter for lectures on specific subjects. But such would probably prefer to consult the various text-books, from which a large number of the illustrations have been borrowed (with due acknowledgment).—A. B. R.


The Norwegian Scientific Expedition included among its members the renowned lichenologist, Dr. Bernt Lyngse; there was, therefore, good reason for expecting an unusually complete account of Northern lichens. Lyngse collected himself 7000 specimens, and the examination of these—mostly by the microscope—has been long and arduous. In the report now issued, 431 different species from his own collection have been listed. The two genera Acarospora and Lecanora were sent away for determination, the former to A. H. Magnnusson, of Gothenburg, who has listed 10 species, included in the above enumeration. The large genus Lecanora was consigned to A. Zahlbruckner, Vienna, whose report is not yet to hand, but he has notified the finding of 52 species; the stones on which they grow probably harboured other lichens, and a supplementary paper may be expected.

The introduction takes due note of the work of previous collectors in Novaya Zembla, with a sketch of the country and the climatic con-
ditions. The island, which lies wholly in the Arctic, is rather long
and narrow, and has been botanically considered by Lyngbye under six
localities—from (I.) the South Fiords, beginning at Goose Bay, to
(VI.) the Farthest North round about Arkangel Bay. It is a barren
land of high mountains and glaciers; the larger number of specimens
were secured from the lowlands round the coasts and bays, and on
the talus slopes. It was found impossible to examine the higher
hills and precipices, the author being, as he states, no alpinist, though
he declares regretfully that these inaccessible regions might have
yielded many fine plants. One place (II.), at the Kara Sea entrance
to Matotchkin Shar, is described by him as “a blessed locality for
lichenologists.” It is astonishing that so many specimens were
gathered, as everywhere the handicap was scarcity of time. Lyngbye
makes no claim to an exhaustive record. Lichens were among the
most abundant plants that grew in Nova Zembla; the vascular plants
found on the Expedition numbered 155 as against 413 lichens. It
was also noted that the former decreased in number towards the
north of the island more rapidly than did the lichens; the latter are
evidently able to endure Arctic conditions better than any other
vegetation, and propagation of lichens is also more easily achieved
as spores are continuously being produced, and, in addition, any
small part of the lichen thallus can give rise to new plants. Lyngbye
has given notes on the systematic of the species and on locality; the
habitat has in every case been carefully defined; the influence of
the exposure is emphasised, as also the effect of the nitrogen
contributed by the many sea-birds that nest on the island: hence the
considerable numbers of nitrophilous species. Microscopic details
have not been neglected: in several instances it has been necessary to
extend the range of spore sizes beyond the recognised diagnosis, as,
for instance, in Candelariella corneli; in one instance an accepted length of the spores is 10–17 μ; along with these normal spores,
some were found on the same plant measuring 19–24 μ. Other
instances could be cited; all are of great assistance to workers. Many
new species were found and are described clearly and succinctly. A
few have been eliminated as wrong determinations, among these
Xanthoria parietina, said to be non-Arctic. The form of Xanthoria
growing in these regions is referred to X. Candelaria (X. lychnea),
“a highly ornithophilous species,” and with a distribution from
the Arctic to the Antarctic. The genus Buellia, so abundant in the
far South, is represented by fifteen species, four new to science. The
genus is evidently well adapted to severe cold. In a recent publica-
tion, Malme replaced the genus Caloplaca by an earlier designation,
Calopisma. Lyngbye accepts his ruling, but the work was too far
advanced to allow the change in nomenclature. In this country we
have avoided these upheavals by retaining De Candolle’s Placodium.
A debt of gratitude is due from us to Dr. Lyngbye for giving us his
interesting and valuable record in English. Occasional mistakes
creep in, such as “Arctic” for Arctic, but there is never any doubt as
to the meaning. Botanists of all lands will welcome this contribution
to the Arctic flora, and the author is to be congratulated on the
successful completion of his task. The Plates give a photographic
representation of new species or special microscopic details.—A. L. S.

BOOK-MERITS, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At the General Meeting on
November 29, 1928, the Director of the Royal Botanic Gardens, Kew,
showed a small collection of minute succulent plants, sent from
South Africa by Mr. J. Hutchinson. These included species of
Cynophyllum, Anacampseros, and Crassula, originally found by
Prof. Compton near the top of Vanrhyns Pass in a small hard pan
of rock; a specimen of a new species of Lithops growing in shales,
and a specimen of Mesembryanthemum growing amongst blocks of
white rock, which it closely resembles.

The specimens had been potted at Kew with stones and shale sent
over with the specimens from South Africa, and the natural conditions
had been so well reproduced that it was difficult to detect the plants
among the stones.

Mr. T. A. Sprague gave an account, illustrated with lantern-slides,
of the results of his study, in conjunction with Mr. E. Nelmes, of the
Herbal of Leonard Fuchs.

The paper on which the account was based gives identifications of
the 511 plants figured, prefaced by a general account of the
Herbal. This is divided into chapters corresponding with those of
Dioscorides, and arranged according to the Greek alphabet; the chief
authorities cited being Dioscorides, Galen, and Pliny. The classifica-
tion is mainly (1) pharmaceutical and economic, but sometimes
(2) phrulological: thus (1) Campanula Rapunculus L. is classed with
the Swede and the Beet, because it has an edible root, and is widely
separated in consequence from *C. Trachelium* L., which was used as
a remedy for ulcers; and (2) *Monordica Balsamina* L. and *Impatiens Balsamina* L. are placed in the same chapter (genus) because the
former was called *Balsamina* and the latter *Balsaminium*.

The nomenclature adopted on the plates is puzzling, and cannot
be understood without reference to the text. It may be unitary,
binary, ternary or rarely quaternary, and unimomial, binomial, tri-
nominal or quadrinominal. But the nature of the nomenclature and
its form do not necessarily correspond. Thus a trinominal designation,
for example, may be either unitary, e.g. *Ephemerum non
latae* (a monotypic genus), or binary, e.g. *Trifolium pratense
purpureum* (a species of the genus *Trifolium pratense*), or ternary,
*e.g. Bellis minor hortensis* (a subspecies or variety of the species
*Bellis minor*). *Helleborus niger adulterinus sylvestris* is really a
binary combination, the genus being *Helleborus niger adulterinus*.

Miss E. L. Stephens exhibited, with explanatory remarks, a large
number of fine and interesting lantern-slides, coloured and uncoloured,
illustrating the scenery, physiographical features, vegetation, and
individual plants and animals characteristic of the Cape Peninsula.

At the Meeting on December 13 twenty-one Fellows were elected,
and the President announced that the number of Fellows was now
within nine of the proscribed limit of 800.

Dr. A. W. Hill gave some account of Australian and New Zealand
vegetation, seen by him during his recent visit, by means of a
beautiful series of photographic lantern-slides. Among the subjects
illustrated were the great desert forming the barrier between West
Australia and the rest of the continent, the Australian Eucalypts, and
the luxuriant mesophytic forest-vegetation and high alpine vege-
tation of New Zealand.

**British Trees.**—The most recent series of picture post-cards
issued at the Natural History Museum is one of British-grown trees.
The series includes, in addition to native species, various well-known
and common trees which are not indigenous, such as the Sweet
and Horse Chestnuts. The cards are in sets of four, each set dealing with
one tree, and including two monochrome reproductions of the tree in
the summer and winter state respectively, and two in colour illustrat-
ing foliage, flower, fruit, and the winter-twig. A four-page leaflet
with each set gives some account of the tree, with notes on geo-
graphical distribution and other points of interest. The following are
already on sale (price Sixpence per set).—Alder, Wild Apple, Ash,
Beech, Sweet Chestnut, Horse Chestnut, Sycamore; and other sets
are in preparation.

**Dr. Leonard Cockayne.**—At the Anniversary Meeting of the
Royal Society on November 30, the Darwin Medal was awarded to
Dr. Leonard Cockayne, F.R.S. Dr. Cockayne, who has devoted many
years to the study of the vegetation of New Zealand, was described as
"one of the foremost living students of plant-association," whose
"taxonomic studies rendered necessary by his ecological results have
led to those remarkable discoveries of natural hybrids in New Zealand
that have won for him a world-wide reputation."
THE SYSTEMATIC POSITION OF THE FOSSIL GENUS
DICLIDOCARYA E. M. REID.

BY P. A. NIKIFIR.

(With a Note by Mrs. E. M. Reid having especial reference to
D. gibboa E. M. Reid and D. Menzelii E. M. Reid.)

(Plate 589.)

Seeds described under the form-name *Diclidocarya* are characteristic fossils of the Pliocene and Miocene. The family to which they belong has hitherto been unknown.

They were first figured, but not described, in 1907, from the Upper Pliocene of Tegelen (2, fig. 124), by Clement Reid and Mrs. Reid, the founders of the scientific study of fossil seeds. Later they were found successively in the Upper (?) Pliocene of Raevels in Belgium (3, p. 529); in the Middle Pliocene of Reuver (4, p. 112, pl. xi, fig. 18); in the Miocene of the Pont-de-Gail (Cantal) (5, p. 50, pl. iv, figs. 23-25; 6, p. 352, pl. xi, fig. 29), from which deposit a second species was described; in the Pliocene of Central Russia; and, finally, in the Miocene Brown-coal of Kauscha in the Suttenberg, from which a third species was described (7, p. 1, pl. 580, figs. 1-7).

The first suggestion made by the Reid's as to the systematic position of the above-mentioned fossils was that they might be related to *Stocksea*, one of the Sapindaceae. The suggestion, which was put forward with much hesitation, was based on the presence of a very characteristic germination valve which serves for the emergence of the embryo.

In 1920 Mrs. E. M. Reid re-examined the fossils and was convinced of the impossibility of referring them to Sapindaceae. She provisionally described them as "Famille: *Diclidocarya* n. g." until such time as their taxonomic position could be found.

At the present time three species of *Diclidocarya* have been figured and described by Mrs. Reid. They are *D. gibboa*, frequent and abundant in the Pliocene of Tegelen, Raevels, Reuver, and Voronezh, the Miocene of Pont-de-Gail, and the Miocene of the Suttenberg; *D. gibboa* known only from the Miocene of Pont-de-Gail; and *D. Menzelii* known only from the Suttenberg.

The conclusions to which Mrs. Reid has been led are the following:

1. The fossils are probably seeds (6, p. 2).
2. The seeds almost certainly belong to a living genus because they still abound in the Upper Pliocene (4, p. 81).
3. It is highly probable that they belong to an aquatic genus because they occur in such abundance and in association with the remains of specifically aquatic plants such as *Naias*, *Potamogeton*, and *Nymphaeaceae*, also similarly abundant.

The seeds which I have found in three deposits of Middle Pliocene age in the province of Voronezh (Central Russia) were determined by Mrs. Reid as *Diclidocarya gibboa* (perhaps two varieties). The Journal of Botany.—Vol. 67. [February, 1929.]
comparison of the Voronezh specimens with specimens, figures, and descriptions of those from Western Europe indicates the correctness of this determination. The deposit of lignite, two metres thick, in the village of Krivoborye (40 km. north of the town of Voronezh), in which *Dictyodocarya* is especially abundant, was examined by me stratum by stratum for the contained fossil plants and mineral ash.

The examination proved that the strata represented successive deposits of lakes, marshes, and woodlands. An abundance of well-ripened seeds of *Dictyodocarya* is met with in the lower part of the lens of lignite. Higher up they are less in quantity and have an admixture of undeveloped seeds. In the upper strata *Dictyodocarya* is represented occasionally by undeveloped seeds which have a narrow triangular shape and thin shrivelled dull testa.

I could not observe any definite distribution corresponding to the succession of lake, marsh, and woodland deposits. *Dictyodocarya* occurred, however, in the least quantity in definitely lacustrine strata where aquatic plants such as *Potamogeton*, *Najas*, and *Aldrovanda* were prevalent, and was abundant where *Salix*, *Epipremnum*, and *Hypericum* were also abundant.

This suggested that the fossils belonged to subaquatic, not aquatic plants.

**Description of the Fossil Fructus.**—The walls of the fruit are not preserved in the fossil state, but sometimes it happens that 20–30 (or fewer) seeds have remained grouped as in the living fruit (PL 589, fig. 7). The dimensions of such a group are from 5.5 to 6 mm.

**Seeds** (PL 589, figs. 1, 3).—These are small inverted triangular-pyramidal in shape, with rounded edges and often with rounded sides. The three facets are more accentuated in the undeveloped than in the developed seeds. In the latter the roundness of sides and edges often makes the seeds hemispherical. The top of the seed is broad and slopes to the back. The base is pointed. The dorsal side is angular, or round and smooth. The median angle of the dorsal side marks the raphe. On the ventral side there is a triangular oval valve which is either concave or flat; it is confluent with the walls of the seed at its base, which is situated near the top of the seed, and its pointed end reaches the base. The outside surface of the valve is ornamented by 8–10 small narrow longitudinal grooves full of pits; the midmost grooves reach the top of the seed. There is a micropyle between the pointed end of the valve and the base. A round hole is to be seen near the micropyle on the ventral side of the base; it is the beginning of the canal which carries the vascular bundle of the raphe.

The ripe seeds are light brown in colour and glossy. The testa (PL 589, fig. 5) is formed of two integuments. The external consists of two layers: the epidermal, and the ligneous layer which lies deeper. Of the epidermal layer, individual bright black cells only are preserved in the fossil state. The ligneous layer of the external integument is represented on the ventral side, by a single layer, 4–6 cells deep, of angular cells with very thick walls. Passing from the base of the valve along the ventral side over to the dorsal side, this thick layer splits into two layers; the space between being filled up by an inter-}

**Text-fig. 1.**

**Text-fig. 2.**

**Decodon verticillatus Ell.**

Fig. 1.—Longitudinal section of living seed. X 27. Original.

Fig. 2.—Transverse section of living fruit, showing the disposition of the seeds within the capsule. X 5. After Koshche.

leading features neither morphologically nor anatomically from the recent seeds of *Decodon verticillatus* Ell. of the family Lythraceae (PL 589, figs. 2, 4, 6; text-fig. 1). The external epidermal layer of the recent seeds is a swollen layer. It is especially strongly developed in the valve and quite conceals it. Such a possibility was suggested by C. and E. M. Reid to account for the difficulty in tracing the living ally. It is observed that frequently the fossil seeds have the external hard part of the woody dorsal layer thicker than the internal, while the external layer of the recent seeds is thinner than the internal. The outline of the lateral margins of the living seeds is either concave or straight. Of the fossils is either convex or straight (PL 589, figs. 1–4). The length of the recent seed is 1.5–1.7 mm., the breadth 1/3 mm. The fruit of the recent plant is a dry 3- (or 4-) celled capsule with 20–30 seeds. The diameter of the capsule is 5–6 mm. (text-fig. 2).
The differences in form, size, and testa, referred to above, are persistent both in the fossil and recent seeds. My original supposition that these differences might possibly be due to there being two living varieties (of which I may have seen but one) was proved not to correspond with facts (see note by Mrs. Reid). It appears therefore that though closely related and possibly ancestral to the living species, *Diclidocarya globosa* differs from it in certain features which are probably specific. Hence while it retains its specific name, it must be referred to the living genus *Decodon* as *D. globosa*.

*Decodon verticillatus* belongs to a monotypic genus, but is represented at the present day by two varieties. It is found only in North America: in Canada and the Eastern and Northern United States within the borders of Quebec-Ohio-Wisconsin-Missouri-Mississippi-Florida (7, p. 249).

I am obliged to Mrs. Reid for her valuable help and criticism in this work and I thank her very warmly.

**Note by Mrs. E. M. Reid.**

Mr. Nikitin's paper shows by what observations he was led to deduce that the fossil seeds named by me *Diclidocarya globosa* (4, p. 80) must belong to a sub-aquatic, not an aquatic plant, and further how his clever deduction, coupled with observations of the grouping of the seeds *in situ* and the character of the seeds themselves, led to his discovery that they were closely related to the fruits and seeds of the living species *Decodon verticillatus* Elliot. The news of this solution of a long-standing puzzle has given me the liveliest satisfaction. It is of interest in that it forms another indisputable link connecting the flora of North America with the Tertiary Flora of Western Europe, and that it carries this linkage into the heart of Russia. It is of especial interest to me, because it confirms a suggestion made by me in 1920 (4, p. 80) as to the probable character and habitat of the plant to which the seeds belonged.

Mr. Nikitin placed his manuscript in my hands, and agreed to its publication in England, a desirable course, as all the previous work on the subject has emanated from England; I have made a transcript of his paper so as to revise the English, but in so doing, hope I have kept his exact meaning. He has himself revised my revised transcript.

I received the manuscript whilst I was working at Kew, and at once examined the seeds of *Decodon verticillatus*. There can be no doubt of the accuracy of Mr. Nikitin's determination of *Diclidocarya globosa* as a species of *Decodon* closely related to *D. verticillatus*, but not identical with it. He originally suggested that a slight difference in the relative thickness of the outer and inner layers of the ligneous coat in the fossil and recent seeds and differences in form might correspond to similar differences in the two varieties of the living species. I was, fortunately, able to consult Dr. H. A. Gleason, of the New York Botanic Garden (who was then working at Kew), upon the subject. He not only gave as his opinion that the so-called varieties are not true, but depend on local edaphic conditions, but most kindly obtained for me the opinions of Mr. Percy Wilson, of the New York Botanic Garden, and of Mr. Ivan Johnston, of the Gray Herbarium, Harvard University, that there is no difference discernible between the fruits and seeds of the two varieties.

It seems, therefore, that the differences to which Mr. Nikitin draws attention must be regarded, like the difference in size and form, as specific.

The species *Decodon gibbosus* E. M. Reid (*Diclidocarya gibbosus* E. M. Reid), from Pont-de-Gail, is more unlike the living species *Decodon verticillatus* Ell. than is *D. globosa*. *D. verticillatus* is broadly triangular in section, the ventral face being the broadest, as in *D. globosa*; *D. gibbosus*, on the contrary, is narrowly triangular in section, the ventral face being the narrowest. It is further to be noted that, whereas *D. globosa* is known to range from the Miocene to the Upper Pliocene and has been found in many districts in Central and Western Europe, *D. gibbosus* is known only from the Mio-Pliocene of Point-de-Gail (Cantal).

*Diclidocarya Menzelii* E. M. Reid, from the Steinfurt Miocene, which I had placed in the same form-genus, although agreeing in general structure with *Decodon*, shows a striking difference in the disposition of the spongy cells as well as a slight difference in the form of the valve, which, instead of being continuous at the base with the body of the seed, as in *Decodon verticillatus*, *D. globosa*, and *D. gibbosus*, is separate from it. This raised a doubt in my mind whether *Diclidocarya Menzelii* ought rightly to be referred to the genus *Decodon*, or might not perchance belong to some allied genus. I therefore again examined the Lythraceae from this point of view, studying the living species in the Kew Herbarium, and referring to Koch's monograph on the family (1). There is no other living genus to which it could be referred. None have the peculiar valve seen in *Decodon* and, in a modified form, in *Diclidocarya Menzelii*. Also, none combine the same size, form, and character of testa. It cannot therefore be referred to any other living genus. The question remains as to whether it should be regarded as being to an extinct genus. In view of our extended knowledge of the genus *Decodon* with its now-known three species, one living and two extinct, it is possible to state that in this genus the valve is never discontinuous all round, but only at the sides, being continuous with the rest of the testa at the top of the fruit. Also the spongy cells are always disposed dorsally as well as laterally. In *D. Menzelii* they are lateral only. Such differences in the light of more intimate knowledge must be regarded as generic. Therefore, whilst *D. globosa* and *D. gibbosus* now pass into the living genus *Decodon*, the fossil name *Diclidocarya* may be retained for the extinct, but closely allied, genus represented by *D. Menzelii*. 
ON SOME VARIETIES OF ROSA TOMENTOSA (SCABRIUSCULAE).

BY LT.-COL. A. H. WOLLEY-DOD.

I HAVE endeavoured, without any great measure of success, to clear up the doubt which has surrounded the name of R. britannica Désgl., and its allies R. Jundzilliana Baker, on Bass., and R. tomentosa var. sylvestris Woods. In order to get all the light I can throw on the question, I have examined all the specimens at Kew and at the British Museum (both in the British and Désglise's herbaria), and those in Herb. Bailey, kindly lent me for the purpose by the Curator of the Botanical Department of Manchester University.

Taking R. Jundzilliana Baker first; there are five distinct gatherings, covering three different varieties to which this name has been applied in the specimens seen, four of them by Baker himself, these all in July 1864, but only one of them has the day of the month on the label, so that it is not easy to trace the sequence of events which led up to the adoption and subsequent dropping of the name. The labels of the five specimens are as follows:—

1. At Kew. "Rosa Jundzilliana (Bess.). By the bridge over Greasy Brook, road between Moreton and Hoylake, Cheshire, July 1864." The label was written by Webb, who collected the specimen, but there is no doubt that he got the name from Baker, who wrote on the sheet "Original of R. britannica of Désglise, now identified by him with fatida Bast." The note is not dated.


The remarks by Baker on No. 1 are of the greatest importance, and might be taken as conclusive evidence, but there is no duplicate of it in Herb. Désglise. I know of no instance in the whole genus in which a specimen seen by Désglise is not to be found in his herbarium, and is not mentioned specifically in Cat. Rais. Désglise certainly saw Nos. 2 and 4, and the defect of No. 1 gives me very strongly the opinion that his opinions were based upon the two former and not upon Cheshire specimens. The "Burton, Cheshire" specimen from Webb, mentioned in the note under R. fatida on p. 304 of Cat. Rais., is misleading. The station is Newton, not Burton, and the specimen, so far as evidence on the sheet is concerned, was never referred to Jundzilliana, though there is good reason to suppose that it came from the same station as No. 1. It was collected in 1872.
I have therefore concluded, though not without a strong element of doubt, that it was to Baker's No. 11 from Studley (No. 2 of above list) that Desgloise proposed the name of *R. britannica*, and that the note on No. 1 should have been written by Baker on No. 2.

In Fl. Chesh. 122, Webb writes: "The plant found by Mr. Fisher and myself about 1863, and described under the name *R. Jundzilliana* of Baker, *Roses*, 21, and in E. B. ed. 3, grew by the road between Moreton and the Oak (sic, ? Carr) Houses on the way to Hoylake, also by a bridge over the Birken; the bush was destroyed when the road was widened. A portion transplanted to a hedge near Clapham Village still exists, although the main stems have been carried away for "standards." I think it worth while giving these particulars, as I do not consider the Newton Heath plant or any of the other "sylvestris" I have seen to be the same as the "original plant." Webb is wrong in his opinion. The Newton Heath plant is identical with No. 1, but may not have come from the same bush.

In a note following the description of *R. Jundzilliana* Bess. in The Naturalist, 1864, 21, Baker says: "Gathered by Mr. F. M. Webb and Mr. H. J. Fisher in a hedge near Moreton, Cheshire, only one bush actually known. The Cheshire plant agrees well with my specimens of the French plant from M. Desgloise... He then proceeds to give certain differences from *R. tomentosa* and *R. Borrorii*, the two he thought it came nearest to. This note was published July 1st, 1864, so must have been written earlier. It will also be noticed that Webb writes of finding the rose "about 1863." Without these two dates it might be difficult to understand why Baker said only one bush was actually known, since he knew of all five specimens, from four different stations, in July 1864, when the remark was published, and therefore presumably too late to correct it.

I have seen no specimens of this aggregation of varieties collected between 1864 and 1871, but it would appear that the name *Jundzilliana* was dropped in the former year, and *R. britannica* substituted for it, and from then confusion as to its application began. Not only were Cheshire specimens differing from the Moreton variety so labelled, but others from other districts, notably the Menai Straits rose and that from Studley. I will deal with these presently.

The name *R. britannica*, though first published by Baker as a synonym of var. *sylvestris* in the *Monograph* (1860), does not appear to have been used in Britain till 1871, viz.—"*R. tomentosa* var. *R. sylvestris* Lindl., *R. britannica* Desglois. MS.—Bank of Menai Straits, Bangor, Carnarvon, leg. Harbord Lewis, July 25, 1871," in Herb. Bailey, duplicate in Herb. Rogers. It was again used for the specimen cited by Desgloise from "Burton," the label of which in his own herbarium reads: "By the bridge at Newton Heath on the road Grange to Frankby, Cheshire, leg. F. M. Webb, Aug. 80, 1872." It appears again on various specimens which it is unnecessary to detail.

In Journ. Bot. 1907, 209, Ley makes *R. britannica* a variety of *R. cuspidatoides*, but his description of the latter species would cover several varieties of *R. tomentosa*. His note on "*var. britannica*" is quite correct as far as it goes, but he allowed considerable latitude in his interpretation of it, and has so labelled specimens from various counties which do not in the least resemble the Moreton Rose. His own description of *var. fatida*, also under *R. cuspidatoides*, shows that he did not understand the special form from Moreton. I think, therefore, that his name may be disregarded as a *nomen confusum*.

In Journ. Bot. 1920, Suppl. 16, I revived the name of *britannica* with a short description to cover both the Moreton and the Menai Straits varieties. The description, as it stands, would do very well for the former, but not for the latter, to be described below. I therefore admit confusion in my own mind and think my name should also be dropped.

Finally, Boulenier, in *Roses d’Europe*, i. 339, uses the name *R. tomentosa* v. *britannica* (Desglois) W-Dod, citing *Jundzilliana* Baker non Bess., *R. fatida* Bast., and other names as synonymous. But his description, which he says is drawn up from living specimens, and which is apparently a reproduction of his own of *R. britannica* in Journ. Bot. 1920, 185 (five months after my own publication) shows that it was based upon Surrey specimens, the Cheshire one having been extinct for many years. It would not be a bad description of the Moreton rose, but is not accurate, nor does it bring out the special features of that variety. On the other hand, it is so obviously a description of my var. *Brittonii*, essentially a Surrey and W. Kent variety, that it is surely drawn from "living specimens" of that. There is certainly a close connection between var. *Brittonii* mini and the Menai Straits rose, which latter has been confounded by most botanists, including myself, with the Moreton "*Jundzilliana*," but from which it is clearly distinct.

I propose, therefore, to discard the name of *britannica* altogether as a *nomen confusum* and to describe two new forms as follows. I hesitate to give either full varietal rank:

- *R. tomentosa* Sm. var. *sabriuscula* Sm. form. nov. *Locii*. Prickles few or none, rather slender, straight or declining from short bases; leaflets large, regularly elliptical, dark green, glabrous above, thinly pubescent on midribs and primary nerves beneath, suboblong glands few; petals glabrous or nearly so, densely glandular and with numerous very small but stout prickles; peduncles long, densely and rather strongly glandular-acuminate, usually about three in a cluster; sepals dark-coloured, intensely glandular, spreading or even suberect, longer persistent than in var. *sabriuscula*: fruit variable, from subglobose to ellipsoid, usually roundish ovoid, with scattered glandular and eglandular seccles; styles glabrous.

The description does not greatly differentiate it from var. *fatida* f. *moretonensis* on the one hand and from var. *Brittonii* on the other, but I consider it to be distinct from both. I name it after its first discovery.

Hab. Banks of Menai Straits, near Bangor, Carnarvon. A specimen from Penmaenmawr, in the same county, distributed by me as No. 1447 in 1906, is very near this, but differs in its reflexed sepals and more fully biserrate, narrower, and less glandular leaflets.
R. tomentosa Sm. var. fasciculata Bast. form. nov. moretonensis. Prickles on the flowering-shoots rather slender, curved or straight, and declining from a rather short base, those on the barrens shoots very strong and large; leaflets large or rather large, oval, acute, not acuminate, with rounded base, those on the stronger barrens shoots very large and broad, all strongly glanduliferous; pubescent both sides, rather more densely beneath, but harsh, not soft, with rather numerous though small subfoliar glands; petioles pubescent, rather densely glandular and prickly; stipules very strongly glandul-ciliate, but nearly naked on backs; peduncles usually in clusters of three to nine, rather long, longer than the fruit, densely clothed with stipitate glandular or glandular-acicile which are not very long; fruit oblong-ovoid, clothed as in the peduncles but less densely so; sepals very dark, spreading horizontally on fully-formed fruit in July, densely glandular and considerably pinnate; styles short, glabrous or sub-glabrous.

It resembles var. Brittoni, but is much more compact with closer-set darker green leaflets, and is much more prickly and darker coloured. Its peduncles, though longer, are not so long, and the leaf-serration differs. Its general appearance is very different, but the characters are not easy to describe.

Hab. Moreton, Hoylake, Newton Heath, Woodchurch, and Cloughton, all in Cheshire, but the first three stations may be identical. It has not been collected for many years and is certainly extinct at Moreton, but may exist at Cloughton or Woodchurch.

The Studley and Boltoth Roses, which have been labelled R. britannica and R. Judasilliana, I believe to be pure var. sylvestris Woods, as did Baker.

SENCIO ERRATICUS BERTOLINI IN BRITAIN.

By Eric Drabble.

In August 1925, a large Senecio was found near Brockenhurst in the New Forest, which was so obviously different from S. aquaticus that I thought it might be S. erraticus Bert., especially as a plant gathered by Mr. C. Trapnell in 1923 had been so named. In September 1928 similar plants were found at Freshwater, Isle of Wight. After careful comparison with published descriptions, my opinion was confirmed. These plants were so unlike aquaticus that there seemed to be little likelihood that they were what Dr. Duce has called S. aquaticus var. intermedius. Dr. Duce kindly examined a specimen and stated that it was not his var. intermedius, giving his opinion that it was erraticus.

The differences between aquaticus and erraticus are well brought out by Rouy (Fl. France, viii. 386):—

S. aquaticus Huds. "Feuilles inférieures ovales ou lancolées, inégalement dentées ou lyrées, à segment terminal très grande, subcordé ou largement tronqué, subtriangulaire, se rétrécissant de la base au sommet; feuilles caulinares à segments latéraux obliques, oblongs

ou linéaires, entiers ou à peine dentés; pédoncules courts, assez épais, étalés ou ascendants; calathides de § env. plus grandes que dans le S. erraticus."

S. erraticus Bertol. "Feuilles inférieures profondément lyreées, à segment terminal très grande, cordé, tronqué ou à peine atténué à la base, arrondi au sommet, ovale ou oblong; feuilles caulinares à segments latéraux étalés à angle droit, oblongs, dentés, pédoncules divariqués, grèles; calathides petites."

Coste (Fl. Fr. ii. 30) also gives the differences clearly. S. aquaticus is described as having the "rameaux du corysme étalés-dressés; lobes latéraux de feuilles caulinares oblique," while S. erraticus is stated to have the "rameaux du corysme étalés-divariqués; lobes latéraux des feuilles caulinares écartés de l'axe à angle droit."

Brebisson (Fl. Normandie) rightly calls attention to the larger number of slender, open and divaricate branches in erraticus. Indeed, this is a leading feature of erraticus, and is well shown in the photograph of Dr. Duce's New Forest plant in Rep. B. E. C. 1927, where, however, the form of the leaves cannot be clearly seen.

Reichenbach, Icones Fl. Germ. et Helv. cmlxiv. i., illustrates a small portion of true S. erraticus, while Icon. cmlxv. ii., (as S. barbarafoiuis Krock.) is S. aquaticus var. pennatifidus G. & G. This figure is quoted by Rouy, Fl. Fr. vii. 377, as S. barbarafoiuis Reiccl., since Krock only refers to S. barbarafoiuis, which, as Rouy rightly says, does not constitute a binary name. S. barbarafoiuis Wimm. et Gmb. Fl. Siles. iii. 151 (now Reiccl.) is S. erraticus Bertol.

The undermentioned sheets in Herb. Mus. Brit. are S. erraticus:—

Billet, Fl. Gall. et Germ. 1894, Vendée, Aout 1855.

Herb. Hiehlreich, ad ripas Libitiam, Aug. 1848.


Fl. Lusitan. exsic. 272; Espinho. Leg. A. Moller, Sept. 1886 (as aquaticus).

A short description of the Freshwater and Brockenhurst plants may be useful:—

Plant tall (up to 13 dm. when growing in shade), profusely and sinuously branched. Leaves very deeply pinnatifid, the lateral segments spreading at approximately a right angle. Lower leaves with large ovate obtuse basally truncate or sub-cordate terminal segment and few short slender lateral segments borne on a long scarcely winged midrib. Intermediate leaves large (up to 25 cm. long), usually about half this size), with about four oblong or spatulate entire or irregularly toothed lateral segments, terminal lobe large ovate and truncate-based. Upper leaves less divided and with narrower oblong toothed terminal segment. Flowering branches very numerous, widely divaricate slender long (up to 4-5 dm.), forming a very loose open cymose corydb. Capitula smaller than those of typical aquaticus. Fruits in my specimens mostly slightly hairy on the ribs, a few glabrous when ripe.

The characters which readily and at once distinguish this plant
from *S. aquaticus* var. *penнатifidus* G. & G. are its great height, the very long slender widely-spreading flowering branches, the generally smaller capitula, the shape of the terminal lobe of the leaf, and the lateral segments spreading at approximately right angles.

It is unnecessary to recapitulate the history of the plant (and the name) in this country, as Dr. Druce has done so recently (see Rep. B. E. C. 1917, p. 36-36; 1919, pp. 771-2; 1929, pp. 39-60; 1935, pp. 99-7; 1927, p. 308).

With regard to the relationships of *erraticus* a few words may be written. It is clearly related to *aquaticus*, but is at once distinguishable even from extreme forms of *penнатifidus* by the characters mentioned above. Whether it should be given specific rank can only be a matter of opinion in the present disturbed and uncertain state of the species problem. The late Dr. Thellung thought it impossible to draw a sharp line between *aquaticus* and *erraticus*, but with this view I cannot agree. The plant is quite distinct from any form of *aquaticus* with which I am acquainted, and in my opinion, it should not be placed as a variety of that species by the side of *penнатifidus*. Dr. Druce (Rep. B. E. C. 1927, p. 308) has given the name var. *intermedius* to the larger plants of the "*penнатifidus" type. Babington at one time thought that certain large plants of *aquaticus* were *S. erraticus*, but he later altered his opinion and described them as var. *major* in his *Manual* (1847). I possess a specimen labelled "*Senecio aquaticus* Huds. *S. major* Raf. Wood near Fillingely (sic), July 1854, T. K." This seems to be Babington's plant and it is certainly not *erraticus*. It would seem to be identical with var. *intermedius* Druce.

The only authenticated records of *S. erraticus* in this country appear to be the following:—Hampshire—Lynnhurst (*C. Trumpey*), Holmesby (*G. C. Druce*), Brockenhurst (*E. & H. Drabble*); Isle of Wight—Freshwater (*E. & H. Drabble*); Berkshire—Southcote, "not quite typical" (*G. C. Druce*).

**NOTES ON SOME SPECIES OF COMBRETUM FROM TANGANYIKA TERRITORY.**

BY A. W. Exell, M.A., F.L.S.

Among a valuable collection recently made by Mr. B. D. Burtt, Botanist (Tsetse Research), Game Department, Tanganyika Territory, are a number of species of *Combretum*, some of which were formerly known only from scanty material. The ecological notes made by the collector are here given in full, as they form an important addition to our knowledge of the climatic and edaphic conditions determining the distribution of the species concerned. The specimens referred to are in the British Museum Herbarium.

I have added, at the end, a description of a new species collected by the British Museum East Africa Expedition, at Tendaguru.

**SPECIES OF COMBRETUM FROM TANGANYIKA TERRITORY**


The fruits, hitherto unknown, are small, about 15 mm. long by 12 mm. across, with rather thin wings standing out at right angles and measuring up to 6 mm. across. Small distinct yellowish scales are present on the wings and more densely on the body of the fruit, which is otherwise glabrous.

Note.—"This species occurs locally in Tanganyika, being confined, as far as my experience goes, to the Great Itigi Thicket Belt, which commences approximately at Dodoma, on the Central Railway, and extends up the line as far as Olaya Station. The belt extends south of the railway for some 30 miles south of Manyore Station; but I am not sure of the exact southern boundary of this thicket area. Northwards the thicket extends in an almost unbroken belt which peters out between Singida Town and the Wambare Steppe. The Great Thicket attains its greatest width in the neighbourhood of Itigi Station. *C. Trotterae* is found generally throughout the thicket, but occurs in almost pure stands in the area north of Kazikazi, where it is dominant in small areas. It is a very much coppiced shrub, about 10 ft. high." [B. D. B.]

C. **Splendens** Engl. Kondoa Irangi District: Beruku, at about 5000 ft., No. 673; near Kingassi, at about 5000 ft., No. 1604. Warnangi name "Milima."

Note.—"This *Combretum* is characteristic of the micaeous sandy soils, of a reddish colour, which support the very extensive *Berlinga glabra* Harv—savannahs, known by the native term "miombo" bush. These "miombo" savannahs cover a very large area of the central plateau region from approximately 1500 to 4500 ft. *C. splendens* is especially common on the savannah slopes of the many escarpments—viz.: the Irangi Scarp, the Simbe Hills, the Cheneke Hills, the Bereku Ridge, and parts of the Great Rift Wall. "This species is usually a small tree up to 20 ft. high, but where the tree has been cut down it grows up as a loose-copied shrub. On the Irambi Plateau, near Mikala, the natives pollard the trees, using the young branches which result from the pollarding as fuel or building material. The flowers appear during the little rains (Nov.–Dec.) and the leaves mature after the flowers have been pollinated. The bark of the old trees is very rough, giving a reticulated appearance." [B. D. B.]


Note.—"This is a very large species growing up to 40 ft. high. The one locality I know of is near Kazikazi Station on the Central Railway. The tree is growing in reddish sandy micaeous soil, and has several young trees near it, up to 15 ft. high." [B. D. B.]
C. APICULATUM Sond. subsp. nov. boreale, foliis majoribus oblique late lanceolatis basi plerumque leviter cordatis.

Kondoa Irangi District: at about 4600 ft., No. 556; near Salia Lake, at about 4500 ft., No. 1120; near Konndaga, at about 4500 ft., No. 1224 (holotype); near Salia, at about 4900 ft., No. 1902; at Salanga, at about 5000 ft., No. 1603. Wanyanwezi name "Sibula."

These specimens from Tanganjika Territory differ from typical C. apiculatum in having much larger leaves, up to 14 x 5-5 cm., while those of the typical subspecies seldom exceed 8 cm. in length. It seems best to treat them, for the present, as two geographical subspecies whose ranges meet in Rhodesia. E. A. Rogers 5369, from Victoria Falls, Rhodesia, belongs to subsp. boreale.

Note.—A shrub, or small tree, up to 15 ft. high, on reddish sandy micaceous soils, occurring in a belt, or zone, between the Berlinitia-savanna and the grey-sandy soils ('semi-mbuga') of the semi-seasonal swamps. It is especially noticeable in the Singida-Mkalama areas which slope down to the Wembare Steppe. The wood is used by the natives for building. [B. D. B.]


Note.—A species occurring in a grey, sandy-clay soil bordering seasonal swamps which are called 'mbuga' by the natives. I refer to this type of soil formation as 'semi-mbuga' type, as it contains a floral formula of very characteristic type; such plants as Anecia spirocarpa Hochst., A. parviflora Roßh., Grevaia bicolora Juss., and Commiphora spp., being usual in this habitat. O. Fischeri is a small tree, 15 to 20 ft. high, flowering before the leaves have matured. [B. D. B.]


I can find no good distinction between C. Zedheri and C. oblongum, and cannot at present even make distinct varieties or subspecies of them.

Note.—"Occurs in a very similar habitat to C. apiculatum." [B. D. B.]

C. PARTIFOLIUM Engl. Singida District: near Manyangi, at about 4500 ft., No. 1381; from near Matelele to Iwumbu, at about 4000 ft., No. 1608. Wanyanwezi name "Mlowasi."

The fruits, not hitherto described, are up to 2.3 x 1.8 cm., with four rather thin wings, projecting at right angles and measuring up to about 0.9 mm. in width. The body of the fruit is densely covered with dark red scales which become sparse on the wings.

Note.—"A common species in the grey sandy-clay-soil area ('semi-mbuga') I have never seen it in any other soils. It is a copically shrub growing to 10 ft. high, with a very erect appearance, the stems being very tough and appearing white in the strong rays of the sun. The side branches are never very long and are usually of uniform size, giving the shrub a very singular aspect. The species is common in the Wembare region and south of the Central Railway, near Itigi." [B. D. B.]

C. OBOVATUM F. Hoffm. Singida District: shrubby bush, in dark soil area, probably the same species as the great climber of the riverine forest, near Matelele, at about 3700 ft., No. 737; great climbing plant of the Matelele riverine forest, at about 3750 ft., No. 1400; climbing liane of the Mwara River, also very common along the Iwumbu and Ugwandi Rivers, at about 3700 ft., No. 1921; great climbing liane of riverine forest, at about 4000 ft., No. 1922. Swahili name "Mgwobeko."

The fruits, hitherto undescribed, are about 3 x 3 cm., with five semi-rigid wings measuring up to about 1.2 cm. in width. The body of the fruit is covered with a short, fairly thick, greyish pubescence, the wings being sparsely puberulous to glabrescent.

Note.—"A species occurring in the 'riverine forest' along seasonal rivers, such as the Iwumbu River, which flows into the Wembare Steppe. I have also seen it near a small water-course in the Chencene Hills, between Kondoa Irangi and Dodoma. It is a climbing plant, boreal as a thick liane of about 8 inches in diameter near the base. It climbs to the tops of Tamarindus indicus L. and Piptadenia sp., trees over 60 ft. in height. The leaf-like bracts near the flower-heads are of a bleached whitish colour, presumably to guide insects to the rather inconspicuous flower-heads. [B. D. B.]


The leaves of this species, hitherto unknown, are ovate, up to 13 x 7 cm., abruptly and sharply acuminate at the apex, and rounded at the base. When very young they are covered with a beautiful dense silvery-sericious tomentum which persists to maturity as a soft indumentum on both surfaces of the leaf. Thorns up to 1.2 cm. long, covered with a greyish tomentum, occur on the older wood. These are apparently formed from the persistent bases of the petals.

Note.—"This is a common species in the dry area of the Territory, from the coast to approximately 3000 ft., where the soil is of a reddish sandy nature,—i. e., the areas dominated by Berlinitia obliqua Harms; also on the margins of the Great Itigi Thicket, and on the slopes of granite kopjes and rocky hills. The flowers usually appear
before the leaves. This species is a climbing plant growing over small shrubs of about 10 ft. high.” [B. D. B.]

C. trichopetalum Engl. Singhia District: a climbing plant reaching 25 ft. high, in Brachystegia woods, flowers white, tinged with pink, very attractive to butterflies, No. 542; a woody shrub 7 ft. high, flowers sweet-scented, white tinged with cherry-pink, in open savannah of Combretum-Mulidica type, on old "samba." Nature name "Gwoleko" or "Ngoleko."

No. 905, from the Konda Irangi Plateau, is very near to C. trichopetalum and may eventually be identifiable with it. It has longer inflorescences and prominent spines on the older wood. Spines have never been recorded for C. trichopetalum, perhaps because they are commonly absent from herbarium specimens which merely consist of flowering twigs.


Hab. TANZANIA TERRITORY: Tangukung, Miged 269 (in Herb. Mus. Brit.).

Shrub; flowers pink, with faint unpleasant smell; fruits pink.

Leaves 9-13 x 4-5 cm.; petioles 4-6 mm. long; spikes about 8 cm. long; lower receptacle 5-6 mm. long; upper receptacle 15 x 8 mm., measuring to the tips of the calyx-lobes; stamens, longer ones 20 mm. long, shorter ones 17 mm. long; style 6 mm. long.

This species, which appears from the dried specimen to be extremely beautiful, belongs to Sect. Trichopetalae Engl. & Diels. The axillary unilateral spikes borne in the axils of the leaves of the previous season relate it to C. longispicatum Engl. & Diels, from which it can be immediately distinguished by the almost glabrous leaves with a strong reticulation below, while those of C. longispicatum are sericeous-tomentose.
rotundatis tubo multo brevioribus; antheris inclusis; ovario oblongo; styllo crassiussculo basi leviter dilatato brevisimae exserto; stigmatum capitato.

Hab. Rain forest, Ihu, Vailala River; Brass. 944.

"Small, weak, branched tree 15 ft. high." Leaves (upper portion not seen) about 12 x 0.5 cm., drying brown, paler below; petioles shallowly channelled, 2-5 cm. long, the basal lamina 6 mm. long. Flowers white, sweet-scented. Peduncle about 4 cm. long; secondary peduncles a little shorter, ascending. Pedicels 2 cm. long. Calyx-tube 12 mm., lobes 13 mm. long, coloured terminal part of latter 6 mm. long. Corolla-tube 6 cm. long, 5 mm. broad, under the limb 10 mm. broad; lobes 22 x 12 mm. Ovary 10 x 3 mm. Fruit not seen.

In some respects imperfect, the specimen is good enough to yield a workable diagnosis. The affinity seems to be with E. macrodendron Gilg & Benedict. It is also near the recently-described E. novo-guinensis Cammerer.

Couthoria Brasili, sp. nov. Arborea glabra; ramosus ultimo compressis 3-4 mm. crass.; foliis sat longe petiolatis late ovatis apice rotundatis vel brevissime latisinuque cuspidatis basi rotundatis pergmeecis costis lateralis sat perspicuis utrique 5-7 percurrentibus; stipulis interpetiolaribus petiolis plane brevioribus ovatis obtusis costis albis basi brevissime fimbriatis ovatis; florum sessilibus axillarisbus; calyce multiflorum brevi acutum foliis brevissimis digestis; cyanis ad apicem rumorum tertii ordinis dense aggregatis; bracteis parvis ovatis obtusis; calyce quam corollae tubo brevior brevis late lobato; corollae tubo lobis triangularibus obtuseusculis paulo longiori intus olivello non aecollum insertionem pilosa-pulvinate; antheris basi brevior barbellatis; ovario late ovoide sulcato in stylo abrupte desinente; stigmatibus capitatis; fructibus angustae ovoides utrique attenuatis cornoide albido.

Hab. Karoma, Gulf Division, on low marshy ground; Brass. 1221.

"Small tree 15 ft." Leaves 12-16 x 8-10 cm., drying greyish green, opaque on both faces; petioles broad, 1-2 cm. long. Stipules 8 mm. long. Inflorescence 6 x 10 cm.; peduncle about 1 cm. long; primary branches 4 cm., secondary 2 cm., tertiary about 1 cm. long. Calyx 1 mm. long. Corolla-tube 2-3 mm., and lobes 1-5 mm. long. Anthers rather more than 1 mm. long, apiculate. Ovary and style 1 mm. long.

This is evidently allied to C. pachypoda Gilg & Benedict (well figured in Engl. Bot. Jahrb. liv. 179), which it greatly resembles in floral structure; but the larger and broader basally leaved leaves with much longer stalks and the apparently narrower stipules are points of difference easily recognised.

GESNERACEÆ.

Cytandra (§ Dissimiles) externa, sp. nov. Bracteis 4 mm. alt.; caulibus simplicibus subteretis transversum rugoso 5 mm. crass.; foliis (specie?) oppositis magnis subseriellis spathulato-obovatis dimidio

inf. angustatis dimidio sup. margine denticulatis apicem versus dentatis dimidio inf. integris chartaceis costis pag. utravis puberulis costis lat. utrique circa 22 uti costae media subitus eminentibus; floriis magnis pedicellatis in fasciculis paucifloris digestis; bracteis 2 calyce breviores brevioribus inter se liberis ovato-lanceolatis acutis glabris; calyceis segmentis oblongis obtusis 2 arculo basi usque liberis posticis 3 in unum latum 3-fidum connotatis; corolla calyce aquilonga ore obliquis labio postico breviter 2-lobo antico usque 2 in lobos late ovatis diviso; staminibus juxta medium tubum corollae insertis; staminodis hau diversis; disco prominenti; ovario glabro in stylium longum complanatum apice papillosum desinente; stigmatibus peltatis.

Hab. Hohora, Vailala River, rain-forest plains; Brass. 1048.

Leaves (said by the collector to be opposite, but one of the pair is not to be seen and perhaps may be represented by a raised line) 44 cm. long, in upper part 13 cm. wide, in the lower 8 cm., and about 2 cm. at base; midrib broad, especially near the somewhat scurfy base; petiole broad, somewhat scurfy, about 1 cm. long. Flowers three together on 1 cm. long glabrous pedicels. Bracts 3 cm. long. Calyx 4-5 cm. long; lobed portion 17 mm. wide with lobes about 8 mm. long; free segments 7 mm. wide. Corolla "greenish yellow, streaked and dotted with red"; antiscus lip broadly obvolute, lobes ovate, about 8 mm. long; posticus lip not seen entire in the expanded state. Filaments (in bud) 5 mm. Anthers 4 mm. long. Disk dentate, 2 mm. deep. Ovary 4 mm., style 3 mm. long. Berry not seen.

Judging from Clarke's imperfect description (Monog. Cyrtand. 254) of an unsatisfactory material, this must be near C. Albertisii Clarke. The leaves of both must be very like, but those of the latter are said to be smaller and have fewer lateral nerves villous on the underside, the flowers are saccate, and the much smaller calyx is split down one side only. Other differences will probably appear when better material comes to hand. C. Wentiana Laut. has much superficial resemblance; but its strongly-toothed leaves are differently shaped, the bracts are longer and tomentose, and the calyx is tubular besides other differences.

New Species of Acanthaceæ from Rhodesia.

By S. Moore.

In the Journal for 1926 (pp. 301-307) a small collection, made in Rhodesia by Dr. R. F. Rand, came under notice. To the new species there described the following must be added:

Lepadathis (§ Neura-kanthesis) persimilis, sp. nov. Herba spathacea; caulibus sursum perpaucifloro puberulis; foliis petiolatis oblongis vel angustae oblongo-ovatis obtusis basi obtusis supra glabris subut in nervis puberulis; cyanis sessilibus axillarisbus vel terminalibus puberulis glabris; foliis florabilibus pubes ovatis acutis inter se

2 2
leviter inequallibus; calycis segmentis folia floralis facile superantibus segmento postico anguste ovato-oblongo acuto longitrusum obscure nervoso segmentis anticus postico equilongis oblongis breviter acuminatis lateralis lobis catoria paullu longioribus lineari-lanceolatis apice breviter aristatis segmentis omnibus fusco-brunneis; corolla tubo juncto medium leviter attenuato dimidio sup. dilatato labii antici lobis intermellii suborbiculari lobis lateralis ovatis obtusissimis labio posteriori antico breviori suborbiculari apice rotundo; antheris posticis 1-localibus; ovulis pro loculo 2.

_Hab._ South Rhodesia, Miami, April 1926; _R. F. Rand, 77._

Leaves mostly 3–4 x 1–1.5 cm.; lateral nerves very few, prominent; cystoliths fairly conspicuous; petioles 3 mm. long. Gymnos (with flower expanded) about 1.5 cm. long. Floral leaves 5–6 mm. long. Posticus calyx-segment 3 x 3–5 mm.; anticus segments 4 mm. long, barely 3 mm. wide; lateral 11 x 1–6 mm. Corolla pale purple; tube 11 mm. long, at bottom 3 mm. wide soon narrowed to 2 mm.; in the upper half of 5 mm. wide; lower lip 7 mm. long, upper 5 x 5 mm. Filaments of anticus stamens 4 mm., of posticus 3 mm. long. Ovary barely 2 mm. long. Style glabrous, 11.9 mm. long.

Very like and, until examination of the inflorescence, might easily be mistaken for _L. Gossweileri_ S. Moore, from Angola, which has, _inter alia_, differently shaped, larger and strongly-nerved floral leaves, ovate obtuse anterior and posterior calyx-lobes, and corolla-tube enlarged only just at the mouth instead of halfway up.

**OBITUARIES.**

_Daniel Alexander Boyd_ (1855–1928)

_Daniel Alexander Boyd_ was born at West Kilbride, Ayrshire, in January 1855, where he lived until 1912, when he moved to Saltcoats, dying there on October 8th last. He was a son of the manse, and was trained as a writer but never practised, devoting himself to the study of archaeology and natural history. He had an excellent all-round acquaintance with natural history, but was best known for his field-knowledge of microfungi. He added very many species to the British flora and discovered several new to science. These he did not himself describe, but sent principally to Miss Lorrain Smith, though he was ready to oblige anyone working at special groups. For himself he was contented to write general accounts of the microfungi of his beloved Clyde area, the last article being contained in the British Association Handbook of the Glasgow Meeting, where the statement concerning _Ovularia_ and _Ramularia—_"The number described by Massee [British Fungus Flora] extended to thirty, the total has now been increased to not less than thirty-three species"—for the Clyde area alone—indicates the intensive work he had accomplished. Probably no area of the British Isles has been so well worked.

I had hoped to meet him at the Scottish Cryptogamic Society's Foray at Troon after the Glasgow meeting, but he was too ill to appear or even to be visited. I had met him at Forres in 1912, when he had astonished us all by the facility he showed in finding microfungi. In my opinion he was our best field-man in this line, and a letter from him, always in a neat small hand, was sure to contain peculiar information. About six years ago he had a serious illness which interfered greatly with his activities, but recently he had again become busy, and it was hoped that he would write up some of his field-observations. He was quiet, courteous, and unassuming, and was beloved by all who knew him. His name is preserved in the genus _Raydia_ A. L. Sm., and in several specific names.—_J. Ramsbottom._

**WILLIAM GARDNER SMITH**

(1866–1928)

_William Gardner Smith_ was born at Dundee on March 20th, 1866, and died at Edinburgh on Dec. 8th last. He graduated in science at St. Andrews, and, after teaching for a short time, lectured on Agriculture for the Forfarshire County Council, and afterwards demonstrated in Botany at Edinburgh University. He went to Munich and worked under Tubef for his Ph.D. His thesis, Untersuchung der Morphologie und Anatomie der durch Exoecen verursachten Spross- und Blatt-Deformationen, was a very able piece of mycological research, and had the unusual compliment paid to it of being translated into Italian. Smith followed the example of many botanists of his period and translated his German Professor's book. The English edition appeared under the title _Diseases of Plants induced by Cryptogamic Parasites_; the book was something more than a translation, and is still much used. The preface is dated 1896, from the Royal Botanic Garden, Edinburgh, where Smith returned for a short period as a junior lecturer in Botany. He was then appointed lecturer in Botany in the Department of Biology at the Yorkshire College, Leeds, under the late Prof. L. C. Miall. It was whilst at Leeds that Smith became interested in ecological plant-geography—although he always retained his interest in microfungi. Smith's brother, the late Robert Smith, had studied under Professor Flahault, of Montpellier, and had imbibed the spirit and the methods of this acute plant-geographer. On returning to Scotland he published his Geographical Distribution of Vegetation in Scotland: I. Edinburgh, and II. Perthshire District. Robert Smith himself died in 1898, and his mantle fell on his brother.

W. G. Smith then published Geographical Distribution of Vegetation in Yorkshire, I. Leeds and Halifax District, in collaboration with C. E. Moss, and II. Harrogate and Skipton District, in collaboration with W. M. Rankin. Moss and Rankin were both students of Smith at Leeds.

The Central Committee for the Survey and Study of British Vegetation was founded in Smith's house at Leeds in 1894, and Smith was the secretary of this Committee throughout its whole existence. When in 1912 the committee was translated into the British Ecolo-
Sir William Turner Thistleton-Dyer
(1848–1928).

The death of Sir William Turner Thistleton-Dyer* in his eighty-eighth year, on December 23, removed a dominant figure in the botanical world of the later decades of the last century and the earlier years of the present. Born in Westminster in 1848 (July 28), he was educated with a view to succeeding his father in his medical practice, but at the age of twenty left King's College, London, and entered Christ Church, Oxford, as a Junior Student. In 1867 he obtained a second class in the final school of Mathematics and a first class in the final school of Natural Science. In 1868 he was appointed to the Chair of Natural History at the Royal Agricultural College at Cirencester, where he collaborated in the production of an edition of a text-book, How Crops Grow.

An active interest in British botany found expression in the Flora of Middlesex (1869), in which he assisted Henry Trimen, a friend of his medical-student days, who had just joined the Department of Botany of the British Museum. It is interesting to note that at the time of this appointment “two young men of promise were anxious to obtain botanical work, and it was after much deliberation that Dr. Trimen rather than Mr. Dyer was chosen for the post” (Journ. Bot. 1896, 183). In his obituary notice of Henry Trimen (ibid, 1896, 489), Mr. Britten also refers to his introduction to Mr. Trimen and Mr. Dyer in 1864 at a meeting of the Society of Amateur Botanists, of which Trimen and Dyer were the leading spirits.

The Flora was in form and arrangement a distinct advance on previous works of this character, being a development of the model initiated by Babington. In 1870 Dyer went to Dublin as Professor of Botany at the Royal College of Science, but after two years returned to London, where he joined the Royal Horticultural Society, which then occupied the old Exhibition Grounds at South Kensington, as its Professor of Botany. His talks on “plants of interest in the show” were an educational and much appreciated feature of the meetings of the Society at that time. Meanwhile, Huxley was developing the Normal School of Science at the new building in the Exhibition Road, and Dyer was invited in 1873 to conduct a course of instruction in botany. In the Preface to the Course of Practical Instruction in Botany, by Bower and Vines (1868)—the outcome of this introduction of modern laboratory methods into the teaching of botany in this country.—Dyer gave an account of the origin of the work which he undertook with the assistance of Prof. Lawson. He writes: “We had the use of Professor Huxley’s convenient and well-appointed laboratory, and we determined to attempt a course of instruction which should embrace the leading morphological facts of every important type in the vegetable kingdom . . . . in fact, to adopt exactly the same plan of work as Professor Huxley in his own teaching had found convenient for the animal side of morphology.”

A further contribution to the inauguration of the new era in botanical teaching was the translation of Sach’s classic Text-book of Botany (1875), in which he was associated with A. W. Bennett. In 1876 Dyer gave up active teaching work and became Assistant Director of the Royal Gardens, Kew, under Sir Joseph Hooker, whose eldest daughter he married two years later. But his influence in the teaching world continued, and his support was eagerly sought by aspirants for University and other appointments in botany. For thirty years he devoted himself to the administrative work of the Royal Gardens, succeeding Hooker as Director on the retirement of the latter in 1886. A great organiser and administrator, he developed the various departments of work initiated by the Hookers, father and son. The Imperial side of Kew was a special obsession; he worked to make the Royal Gardens the centre of information in matters of economic botany for the overseas parts of the Empire, and a medium for the interchange of plants and seeds. An example was the foundation of the East Indian rubber trade by the introduction to Singapore from Kew of plants germinated from South American seeds. His reference to “the burden of Empire” which “we feel so heavily at Kew” was not in the nature of a complaint, but rather an expression of the recognition of his efforts.

Among special results of his activity at Kew may be mentioned the extension of the Herbarium, the building of the Jodrell laboratory for botanical research, the formation of a Forestry Museum, and the initiation in 1887 of the Kew Bulletin of Miscellaneous Information, a periodical publication for the record of work done at Kew and of items of interest in connection with the numerous associated overseas botanical establishments.

* The hyphen was assumed about 1891.
Two important Floras, the *Flora Capensis* and the *Flora of Tropical Africa*, the publication of which had been in abeyance, were resumed and carried towards completion under his editorship. A fuller appreciation of Dyer's work at Kew will doubtless be given elsewhere.

In the extra-mural activities incidental to a man of his position and calibre, Dyer took a full share. For many years he was at the centre of most movements in biological science, and his services were recognised by honours from universities and scientific societies at home and abroad. He was elected F.R.S. in 1880, and was a Vice-President 1896-7; he resigned his fellowship in 1917. He joined the Linnean Society in 1872 and remained a Fellow until his death. In 1890 he was nominated for the Botanical Secretaryship, but the late Dr. Daydon Jackson was elected.

Dyer served for two periods on the Council of the British Association and presided over the section of Biology (D) in 1888, and was the first president of the new Botany Section (K) at Ipswich in 1895. At the Cambridge meeting some years later he was one of the recipients of an Honorary Doctorate from the University. He also received numerous other honours, including the K.C.M.G. in 1899.

The burden of official and other duties left no leisure for protracted scientific research, but his frequent communications on matters of general scientific or botanical interest to *Nature*, the *Annals of Botany* (in the editorship of which he shared for a time), and other journals, gave evidence of wide knowledge and a close touch with things, and were marked by a clearness of exposition. His biographical notices make excellent reading; we recall, for instance, his "Eulogy on George Bentham" at the Centenary Anniversary of the Linnean Society in 1888, and his appreciation of John Ball in this Journal in 1895.

After his retirement from Kew in 1905 he continued for a few years his advisory work to the Colonial Office, but practically retired from active association with botanical work, removing to Whitcombe, in Gloucestershire, where he spent the remaining years of his life. Here he found leisure for the development of his interest in the botany of the classics. Sir Arthur Hort acknowledges his help in the identification of the plants in his edition and English translation of Theophrastus's *Enquiry into Plants*, 1916; and a writer in the *Times* of Dec. 81 last refers to the invaluable services which Dyer rendered to Greek lexicography by his identifications of ancient plant-names. He also supplied the section on "Flora" to the *Companions to Latin and Greek Studies*, issued by the Cambridge Press, and edited by Sir J. E. Sandys and L. Whibley respectively.

The younger generation of botanists would find it difficult to appreciate the respect and deference accorded to an individual such as were given to the subject of this notice, and which did not tend to the amelioration of a naturally autocratic disposition. As might be expected, resentment was on occasion provoked, especially on the part of senior men. But, though my earlier years at the Museum coin-
SHORT NOTES.

THE BIOLOGICAL EQUIPMENT OF SPECIES IN RELATION TO
COMPETITION.—Dr. Salisbury, in his presidential address to the
Ecological Society, considered how far it is possible to analyse the
factors of competition and to replace vague generalisations by obser-
vation and measurement. That the factors determining the dominance
of particular species may in some cases be due to causes incapable of
measurement with our present knowledge and technique was illustrated
by reference to epidemics among the higher plants and the close
parallel which these offer to the epidemiology of Bacteria, even to the
peculiar recrudescence demonstrated by Greenwood and Topley.

The much wider range of conditions tolerated by certain species in
cultures, free from competition, as compared with the same species in
the wild state, furnished striking evidence of the importance of com-
petition. Examples were cited showing that the habitat conditions
which determine the occurrence of species in nature may act either by
"selective stimulation" or "selective depression."

The prominent rôle played by potential height was shown by
reference to various arboreal species, by the competitive struggle
between Ulex europaeus and Pteridium aquilinum on the heaths of
Hertfordshire, and by the importance attained by species of naturally
low growth in communities of artificially restricted stature such as
pastures and lawns. The height-factor must, however, be considered
in relation to transluency of the foliage canopy and also the relative
phenology of the species concerned, respecting all of which the data
available are lamentably meagre.

Various examples demonstrating the intensity of root-competition
were furnished, and it was shown that the root-systems, of some
species at least, differ considerably both in form and branching when
grown in competition, whereby the struggle for water is accentuated.
The competition for water was shown to be further complicated by
the fact that some species produce at the surface humus highly
retentive of water, in such amounts as to bring about suppression by
drought of their deeper-rooted competitors.

The rôle of means of propagation was next considered, and Dr.
Salisbury provided data illustrating the importance of such features as
the seed-output and the rate of vegetative increase, as measured by
the "annual increment." With reference to the latter, the influence of
soil-texture was shown to be considerable, whilst the seed-output
had to be evaluated in conjunction with the normal percentage germi-
nation. It was shown also that the mode of germination might have
considerable biological significance, and three types were distinguished,
namely, "the simultaneous," "the continuous," and "the dis-
continuous."

The relatively greater importance of vegetative means of propa-
gation in closed communities and late stages of succession was
emphasized.

Stress was laid on the fact that these and other features con-
sidered, which are demonstrably of the first importance in estimating

the causes of frequency and dominance and all of which are capable
of accurate presentation, are nevertheless aspects concerning which
our knowledge is as yet extremely scanty.

RUSSIAN BOTANICAL CONGRESS, 1928.—In the Berichte d.
Deutsch. Botan. Ges. 1928, Generalversamml.-Hft. 124, H. Gams,
who states that he was the only Central European participant in the
recent Russian Botanical Congress in St. Petersburg in January 1928,
gives some account of the proceedings and incidentally an apprecia-
tion of the amount of plant-geographical work that is being done in
Russia. 825 members attended the Congress, which occupied nine
days and included about 400 discussions, distributed in general sittings
in eight sections. The writer commented on the thoroughness of the
organisation and the quantity and quality of the work represented.
Plant-physiology was most strongly represented; the other sections,
according to number of communications and participants, ranged in
the following order:—(2) Phytosociology and Ecology, (3) Applied
Botany (including a fundamental communication by Wavilow on the
regional variability of cultivated plants), (4) Systematics and
Geography of the higher plants, (5) Morphology, Anatomy, Cytology,
and Genetics, and (6)—(8) the three Cryptogamic sections.

The writer comments in very encomiastic terms on the extent of
the plant-geographic and floristic work which has already been done,
or is in preparation, for the various provinces of European Russia and
also for Siberia and Kamtchatka, which compares very favourably
with that available for Central Europe. He also insists on the
importance of a knowledge of the Russian language and literature for
students of plant-geography.

CAREX TOMETOSA L IN MIDDLESEX.—On May 26, 1928, I found
Carex tomentosa growing in some quantity in a meadow not very far
from its Surrey locality, but on the Middlesex side of the Thames. I
do not know that this sedge has previously been recorded in Middlesex.
A specimen has been deposited in the British Museum Herbarium.—
I. A. WILLIAMS.

REVIEWS.

Botany for Students of Medicine and Pharmacy. By F. E.
Price 10s. 6d.

The kindred arts of medicine and pharmacy are complementary
to each other. Though both direct their efforts towards the main-
tenance of the public health, they approach their objective from
different points of view. Medicine focuses attention upon
the patient, while pharmacy is mainly concerned with drugs and
medicines. The physician is chiefly interested in physiological

The appearance of a third edition of this well-known elementary text-book is an indication of the popularity which it deservedly enjoys. First published in 1914, it was one of the earliest attempts to provide an introduction to the study of plants from a modern standpoint, and in this purpose it has admirably succeeded. Throughout the book the nature and reactions of the plant as a living organism are insisted upon—form is studied in relation to function, and functions are elucidated by simple experiments requiring only such apparatus as should be readily available or easily constructed in a school laboratory.

In its main contents the book does not differ from that of other similar elementary texts. The morphology and physiology of the flowering plant are its main theses. It is, however, in the treatment of the subject of this, in common with other modern text-books, differs so markedly from the text-books of even twenty years ago. There is no chapter, for example, with the familiar title of "The Stem and its Modifications." The stem is studied in relation to its functions, and the varying habits and environments of plants, as the titles of its chapters indicate, e.g.:—VII. "The Architecture of the Shoot"; VIII. "Buds, The Mechanical Structure of the Shoot"; XII. "Food Storage and Vegetative Reproduction."

Not the least important part of the book is the section on Ecology. The floras of Woodland, Heath and Moor, Sea Shores, etc., are described, and the various factors which are concerned in the determination of the composition of the vegetation are discussed.

There are some, no doubt, who may regret the decline of the purely descriptive botany which made up so much of the practical work of an earlier generation of students. It is an excellent discipline, and few who survived it regret the time and labour entailed. It must, however, be remembered that few of the thousands of young people who every year begin in the schools the study of plants will have an opportunity to continue this work in the Universities. For the majority their school-work in botany is the only formal training they will ever enjoy in a biological subject. If only for this reason, it is important that their instruction should emphasize the physiological and biological aspects of plant life.

The present edition is substantially the same as the first, no drastic alteration has been made, but throughout the book the text has been modified, wherever necessary, to bring it into conformity with recent advances in the subject. The section dealing with respiration has been recast and an additional experiment included. The chapters on Ecology have been brought up to date, and paragraphs added on mountain floras and on hedge-rows. The book is well written and in such a style as to make it readily intelligible to beginners. Used, as the authors intend it to be employed, as an adjunct to class-teaching and with adequate illustration from living materials, it will help the teacher to lay a sound foundation in the study of plants and stimulate a desire for further and wider knowledge.—R. J. Tabor.


This is the first volume of a ten-volume handbook, completion of which is promised in 1930, under the editorship of Professor Blanck, of the Agricultural Institute, Göttingen; it is appropriate, therefore,
to deal in the first instance with the general plan of the work. Of the ten volumes, the first seven are to be devoted to the scientific aspects of soil study, in all its bearings, and the last three to agricultural science in the field, for which there is no exact word in English; the American word "agronomy" is perhaps the nearest. This division is significant, for it marks the westward progress of the Russian claim that soil science has as much right to be a separate branch of natural philosophy as have physics, chemistry, or botany. Generally speaking, it is correct to say that until a few years ago, the study of the soil was regarded as a means to an end—the improvement of agriculture; it was an applied, not a pure science. This was certainly the case in Great Britain and North America. The merit of the Russian viewpoint, that in its essentials is now adopted by most countries, is that it makes for sounder and surer progress. The investigators’ attitude to the problems is dictated mainly by scientific curiosity, rather than by the necessity to solve by some rough and ready means an urgent practical problem in the shortest time. This is the view adopted in the present work. The subject is approached in the comprehensive manner characteristic of German textbooks. The first volume is primarily devoted to the geological aspect of the origin of soils—in fact, it is not until the sixth and seventh volumes that the physical, chemical, and biological properties of the soil are discussed in detail. The main sections deal with the genesis of soils: (a) mineral material, (b) organic material; and the factors concerned in soil-formation (a) physical, (b) chemical, including colloidal factors, (c) geological actions such as water, ice, and wind. Mention should also be made of a long historical review by Dr. Giesche on the development of soil science up to the beginning of the 20th century.

Practically all the well-known German soil scientists are contributing to the various volumes, and to those interested in the German outlook and research on soils, the publication can certainly be recommended. As far as the reviewer is aware, there is at present no similar work contemplated in any other country. —B. A. Keen.

Ortho-Articraft, by Theo. B. Hyslop, C.M., M.D. (Amateur Artist Publishing Co.; price 2s. 6d.), is a paper-covered booklet describing the technique for obtaining effective nature prints from leaves, sea-weeds, feathers, and other flat natural objects, and suggestions as to their use for design and decoration. It is a precise elaboration of the method which most of us have practised at some time—smearing a flat object with pigment and then pressing it upon the surface on which it is desired to obtain the picture. The author also describes a method of painting a picture on glass and then transferring it to paper. There are numerous illustrations showing results, good and indifferent, for the guidance of the learner.

Linnaean Society of London.—At the General Meeting on January 3, Prof. C. E. Moss gave an account of specimens of a new genus of Hydrocharitaceae, recently discovered on the River Zambesi, but which are identical with specimens hitherto assigned to the genus Boottia. The new genus differs fundamentally from Boottia in the fact that the three placentas scarcely project at all into the ovary. It is most nearly allied to Blyso, but differs in having broad petals and more numerous (12) stamens in the male flower, and in the presence of staminodes in the female flower. It is remarkable by its elongate and ligulate leaves, its long cylindrical peduncles, and its cylindrical monophylophyte spathes, all covered with soft conical projections.

At the General Meeting of January 17, Dr. A. B. Rendle showed, on behalf of Miss Maude Egremont, a series of coloured drawings in pastel of West Australian flowers and vegetation. The drawings, most of which were made in the Perth-Darlington district, gave a very vivid representation of some of the constituents of the remarkable flora of West Australia and of some general aspects of the vegetation.

Dr. Rendle also gave an account of a remarkable subterranean orchid from West Australia, recently described by Dr. R. S. Rogers, F.L.S., before the Royal Society of Western Australia. The first specimen was turned up by the plough of an observant farmer in West Australia, and was sent to the W.A. Agricultural Department; a notice in the press produced specimens from two other localities. Dr. Rogers had kindly sent photographs (from which lantern-slides had been prepared) and a short account of the plant.

The plant consists of an underground rootless rhizome, which is "in symbiotic relationship with a fungus which closely invests the decayed roots of Melaleuca uncinata K. Br." It lives about a foot below the surface of the ground. The figure shows short rhizomes with a terminal bud and slender lateral branches covered with scale-leaves. The flowers are borne in a dense head surrounded by an involucre of bracts terminating a slender scape, which grows from the rhizome apparently towards the surface of the soil. The inlorescence, which suggests the capitulum of a Composite, reaches about three inches across. The relatively large bracts surround numerous small flowers. The plant "when fresh is colourless," but "the capitulum acquires purplish-coloured tints on exposure to light." Dr. Rogers writes:—"The affinities of the plant are with the Gastrocleneae, especially as regards its vegetative parts, but it is felt that its inlorescence and certain other characters are too extraordinary to include it in that sub-tribe without unduly extending its limits. I have therefore thought it better to accommodate it in a new sub-tribe, which should be placed next to Gastrocleneae."—Dr. Rendle also showed an illustration of the nearly allied genus Gastrorhiza, an Eastern Asiatic and Australian "saprophytic" genus which throws up a race of flowers from an underground tuber.
He also referred to the remarkable association of the Asiatic species, *G. alta*, which, as recently shown by the Japanese botanist Kusano, only reaches full development and produces an inflorescence when the tuber is invaded by the rhizomorph of the basidiomycetous fungus *Arnaria melia*.

Mr. Ramsbottom emphasized the interest of the symbiotic association between this deadliest of parasitic fungi and the tuber of *Gastrodia*.

**The British Bryological Society.**—A winter meeting of this Society was called by the President, the Rev. C. H. Binstead, M.A., F.L.S., and was held on January 4, 1929, by kind permission of the Linnean Society, at their Rooms at Burlington House. Members and friends assembled to the gratifying number of twenty-seven. They thoroughly enjoyed the reunion and disposed of some business questions. Mr. Marquand read some interesting notes on plant-collecting in Tirol and Carinthia. Mr. Dixon had kindly brought specimens of a number of very rare and interesting mosses, including one from 18,000 feet on Mount Everest, and gave explanatory descriptions, some being new species. Bryophytes were shown on microscopical slides, including a new American *Sphaerotheca* detected by Miss Wigglesworth, of the Manchester Museum. It is hoped that such a meeting may become a yearly event.—*Elenora Armitage*.

Dr. F. J. Seaver, Curator of Fungi in the New York Botanic Garden, and well known for his studies on Discoscytaceae, has published a volume entitled *The North American Cup-Fungi* (Operculata). The work contains 284 pages and 40 plates, two of which are in colour. Thus more than 100 species are illustrated out of the 250 described. Seventeen new species are described, and a new genus, *Durandoscytus*, is erected for *Gyronia gigantea* Phil. (G. Philippii Mass.). The work seems to be very carefully done, and the illustrations call for a special word of praise though they have necessitated the use of a rather heavily loaded paper. As a large number of Discoscytaceae are apparently cosmopolitan the monograph will be useful to European workers. Unfortunately, the American code of nomenclature has been followed, and consequently there are many name-changes, and in the effort to achieve finality we have another series of generic and specific names for these attractive fungi. The volume is published by the author and costs 5 dollars 50 cents post-free.—*J. R.*

**International Botanical Congress, 1930.**—We would remind readers of the *Journal* that motions on the subject of Nomenclature for consideration by the Congress should be in the hands of the Rapporteur Général, Dr. J. Briquet, Conservatoire Botanique, Geneva, before March 31 next.

Motions must be presented in the form of additional articles (or amendments) to the Rules of 1905, 1910, drawn up in the form adopted in the *International Code*, and must be drafted as briefly as possible in Latin, English, French, German, or Italian. At least 100 printed copies must be presented.

A NEW SPECIES OF BROMUS.

By I. A. Williams, F.L.S.

While staying near Brampton, Cumberland, early in July 1928, I found in three places (a hay-field, the side of a main road, and the edge of a farm-track) a *Bromus* which I recognised as being the same as a plant I had gathered, in the preceding month, in a dry sandy ditch by the side of a road crossing Hersell Common, Woking, Surrey. In the next few weeks, I also found the same grass near Thursley, Surrey, and in Hampshire, near Fronsham Pond. Examination of the Herbaria at the British Museum and at Kew revealed more specimens of the plant, all of them British, and generally labelled either as a variety of *Bromus hordeaceus* (i.e., *mollis*) L. or as *Bromus brachystachyus* Hornung.

The oldest specimen was that in the Borrer Herbarium at Kew. It was collected in June 1836 in corn-land at Dowdeswell, near Cheltenham (sic, for Cheltenham), and was labelled by Borrer as an (unnamed) variety of *Bromus mollis*. In H. C. Watson’s Herbarium, also at Kew, are gatherings from Surrey, one from “on the chalk down near Wainborough,” 1867, and another from the “Hop’s Back, near Guildford,” 1871. Possibly these two localities were the same. To his plants Watson gave the name *Bromus mollis* var. *subglaber*, which he published in the sixth edition of the *London Catalogue*, 1867. But I have been unable to discover that he described his variety anywhere, and not all plants to which he gave the name were the same, some being, indeed, sub-glabrous states of *mollis*, and others (including his earliest gathering, that of 1867) being similar states of the plant which I am now venturing to describe as a new species. It is neither *B. hordeaceus* (mollis) L. nor *B. brachystachyus* Horn., a plant which may possibly have to be struck out of the British list, even as a casual.

As there are many British records of this plant, spread over nearly a century, and (so far as material at Kew and the British Museum goes) no foreign ones, I am calling this grass *Bromus britannicus*. It is at least British by discovery, though it may eventually prove to occur also out of the British Islands; it appears to be frequent and native with us, or as native as any plant of roadsides, hayfields, and arable land can be said to be; and the specific name *britannicus* is not likely already to have been given to any species of *Bromus*.


*Journal of Botany. — Vol. 67. [March, 1929.]*
**B. hordeaceus** L. emend. (*B. mollis* L.), spicula floribusque valde majoribus (palea inferior 0–10 mm. longa), carynopside in paleis omnino inclusa ceterisque notis differt.

*B. brachystachys* Hornung habitus formae gracilis *B. arcesis* nec formae debilis *B. hordeaceus* similis, panicula ampla ramulis longis tandem patulis laxa, palea inferior modo 4 mm. longa, ciliis paleis superioris apice versus supra paleis inferioris margine prominently differt.

**Annual (F).** In general appearance like a slender form of *Bromus hordeaceus* L. Height 25–75 cm. Stems one or several. Stem and leaves more or less hairy. Panicle usually contracted, 4–8 cm. long, the branches being mostly about as long as the generally solitary spikelets; sometimes the lower branches are about 2 cm. long, and bear more than one spikelet. Spikelets hairy or glabrescent (? sometimes glabrous), small, usually about 10 or 11 mm. long, excluding the awns about 4 or 5 mm. broad, and broadest about the middle after the flower has opened; occasionally about 1.4 × 5 cm.; 6–9-flowered. Upper glume reaching about halfway to the top of the sixth flower (i.e., the third on the same side). Glumes and lower pales green, with a white membranaceous border. Lower pales markedly angular well above the middle, and divided into two very sharp, narrow, somewhat diverging points, the awn springing from the base of the sinus between them. Lower pales about 6 mm. long, their awns about the same length. Upper pale much shorter than the Caryopsis and ciliate up about two-thirds of its length only. Caryopsis, as it comes to maturity, reaching quite, or almost, to the top of the lower pale, the tuft of whitish hairs at the top of the Caryopsis being evenly easily visible either in the sinus between the points of the lower pale or projecting beyond them. Flowers very narrow at their bases, and not closely imbricated, except when young, so that the rachis of the mature spikelet is often visible, and it is even sometimes possible to see right through the spikelet between the lower part of the flower and the rachis.

In *Bromus hordeaceus* (mollis) L., the lower pale is about 9 mm. or 1 cm. long, and its points are less slender and less easily observed. Also the Caryopsis is only about 1/4 or 1/3 of the length of the lower pale, and the upper pale is considerably (about 1 mm.) longer than the Caryopsis, and ciliate nearly to the top. The Spikelets of *B. hordeaceus* are normally 50 per cent. to 100 per cent. longer than those of *Bromus britannicus*. Duval-Jouve gave the varietal name *microstachys* to small-spikelet forms of several species of *Bromus*, including *B. hordeaceus*, and some groupings of *B. britannicus* have been named *B. mollis* var. *microstachys*. What Duval-Jouve's own specimens of his variety were I do not know; but there seem to be small-spikelet forms of *hordeaceus*, to which the name should presumably be applied, and which are not to be confused with *B. britannicus*.

Various other varietal names, such as *glabratuus* Doell. and *glabrescens* Coss. & Germ., as well as Watson's subglaber, referred to above, have been applied to more or less glabrous forms of *britannicus*. From *Bromus brachystachys* Horn., with which specimens of *H. britannicus* have sometimes been misidentified, it differs very much in habit (B. brachystachys having a longer (12–17 cm.) panicle, composed of long (e.g., 9 cm.) compound, finely spreading
branched, and in the upper pale, which in Hornung's plant is ciliate almost to the top and reaches to, or projects beyond, the shoulders of the lower pale when the flower is fully open. The resemblance between the two species (which has led to this confusion) lies in the projecting Caryopsis and the small size of the spikelets. *B. brachytaechy*, however, has shorter lower pales (4 mm.) and spikelets rather shorter and broader in proportion to their length (about 9-10 x 5 mm.). Its lower pales are rather broader in proportion, the angles on their sides are more rounded, and their points less distinct. Hornung described this plant as strictly biennial; much of the British material has every appearance of being annual. But the habits of *brachytaechy* and *britannicus* are so different that there can be little confusion between them once this difference is realised. It may be summed up by saying that superficially *brachytaechy* resembles a slender *B. arvensis* (from which plant, and not from *hordencus*, Hornung was at pains to separate his grass), whereas *B. britannicus* is in appearance a slender *hordencus*.

There are specimens of *Bromus brachytaechy*, from its original locality at Aschersleben in Germany, at Kew, and in the British Museum; and Mr. C. E. Salmon also has one which he was kind enough to lend me.

It is also, perhaps, worth remarking that the not closely imbricated flowers of the mature spikelets of *B. britannicus* have led to its being occasionally misidentified with *B. acclinus*.

The following is a list, arranged by vice-counties, of the gatherings of *Bromus britannicus* which I have seen. The herbaria in which these specimens are to be found are indicated by capital letters, of which B.M. indicates the Natural History Museum, South Kensington; K. Kew; S. the herbarium of Mr. C. E. Salmon; and W. my own. Records in square brackets refer to plants which are apparently *B. britannicus*, but have been gathered too young for absolute certainty. Collectors should note, in this connection, that specimens of this and its closely allied species should be fairly ripe for satisfactory determination.

[V.c. 2, East Cornwall. Par Harbour. L. T. (?) Medlin, 1926, K.]

[V.c. 3, North Somerset. Field border, Tickenham Hill. Miss I. M. Roper, 1915, B.M.]

[V.c. 12, North Hampshire. Edge of barley field, near Frensham Pond. I. A. Williams, 1925, W.]

[V.c. 14, East Sussex. Rottingdean. T. Hilton, 1907, K. Other specimens also immature from this locality in B.M. and S.B.]

[V.c. 16, West Kent. In a field of Italian Rye-grass, near Eynsford. E. S. Marshall, 1893, B.M.]


KEY TO THE BRITISH PANSIES.

BY ERIC DRALE.

The following Key has been drawn up in response to requests from many collectors. The writer has complied with great reluctance, as the pansies are difficult to characterize on paper. This, however, is not at all due to any indefinite limits between the various forms. Indeed, they seem to fall into much more sharply delimited groups than do the *Chenopodia, Atriplices, Salicornie, Ranunculi, and Euphorbias*, to mention a few genera to which the writer has given some attention. Indeed, it is the examination and attempted use of published keys to those genera that has emboldened him to draw up a Key to the pansies.
With the pansies, as with many other genera, the difficulty lies in the nature of the distinguishing characters. The form of the leaves and stipules and the size and breadth of the sepals are often decisive features, and when the plants in question lie before any practised observer the differences are recognized at once. But when the beginner is confronted with printed descriptions without any standard of reference, it is hopeless for him to expect to form clear and correct mental images of the plants. Moreover, mere measurements are here generally of but little use, as the sizes are relative. There is much variation in size in nearly all the pansies, but the enlargement or diminution as a rule affects the plant in every part, leaving the relative proportions the same.

There are several matters to which careful attention must be given:

(i.) Only entire plants must be used.

(ii.) At first only well-grown plants should be examined, and, if possible, several plants from the same gathering should lie before the collector when he uses the Key. Later, when familiarity with typical normally developed plants has been acquired, the more aberrant states will be readily recognized.

(iii.) All our British pansies are more or less hairy; when in the Key a plant is stated to be hairy, a very definite and noticeable hairy coating is implied. Thus in *sogetalia, ruralis, Lloydii, Lejunei*, the hairiness is comparatively slight; in *anglica* and *variotae* it is very evident, and in *contiana, rectens*, and (usually) *agrestis*, it is dense and almost hispid.

(iv.) In considering the shape of the leaves and stipules, those of the middle region of the plant should be examined. In the uppermost leaves the laminae tend in nearly all the pansies to be more acute and the form of the stipules less characteristic.

(v.) Many pansies, perhaps all, may flower at an early stage when only a few leaves have been formed and before any vegetative branching has occurred. Such plants are apt to be very puzzling, but generally more fully developed specimens may be found in the neighbourhood. These small imperfectly developed plants of the various members of the arvensis group must be carefully distinguished from *V. derelicta*, which is permanently of this type. Branching is sometimes but little evident in such a normally compound plant as *V. variotae*, especially in the north of Scotland; but here again it is usually possible to find branced examples, and the leaf and stipular characters, when once these have become familiar in typical examples, should prevent confusion.

Further, perennials, especially *lindia*, when flowering in the first year before the formation of the twiggy bases of the branches, are liable to be mistaken for members of the tricolor group, particularly *V. Lejunei*.

(vi.) Some suffusion of the petals with violet or blue is found occasionally, though rarely, in the pale-flowered plants, such as the arvensis-pansies and *V. contempa*.

In the first instance the Key should be used as a guide to an approximate determination and references to the fuller descriptions already given in this *Journal* should be made. It is very greatly hoped that specimens thus approximately determined will not be recorded or distributed without further confirmation. The writer will always be willing to examine and report on carefully selected and prepared whole plants, provided that sufficient material be sent to enable him to retain a representative specimen for reference.

* Flowers small, petals not longer than the sepals.
  Maritime annuals, 1-3 in. in height with minute flowers, petals usually shorter than the very small
  sepals. Channel and Scilly Islands ......................... NANA Group.
  Inland annuals of cultivated ground, petals shorter
  than or equaling the rather large sepals.................. ARVENSI GROUP.

** Flowers large, petals longer than the sepals.
  Annuals................................................. TRICOLOR GROUP.
  Perennials, stems generally upright, branching from
  the base, lower parts twiggy lying on or just
  below the surface of the ground. Lower stipules
  digitate............................................. SAXATLINS GROUP. *lindia*
  Perennials with extensive underground development of
  slender herbaceous or twiggy branches, flowering
  shoots generally emerging separately from the
  earth. Lower stipules digitate ......................... LUTEA CURTISS GROUP.

NANA GROUP.

Plant very small, 2-3 in. in height, unbranched or but
little branched........................................ V. nana.

Plants of low growth but considerably branched,
branches up to 4 inches or more in length and
spreading.............................................. V. nana f. major.

ARVENSI GROUP.

* Plants upright.
  Very small (4-6 in.), usually unbranched, peduncles
  ascending. Local ...................................... V. derelicta.
  Usually small (4 in.) with little or no branching
  peduncles very widely divaricate. (When growing
  amongst corn the stem may be much elongated,
  but the usually unbranched slender stem with long
  internodes and the widely divaricate peduncles are
  characteristic.) Local ...................................... V. araratia.
  [Small (3-5 in.), very hairy.............................. Confer V. rectens.]
  Tall (12-20 in.), main stem dominant, lateral branches
  usually shorter than the main stem, often very
  short, spreading a little at the base and then
  upright; leaves narrowly lanceolate, mid-lobe of
  stipule with slender stalk, lateral lobes linear.
  Common ............................................... V. sogetalia.
  Do, but leaves broader and more obtuse, mid-lobe of
  stipules broader, more foliaceous. Locally common.
  f. obtusifolia......................................... V. Derazaei.
  Plant 6-10 in. in height, branches upright or sharply
  ascending from the base, subequal to main stem,
  leaves ovate-lanceolate. Locally common................ V. Derazaei.
  Do, but plant usually shorter and with linear leaves
  and mid-stipular lobes. Local ......................... f. subtilis.
Branches prostrate or widely spreading and decumbent from the base.

Lateral branches very long (8-12 in. or more) and prostrate; leaves lanceolate-acute, mid-lobe of stipules usually toothed, acute at apex, whole plant densely covered with short hairs which give it a dull rather satiny appearance. Very common.

Branches 0 in. or more. Leaves large, broadly ovate or oval, clear green, mid-lobe of stipule very broad-based, rounded, obtuse, lateral lobes spreading at nearly right angles, rather broad, parallel-sided, obtuse. Very common

Plant smaller than *rutilis*, leaves small, rather densely hairy, pale green, stipules similar to those of *rutilis*, but much smaller. Rather rare

Plant dark clear green, nearly glabrous, leaves very broadly ovate or oval with long slender petioles, stalk of mid-lobe of stipule elongated, slender, sepals large, petals white, very pale, generally shorter than the sepals. Rare

*Tricolor* Group.

* Plants not cespitose, branches for the most part upright.
  
  Plant tall (10-12 in.), leaves acute, stipules pinnately lobed, mid-lobe narrow acute, flowers pale creamy yellow. Rather rare

  Plant tall (6-12 in.), very leafy, leaves large, usually oblong-lanceolate, obtuse or subacute, mid-lobe of stipule +crenate, sepals broad, upper or all the petals purple or violet (occ. all yellow). Locally abundant

  Do, but with very large flowers; internodes generally longer than the leaves. Uncommon.

  Plant short (4-5 in.), unbranched or with few very short basal branches, leaves oblong-lanceolate, coarsely crenate obtuse, mid-lobe of stipule narrowly oblong or spathulate entire, lateral lobes short, flowers few, very large, violet, on long peduncles. Orkney and Shetland Is., Caithness, and Sutherland

  Plant tall (10-12 in.), leaves lanceolate or ovate-lanceolate, acute, smaller than in *Lloydii*, the plant thus appearing less leafy; sepals narrow, petals violet or particoloured. Locally common

  Plant small (3-4 in.), little branched or unbranched, leaves very hairy, petals yellow or upper petals tinged with pale violet. Rare. (Certain less hairy plants with smaller flowers from Berkshire seem to be inseparable from *sectenaria*.)

  ** Plant + cespitose or at least with branches widely prostrate at base.

  Plant widely spreading (8-12 in.), leaves and mid-lobes of stipules narrow, acute; flowers pale creamy yellow. Rare

  *V. contempla* var. *patula.*

**KEY TO THE BRITISH PANSIES**

Branches 3-5 in.; leaves of middle of stem broadly ovate obtuse, stipules very small, mid-lobe not much larger than the lateral lobes, especially on the lower leaves; plant usually with very small flowerless branches at the base bearing round leaves; petals pale yellow or the upper petals violet. Very local

  *V. monticola.*

Branches 6-8 in.; leaves and mid-lobes of stipules +rounded or obtuse, distinctly hairy, flowers particoloured or violet. Locally abundant

  *V. variata.*

Do, but stouter, leaves larger and less hairy, sepals broader, petals sulphur-yellow; plant with general habit of *rutilis.* Locally abundant

  *V. variata* var. sulphurea.

Similar to sulphurea, but more slender, with smaller leaves and stipules, narrow sepals, and smaller sepalline appendages.

  Very rare

  *V. alpestris.*

Plant small, branches 4-5 in.; leaves and stipules very small, densely covered with short hairs; mid-lobe of stipule +rounded and obtuse; flowers brilliantly particoloured on very slender peduncles.

  Very rare

  *V. cantiana.*

* Saxatilis Group.*

All our British plants come under *V. lepida* Jord. Typical *lepida* has many tall (10-12 in. or more) upright stems with narrow leaves (sometimes considerably broadened) with digitate stipules and entire (or in the lower leaves +crenate-dentate) mid-lobe. *V. car. putica* Ker. is a luxuriant state with large leaves, while *V. medus- anensis* Jord. is probably, at least in part, merely *lepida* flowering in its first year.

* Lutea-Curtisi Group.*

* Plants of calcareous uplands, usually only slightly hairy.

  Aerial branches short, few-flowered, flowers yellow.

  Locally abundant

  *V. lutea* Huds., *sens. str.*

  Do, flowers purple. Locally abundant

  *V. lutea* sens. str., *f. amena.*

  Plant low-growing, with prostrate rooting sympodial branches and more hairy leaves. Very rare

  *f. Murrapi.*

  Branches long straggling (16 in. or more), flowers very large, purple (occasionally yellow), lower petals strongly unguiculate. Very rare

  *f. sudetica.*

  Aerial stems many, tall (10-12 in. or more), leaves broad, lower petal less unguiculate, flowers bright purplish-coloured or yellow. Very local

  *f. polychroma.*

  Aerial stems many (6-10 in. or more), leaves narrow, flowers usually smaller than in typical *lutea.*

  Very local

  *f. calaminaria.*

  ** Plants of sand-dunes by the sea, usually very hairy.

  Underground branches more woody than in *lutea,* flowers yellow, usually smaller than in *lutea,* but varying greatly in size. Locally abundant

  *Curtisi* *f. Porteri.*

  Do, but usually less hairy than in *Porteri,* and with parti-coloured or purple flowers. Locally abundant

  *f. Pomeani.*
A short description of *Viola contorta var. patula*, referred to in the Key, but not hitherto described, here follows:

**Viola contorta** Jordan var. *patula*, var. nov. *Viola annua, V. contorta similis*, sed ab illa minus patulus differt.

Annual, branches widely spreading from the base, more or less prostrate, with short hairy coating; leaves lanceolate to linear-lanceolate, acute, crenate, more or less hairy, strongly ciliate; stigmas with linear-lanceolate or linear-oblong acute entire or crenate-dentate mid-lobe and linear acute lateral lobes arising chiefly near the base, distinctly hairy and ciliate; petals longer than the sepals, pale yellow, the upper occasionally with slight violet suffusion. The plant resembles *V. contorta*, but is at once distinguished by its widely-spread, more or less prostrate habit. It is not covered by Jordan's description of *V. contorta* (Puigilis, 24, 1832).

Habitat. In arable land. Surrey—Shere; Sussex—near Crowborough; Buckinghamshire—Chesham; Hertfordshire—Furwell Field, near Hitchin (J. E. Little).

**Lichenological Notes.—IV.**

By W. Watson, D.Sc.

As in former notes, species and varieties not previously recorded for the British Isles are indicated by asterisks, and botanical vicinities are indicated by their numbers. Many of the records of localities are due to the work of Messrs. D. A. Jones, of Harwood, and H. H. Knight, of Cheltenham, and such records are indicated by D. A. J. and H. H. K., respectively.

**Stenocybe bryophila** Wats. In Bull. Soc. Mycol. France, 1926, 207, Abbé L. J. Grelet describes a new variety of *Stenocybe major* as var. *Microcarpa*. It was found on the liverwort *Plagiochila punctata*, collected by S. M. Maurice at West Inverness, v.e. 97, in 1908. The description was considered by Miss Lorain Smith to correspond with that of the plant published under the name of *S. bryophila* in this Journal (1925, 130), and she kindly drew my attention to the matter. On communicating to the Abbé Grelet a copy of the description of *S. bryophila*, he agreed that his new variety of *S. major* corresponded, and that the former name had priority. He also kindly sent me a portion of his type-specimen, and there is no doubt as to the identity of the two plants. The Abbé describes the plant as a fungus and considers it to be “une forme intermédiaire quant aux dimensions des spores” between *S. major* Nyl. and *S. septata* Rehm., but “avec un habitat différent.” Apparently he considers that *S. septata* (Calocicum septatum Leight.) should also be placed as a variety of *S. major*. This interpretation of the status of these plants is not generally accepted by lichenologists. *Plagiochila* is one of the genres of heathers on which *S. bryophila* has previously been found. It was on *P. punctata* at Ceuamt Mawr (D. A. J.) and partly on *P. tridenticulata* at Cwm-y-glo. The habitat is always on heathers except in the possible case mentioned in the original description (this Journal, 1925, 190), when it seemed to be attached to *Sphagnum* (inadvertently given as *Stereocaulon* previously compressus).

**S.byssacea** (Fr.) Nyl. On branches of alders overhanging water, near Lanercost on Devon side, v.e. 3; Langford Heathfield, v.e. 5; near Brecon, v.e. 42 (D. A. J.).


**Parmelia saxatilis** var. *panniformis* Schinz, Harmand (Lichenes de France) gives several forms which are found in our islands. Form *cincte-oblata* Harm. is not uncommon, and I have definite records of it from Princetown (3), Oareford (5), Bristol (34), Brecon (42), Astro Valley and Dolgelley (48). It may be considered as typical *P. saxatilis* var. *panniformis*, and is not necessarily the same plant given as *form* *pinniformis* by Bromme (Mon. Br. Lich. 241) and referred to by Lorain Smith (Mon. Br. Lich. 138), since Bromme's plant was sometimes so indistinct that it is referred to as a state of *Turifluence*, whereas typical *pinniformis* has a fairly smooth thallus. Form *cresta-pruinosa* Harm. has a bluish tint and is a much rarer plant. It occurs on rocks near Bristol (24) and near Pitspe Falls (42). There is a tendency for the blue colour to disappear in the herbarium. This form does not correspond with *P. omphalodes* var. *cresta-pruinosa* Nyl. ex Stiz. (Cromb. Mon. p. 244; Lorain Smith, Mon. i. p. 144), as it is put under the type of *P. omphalodes* and is not given as being panniform or with narrower laciniae. Form *brunea* Harm. may be considered as the typical form of what is usually regarded as *P. omphalodes* var. *pinniformis*, and is a fairly frequent plant in mountainous districts. Form *nigrescens* Harm. is a dark form and is better placed under *P. omphalodes* var. *pinniformis*. Harmand does not recognize the specific status of *P. omphalodes*, merely giving it as a variety of *P. saxatilis*. *P. omphalodes* var. *pinniformis* form *nigrescens* (Harm.), comb. nov., not only has a darker colour, but the reticulations are usually indistinct and often almost absent. It seems to be a plant of mountainous districts and occurs on rocks, Brecon Beacons (42), Harlech (48, D. A. J.), and Cwm-y-glo (40).

**P. exasperata** (Ach.) Carroll is given as general and common in the S. and W. (Smith, Mon. Br. Lich. i. 142), but it is rare in Somerset. It occurs on trees at Dunster (5) and at Minehead Warren. In the same district Mr. Knight and I noticed it on shingle boulders, so far as I am aware, it has not previously been recorded from rocks in the British Isles.

**P. somediata** (Ach.) Th. Fr. A specimen collected near Peebles, v.e. 78, by T. Hebben in 1891, was determined by Nylander.
P. fuliginosa form *Atterrima* Wedd. is a very dark form found on rocks, especially near the sea. —Lustleigh (3), Withypool and Porlock (5), near Bristol (6), Flifield (7), and Dolgelly (48).

Var. GLABBATA (Lamy) Oliv.; Longleat (6).

P. caperata form sorediosa Malbr. is the sorediate form which is not so common as the type, but is well distributed throughout the British Isles.

Var. *Saxicola* Müll., on shingle, Porlock, v.e. 5. This is not merely a saxicolous state, since many saxicolous specimens of P. caperata cannot be referred to it. According to Flagg (side Harm. Lich. de Fr. p. 574) it somewhat resembles *P. conspersa*, but is easily distinguished from it by the less laciniate lobes, less concave apothecia with their margins less crenated, and especially by the rarity of spongornia.

P. sinuosa (Sm.) Ach. On rock, Loch Gal, Kerry (T. Hebdon).

P. dissecta Nyl. On tree, Tyne-y-Groes, v.e. 48.

P. multipedia (Dicks.) A. L. Sm. On rocks, Cwm Mawr, v.e. 48 (D. A. J.).

P. acutifolium (Neck.) Dub. Martinsell hill, v.e. 7 (H. H. K.).

P. dubia (Wulf.) Schaer. Saxicolous plants, which are rare, occur on shingle and on a sea-wall at Blue Anchor (5). A number of small species have been segregated from the main stock. *P. ulophylla* Ach., *P. reddenda* Stirr., *P. rudaecta* Ach., *P. negata* Nyl., *P. stictica* Nyl., *P. cristifera* Tayl., and *P. frondifera* Merrill, all seem to belong to the genus of *P. dubia*. Some of these occur in our islands. *P. dubia* var. *ulophylla* (Ach.) Harm., on a Lombardy poplar, Oake near Taunton, v.e. 5, has more or less recurved sorediate lobes somewhat similar to those of *P. physodes* form labrosa. *P. rudaecta* Ach. Syn. Lich. 197 (1814); *P. ulophylla* Nyl. Syn. Lich. 369 (1860); *P. rudaecta* Ach. Syn. Lich. 197 (1814); *P. ulophylla* Nyl. Syn. Lich. 369 (1860); *P. rudaecta* Ach. Syn. Lich. 197 (1814); *P. ulophylla* Nyl. Syn. Lich. 369 (1860); the thallus levior, scrobiculato-rugosus, ciliis et sorediosi desitius, maculis albis prominulis dense instructis, marginem excepto dense (usque confluentem) isidiformer vel squamuliformer microphyllinos vel glomuliferas.” The cortex gives a yellowish coloration with K and the medulla a reddish one with C. Many British plants, which have been considered as states of *P. dubia*, are albo-punctate and become or less isidoid, but to a less extent than in typical specimens of *P. rudaecta*. The reaction of the medulla is similar to that of *P. dubia*. Corticoides specimens from two localities near Harlech, v.e. 48 (leg. D. A. J.), correspond almost exactly with a Nylanderian specimen in the British Museum Herbarium (ex herb. Nylander, 1874, from S. Carolina, Ravenal, 1852), but the reaction of the medulla to calcium hypochlorite is negative. These belong to *P. negata* Nyl., which chiefly *differt a rudaecta thallo fimori, medulla Cal—* “Nyds. Lich. Pyr. Or. in Flora, 1872, 547. It has also been noted from the New Forest at Bramshaw, v.e. 11. A specimen of *P. dubia* in my herbarium, collected by G. Livers, contained the typical form and also another which was apparently considered distinct. In this the thallus was albo-punctate rather than albo-sorediate with the points becoming larger and irregular, whilst neither the points nor the medulla gave any coloration with *C. P. reddenda* Stirr., is “precisely similar externally both in colour and albo-sorediate points to *P. Borreri* Turn., but the medulla K—C—” (Leight. Lich. Flora, ed. 3). Crompton considered that it was an accidental state in which the medulla (not the soredia) gave no reaction with calcium hypochlorite. The specimen in the British Museum Herbarium was collected by J. M. Androw from New Galloway. The soredia are quite distinct and, though isidoid granules are sparsely present, the plant scous quite distinct from *P. negata*. Glyn, near Capel Curig, is another locality given for the plant by Leighton.

Several specimens, which have been named *P. reddenda*, at some time, by myself and other lichenologists, are referable to *P. negata* Nyl. A specimen from the Taunton district referred many years ago to *P. reddenda* has been mislaid, but it was probably correct. On comparing a series of plants from the same locality, especially in the field, belonging to the stips of *P. dubia*, it is difficult to resist the conclusion that they are all forms of one plant. Specimens are frequently met with in which the white spots characteristic of *P. rudaecta* or *P. negata*, partly merge into soredia similar to those of *P. dubia*, and partly become more or less confluent groups of isidia or small squamoles. The more or less recurved sorediate lobes may justify the separation of *ulophylla* as a variety, whilst *negata* may have the same status because of its negative reaction to *C. P. stictica* Nyl., *P. cristifera* Tayl., and *P. frondifera* Merr. have not been recorded from our islands.


Biatora micrococcus Krb. On oak, Oaksey, v.e. 7 (H. H. K.).

B. tegidula (Fr.) Nyl. On pine, Aviemore, v.e. 96 (H. H. K.).

B. kerryboides (Nyl.) Th. Fr. Near Harlech, v.e. 48 (D. A. J.).

B. prasina (Fr.) Syd. This is usually corticoid, but a plant from the bare soil of a hedgebank near Stogumber (5) agrees, except that the apothecia are often paler at first. They eventually become vivid brown to blackish. As usual many spores are simple.


B. rugofusca Anz. On the trunks of beeches near Lyddard hill (900 ft.), Quantocks, v.e. 5. I am indebted to Mr. Paulson for
independent corroboration of the determination of this plant. He remarks (in litt.) that "the specimen on beech sent by Larblestier from Kylemore, Connemara, is remarkably like the Quaintocks one. The specimens marked Anzi Cat. Lieh. Sond. 76 (1800), in the Kew Herbarium, are on decayed vegetation and do not look like the Kylemore specimen." The Quaintocks plant has remarkably rigid and cylindrical paraphyses which are discrete rather than concretes. The spores are 7-8 μ broad, and are therefore wider than is usually given for B. rusfulaua. The slight differences do not seem sufficient to form a new species.


B. symmichella (Nyl.) Lind. On pine, Cwm Bychan, v.c. 48. Previously recorded only from Braemar (92).

B. sanguinea (Wulf.) Tuck. On Frullania tamarisci, Crickley Hill, Cheltenham (H. H. K.), v.c. 33.


L. Kochian Hepp. is a frequent plant in vice-counties 48 and 49. It has also been noted at Brecon (42), Aberystwyth (46), Buckden (64), Hawkhurst (90).

Var. lynea Leight. has been noted on the stones of the cairn on Dunkery Beacon (1760 ft.), Exmoor, in v.c. 5. In v.c. 48 and 49 it seems to be commoner than the type.

L. petrosa Arn. On limestone pavement, Cray and Buckden, v.c. 64. Vainio considers this to be a variety of L. asbrosoflua.

L. mursata Sirt. On stones, sometimes submerged, on shore of Loch Tulla, v.c. 98.

L. cinerascens (With.) A. L. Sm. Oareford (5), Craig-erig-Gleisiad and Hepste Falls near Brecon (42), Buckden (64).

L. nigrolinea Nyl. The "only locality" in the Monograph of British Lichens is on a mica-schist wall in Pembrokeshire. Plants agreeing with the description are found on calcareous stones in fields, Thrubwell (5) and Somerton (6).

L. furcella Nyl. has only been recorded from the Grampians, but plants from arenaceous rocks, Cocker Combe, Quintocks (5), and Prestpice Walk, Dolgelley (48), seem referable to it.

L. expansa Nyl. On shingle, Cheshill Beach (9) and Blakeney Pt. (27 and 28). On rocks, Llanwryd (H. H. K.) and Brecon (42).

Bacillaria scopulicolus (Nyl.) A. L. Sm. On soil over rock, Land's End (H. H. K.), v.c. 1. The "only locality" previously recorded

is at Penzance. Another Bacillaria collected by Mr. Knight from the Island is near to B. scopulicolus, but it is probably an undescribed species.

Micromela breadalbanensis Wh. & Wils. was described from material from the Breadalbane. A plant collected from Brecknock Beacon (42) in 1927 has been compared with the type-specimen in the National Museum of Wales at Cardiff. The thallus is much better developed, is slightly rougher, and shows the crinkled-areolate character much better. Correlated with the better development of the thallus, the asci and spores are better shown and are slightly larger. The spores are usually arranged in an obliquely uniseriate manner and their septation is variable in both the Brecknock and the type-specimen from Ben Cruachan, but in both they are somewhat irregularly muriform when mature. The only definite difference between the two specimens is in the reaction of the hymenium to outline; in the Brecknock specimen the temporary bluish coloration appears, whilst in the type-specimen the coloration is wine-reddish. In the original description the spores are given as irregularly biseriate and 10 μ thick. In a pellucidum of the type-specimen examined, the spores were often uniseriate (sometimes so obliquely arranged as to appear biseriate), irregularly muriform when mature, and sometimes broader than 10 μ.

Thelidium terrestrum Wats. On soil on bare parts of bank, Cwmish, v.c. 5. This is the second record for this plant, which was first found on a bank, about five miles away from the present locality. It also occurs on a bare hedgebank about a mile away from its original locality at Cheddon, near Taunton. Its relationship to T. hoistum Arn. is close, but the spores are rather smaller and smoother, the asci are larger, the perithecia are not truncated, and the thallus is rather more definite.

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

Dactylorhizes in France and Great Britain.—Dr. T. Stephenson (Ball. Soc. Bot. Fr. lxxx. pp. 481-495, 1928) gives an interesting account of our present knowledge of the group Dactylorhizes occurring in France and Great Britain. The principal species are O. maculata, O. latifolia, and O. incarnata, to which should be added a complex series of marsh-orchids of which the most important are O. prettmeris Druce and O. sacripedalis Wild. O. maculata L. Two forms are enumerated, A and B. Form A is larger, 25-30 cm. high, the leaves are more flattened, the lower ones oval or oblong and generally obtuse; the floral spike is conical at first and the labellum has a prominent middle lobe, larger than the lateral which are often narrow. Form B is shorter, 15-25 cm. high on the average; leaves nearly all reflexed, the lower oval-lanceolate;
the floral spike is more cylindrical and usually shorter; labellum with the middle lobe generally very small, and even when it is fairly large it is not prominent; the lateral lobes are relatively more important. Form A corresponds to what is known on the continent as *O. maculata* L. type, though Dr. Druce feels convinced that form B is the true *O. maculata L.* Form B was first called in England *O. maculata* var. *praeceps* Webster (1886), then *O. maculata* subsp. *ericetorum* Linton (1900), but Col. Godfrey (Journ. Bot. 1921, 305 et seq.) has given good reasons for the admission of the name *O. elodes* Grisebach. In Great Britain and Ireland the two forms have an extended geographical distribution. *O. maculata* favours the borders of woods and the neighbouring meadows. *O. elodes* grows, often profusely, on stretches of heath and the edges of marshes. In Ireland a very beautiful form of *O. maculata* is found, having leaves always unspotted and flowers pure white (*O. O’Kellyi* Druce).

*O. latifolia* L. British specimens which the author has considered to belong to this species have more or less broad leaves, usually with accentuated spots or circles of dark brown, although some are not spotted; the labellum is broader than long, the lateral lobes regularly rounded and the middle lobe small and rounded; the colour of the flowers varies from pale purple-violet to dark purple-violet; these plants are found in humid places, generally in the company of other marsh-orchids.

*O. purpurascens* T. & T. A. Stephenson. This new and interesting orchid was described in 1920. It is normally short, 12–15 cm. high, although it may reach 25 cm.; the leaves are carinate, lanceolate, and rather broad, generally having small black dots at the apex; labellum either rhomboidal and scarcely 3-partite or more rounded, with a small rounded middle lobe. In Great Britain it has been found in Wales, northern England, and also in Scotland and the Orkney and Shetland Islands. English forms were first taken to be *O. ortenta* Muell., but this is incorrect.

*O. incarnata* L. In English floras this species has sometimes been placed under *O. latifolia*, but it is quite distinct and is probably the most ancient of the group *Dactylorchis*. The leaves are fleshy, erect, yellowish green, without spots, broader at the base and generally hooded at the apex; the labellum is ±7 mm. long and broad, and normally has markings of simple lines in a lozenge-shape, evenly distributed on each side of the labellum; the colour is very variable, frequently flesh-pink but often also purple-violet of the usual orchid shades; other varieties are white, straw-yellow, lemon-yellow, brilliant purple or deep maroon. *Var. pulchella* Druce is a beautiful purple with the labellum-marking formed of accentuated deep purple-violet lines.

*O. praemorsa* Druce. This was first described in 1913. It is very common and was first considered a form of *O. latifolia* or *O. incarnata*. It has the habit of *O. latifolia*, with broad- or narrow-lanceolate leaves, spreading and not erect or joined in a hood at the apex as in *O. incarnata* and never spotted; the labellum is spreading and larger than in *O. incarnata*, the middle lobe being either small and

**ABSTRACTS OF PAPERS ON THE BRITISH FLORA**

rounded or long and prominent; the marking is formed of dots and dashes, few or abundant; the colour is usually pale purple-violet, but sometimes also rich magenta, pale lilac, or white. This is much the most common marsh-orchid of the British Isles. There is a fine variety in Scotland and the north and west of England with a rich purple-violet flower—*var. pulchella* Druce.

*O. sesquipedalis* Wild. This beautiful species is absent from Great Britain and northern France. An account of it was given by Dr. Stephenson in Journ. Bot. 1925, p. 93, t. 572.

The leaf-habit is illustrated in the accompanying block kindly lent by Dr. Stephenson.

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The paper is illustrated by two photographic plates, each showing three species. The hybrids are not discussed, as this subject would need a special treatise to itself.—E. G. B.

**POLLINATION OF EPIPACTIS** (F. Martens in Bull. Soc. Roy. Bot. Belg. ix. pp. 109–11, 1928).—In a recent paper (ibid. lix. 1926, pp. 69–88, 18 figs.) the author has shown that in *Epipactis latifolia* All. direct pollination is effected by insects, small Coleoptera lifting up the wall of the anther, loading themselves with pollen and then discharging part of it on the receptive portion of the JOURNAL OF BOTANY.—Vol. 67. [MARCH 1929.]
stigma. He has also noted that if the wall of the mature anther is straightened and the large end of the pollinium slightly raised, the whole pollinium continues spontaneously the movement so started, moves up and down in front, pivoting on the "bonnet" of the rostellum, and finishes by reaching the stigma itself.

More recent observations compel him to question the latter point. On all the flowers examined this year the pollinium, when raised, has assumed its first position or remained motionless even if forced to bend forward. The density of the viscous matter which attaches it to the rostellum seems to prevent the pivoting movement and no doubt it is the variable degree of viscosity or fluidity of this matter which explains the difference in the results.

Direct pollination by Coleoptera is shown to be very general, the majority of flowers being visited when scarcely open.

The author confirms the descriptions of Kirchner and of Kern von Marilau (Kirchner, Blumen und Insekten, 341, 111; Kern von Marilau and Hansen, Pflanzenleben, ii. 451, 1921) and also his previous observations on autogamy (i. e. lxx. 69-76)—spontaneous or brought about by insects.—E. G. B.

Anandrogy in the Carex dioica Group, by Th. Arvidsson (Svensk Botanisk Tidskrift, xxii. p. 106, 1928).—Arthur Bennett (Journ. Bot. 1927, 351) described an androgyous C. dioica under the name C. dioica forma isogyna: it was only the British specimen he had seen. The present author states that the androgyous plants of this group can take the following form: (1) Two-thirds of the lowest part of the spike is composed of male, the upper third of female flowers. (2) Spikes of equally mixed male and female flowers or the female preponderating. (3) Some female flowers at the middle or at the apex of the spike. (4) From the same rhizome arise stems with spikes of male flowers only and stems with spikes for the greater part of female flowers.

Figures are given of an androgyous spike of C. dioica from Sweden and an androgyous C. parallela. The author gives some localities in Sweden, Norway, and Finland where androgyous plants have been collected, and concludes with an enumeration of the literature bearing on this subject.—E. G. B.

OBITUARIES.

JOHN MERLE COULTER

(1851-1928).

Professor Coulters name has become familiar to botanists throughout the world from his association with the Botanical Gazette, for many years past one of the best-known botanical journals. And equally so, perhaps, from his association with the Department of Botany of the University of Chicago, of which he was the head from its foundation in 1896 until his retirement in 1922.

Born at Ningpo in China (Nov. 20, 1851), Coulters education in America, his alma mater being Hanover College, Indiana. He left College in 1872 and worked for two years in the Rockies as an assistant to the U.S. Geological Survey. The results of this work appeared in a Synopsis of the Flora of Colorado, by Prof. Thomas Porter and himself, in 1874, in which were also incorporated the results of the investigations of the earlier collectors. Coulters Manual of the Botany of the Rocky Mountain Region, published ten years later, was a more important piece of work, on the lines of Gray's Manual of the Botany of the Northern United States. With Memoir Watson, Coulters also edited the sixth edition of Gray's Manual (1890). Other contributions to American taxonomy were a Flora of Indiana with his brother, M. S. Coulters, which appeared as a Supplement to the Botanical Gazette (1891), a revision of the North American Umbellifer (1888), and a Synopsis of the Mexican and Central American Umbellifer (1900), both in collaboration with the late Dr. J. N. Rose.

Meanwhile, Coulters held various academic positions—Professor of Natural Sciences at Hanover College (1874-9), Professor of Biology, Wabash College (1879-91), President of Indiana University and Professor of Botany (1891-3), and President, Lake Forest University (1893-96) before he was appointed to the new Department of Botany at Chicago.

In 1876 he started the Botanical Bulletin as a medium for short floristic notes. From this modest sheet of four pages (subscription price, One Dollar) has developed the important journal familiar to the present generation of botanists. The name was altered with the second volume (with an increase in size to eight pages) to the Botanical Gazette, apparently in deference to the wish of some botanists, who feared that confusion might arise with the Bulletin of the Torrey Botanical Club. "However," the editor remarks we have selected a name which we are assured by an accomplished scholar and botanist means about the same thing.

Coulters retained the editorship for fifty years, at times in association with other botanists, and when in 1926 Prof. Henry Cowles took over the responsibility, Coulters name was retained as Editor Emeritus. In 1896 the Gazette became the property of the Chicago University and also a medium for the publication of the work of the School of Botany which Coulters was developing with the help of his assistant, C. J. Chamberlain. The work of this school is familiar to students in the volumes on the 'Morphology of the Seed-plants,' by Coulters and Chamberlain, which, besides embodying the results of the work of the Chicago school, supply a useful critical review of the subject, especially the details of sporangial development, fertilization, and embryology.

Coulters also shared in the production of a Text-book of Botany for Colleges (1911) and other works for students were Evolution of Sex in Plants, in the University of Chicago Science Series (1914), and a small handbook on Plant Genetics (with M. C. Coulters) (1918).

Coulters interests were not confined to his editorial and professorial
work. He had taken his share in the work of Scientific Societies and Associations. Among other offices, he had been General Secretary and, later (1915), President of the American Association for the Advancement of Science, President of the Botanical Society of America; of the Chicago Academy of Sciences, and the American Association of University Professors.

Among the marks of recognition for his services to botanical science was the Foreign Membership of the Linnean Society, to which he was elected in 1921. He was also an Honorary Fellow of the Botanical Society of Edinburgh and a Corresponding Member of the British Association.

On resigning his professorship at Chicago in 1925, he became adviser to the Boyce Thompson Institute of Plant Research, Yonkers, N.Y. He had been a member of the National Research Council since 1928. He died on December 23 last, after a few weeks' illness.—A. B. R.

RICHARD HIND CAMBAGE, C.B.E.

In the November number of the Journal we gave a short report of Mr. R. H. Cambage's Presidential Address to the Australian Association for the Advancement of Science at Hobart, and it is with much regret that we hear of his sudden death on November 28, at the age of 69. Though not a professional botanist, Mr. Cambage had made useful contributions to botanical knowledge in Australia. He held a Government appointment in New South Wales—Surveyor of Mines—and had served as Under Secretary for Mines. He was especially interested in Acacia seedlings and contributed a series of papers to the Journal and Proceedings of the Royal Society of New South Wales (1915–1924) on their form and development. He had served as President of this Society (1912–13), and was a frequent contributor to its Journal on subjects mainly of floristic interest. A series of notes on the native flora of New South Wales appeared in the Proceedings of the Linnean Society of N.S.W.

Mr. Cambage had wide scientific interests, and in the official intimation to its members and correspondents of "the great loss it has suffered by the sudden death of its President" the Australian Association refers to the loss to Australasian science of one of its most able and active supporters. He was President of the recently constituted Australian National Research Council, to the work of which he referred to his recent Presidential Address to the Association. His services to the Commonwealth were recognised by the conferring of the C.B.E.

Botanists who visited Australia in 1914 with the British Association will remember Mr. Cambage as one of the hosts at Sydney. He co-operated with the late Mr. Maiden in an account of the botany of certain areas of the colony in the British Association Handbook for New South Wales, and proved a very helpful guide in the long excursion to the Blue Mountains and the Jenolan Caves. He was elected F.L.S. in 1904.—A. B. R.

OBITUARIES.

RICHARD HENRY YAPP
(1871–1929).

By the untimely death of Professor R. H. Yapp, botanical science lost an ardent investigator and the University of Birmingham a gifted teacher. Born in the village of Orleton in Herefordshire in 1871, he was educated at a Secondary School in Hereford, and, having lost his father at an early age, was placed in business in Leominster. His strong inclination towards an academic career, however, led him to pursue his studies in evening classes and later on to attend lectures at Nottingham, which he did with such success that in 1895 he entered St. John's College, Cambridge, where he obtained a scholarship. Graduating with First Class Honours in Botany, he was awarded the Frank Smart Studentship of Gonville and Caius College, and was appointed botanist to the University scientific expedition to the Malay States. Of this excellent opportunity for a young naturalist to become familiar with tropical vegetation, he made the fullest use, and he always looked back with pleasure to this expedition, which was not without its adventures. Returning to Cambridge, he published several papers in the Proceedings of the Cambridge Philosophical Society and the Annals of Botany on plants collected in Malay, one dealing with "Myrmecophilous Ferns." His interest in the study of natural vegetation having been roused by his visit to the East, he was attracted by the peculiar environmental conditions of the fern flora and for many years he studied them carefully, publishing an account of the vegetation of Wickham Fen in the New Phytologist. Continuing his studies of fern plants, he published an important paper in the Annals of Botany, dealing with the development and structure of the leaves of Spirea Ulmaria as bearing on the problems of xeromorphy.

Elected to the Professorship of Botany in University College, Aberystwyth, Yapp commenced a detailed investigation of the interesting salt-marsh vegetation of the Dovey Estuary, two accounts of which appeared in the Journal of Ecology. His interest in this branch of botany was always profound, and, after serving on the committees of the Ecological Society for some years, he was elected President in 1921. His presidential address on the "Concept of Association" was followed a few years later by an equally interesting paper on the "Concept of Habitat," both of these publications indicating the development of his critical powers.

For these investigations and publications Yapp found time, in spite of onerous teaching and organising duties, not only while at Aberystwyth, but subsequently when he was elected to the Chair of Botany in Queen's College, Belfast, and, finally, as Mason Professor of Botany in Birmingham, a post he occupied since 1919. Here he was of late years busily engaged in planning and superintending the building and equipping of an excellent new laboratory, which was opened in the autumn of 1927. But, alas, Yapp was never destined to work in this spacious building. Already in the summer of that year he began to suffer, and at the beginning of 1928 the doctors had
diagnosed a serious ailment. But Yapp never lost courage or patience during his long illness. Cheerfully he set himself to complete some of the work he had had to lay aside when other duties were pressing, and though confined to bed he undertook and carried out the revision of the English Version of Prof. Maximow's book on the Plant and its Relation to Water, which dealt with problems closely related to his own investigations. The last proofs of this book were revised only a few weeks before his death, which occurred on January 22nd of this year.

Those botanists who were privileged to know Yapp will remember him as one of the most gentle and courteous of friends. Always keen to discuss botanical problems whether his own or those of others, he was ever ready with valuable advice and help. Those who saw something of his herculean behaviour during his illness will cherish the memory of a truly great man, and like these he had a most modest nature. His death is a great loss to botanical science, which can ill afford to lose so keen an observer and so ardent an investigator.—F. E. Weiss.

Percy Highley
(1856–1929)

Some of our readers will have a sense almost of personal loss in the death of Mr. Percy Highley who closed an association of more than fifty years with the Natural History Departments of the British Museum. During that period Mr. Highley has illustrated British Museum 'Guides' and 'Catalogues' and innumerable papers, official and otherwise, by members of the staff and other workers, in the publications of various Scientific Societies. Many of his drawings, both in black-and-white and water-colour, are exhibited in the public gallery, in the exhibits illustrating structure and classification of Sponges, Tunicates, Corals, &c., and especially those in the Botanical Gallery.

Percy Highley was born in London, Aug. 12, 1856. His father was the last of the old firm of medical book-publishers of Samuel Highley in Fleet Street; he studied medicine at Guy's Hospital, but did not practise. Through his father, Highley was brought in contact with Drs. Carpenter, Bent, Busk, and others. His first work was on the 'Challenger' Report, and included illustrations for the Polyzoa by Busk, the Sponges by S. O. Ridley and Dendy, the Corals by Moseley, and the Crinoids by P. H. Carpenter. In this way was begun his life-long association with the Natural History Museum.

His introduction to the Department of Botany was through George Murray, who taught him to make drawings of microscope preparations of Algae, and to hunt out and draw Peridiniæ, Diatoms, &c., in the marine dredging made largely by Murray himself. A number of these, unpublished, are in the Department, and in some are revealed the reproductive bodies of the Diatoms which had hitherto been very imperfectly known. Highley also illustrated Murray's short-lived Physiological Memoirs and his Introduction to the Study of Seaweeds. After Robert Morgan's untimely death in 1900, Highley became practically the unofficial draughtsman of the Department. His work in the Journal is familiar to our readers, and he also prepared illustrations for papers by members of the staff in the Journal and Transactions of the Linnean Society, and for official publications, notably the Monograph of British Lichens (Lorrain Smith) and the Flora of Jamaica (Fawcett and Rendle); his last piece of work was the preparation of the drawings for a Handbook of British Seaweeds by Dr. L. Newton, now in the press.

Highley was a good draughtsman and lithographer, and could also dissect carefully and draw floral details or work out points in microscope preparations. He took great pains and interest in his work, but would not be hurried, and he possessed to the full what is generally conceded, perforce, as the artistic temperament. He always looked ill and had probably long suffered from anaemia, to a precarious attack of which he eventually succumbed; but he was endowed with a cheery optimism, which must have stood him in good stead in the uncertainties attendant on his means of livelihood. The latter years of his life were rendered still more difficult by domestic trouble—his wife became an invalid—and his own increasing ill-health. He died at the home of his married daughter, his only child, at Wokingham, on January 23rd.—A. B. R.

SHORT NOTES.

Varieties of Rosa tomentosa.—I fear I have not made it clear that the Rose I have described as R. tomentosa var. scabriuscula Sm. f. Leesii mihii on p. 41 in my article "On some Varieties of Rosa tomentosa (Scabriuscula)" is the one referred to by Ley in Journ. Bot. 1907, p. 208, as a specialised form of R. scabriuscula Sm. It was first found by Arnold Lees in 1871, and was frequently gathered by the Messrs. Straits in that and later years by Harbold Lewis and Fisher. It has been labelled R. sylvestris Lindl. or Woods, R. britannica Desg., and R. jundzilliana Baker, but, as Ley has pointed out, none of those names suit it so well as R. scabriuscula Sm. forma. It is only slightly biserrate, a fact which I omitted to include in my description.—A. H. WOLLEY-DOD.

Schefflera minimaflora Ridl., comb. nov.—I propose to substitute this name for Schefflera micrantha Ridl., Flora of the Malay Peninsula, i. 861 (Paraturpia micrantha Miquel, Fl. Ind. Bat. Suppl. 377), as I find that Gaubbe, in Fl. Madras Presid. pt. iii, 569 (1919), has previously used the combination.—H. N. RIDLEY.

Abnormal Secondary Thickening in Amaranthaceae.—The axes of the root and shoot in the Amaranthaceae show no normal secondary thickening, the increase in growth taking place outside the secondary thickening, the increase in growth taking place outside the central cylinder by means of successive cambial layers. The first of these extra-fascicular cambia is produced from the pericambium, the second from the pericambium or pericycle. The function of the normal cambium, secondary ground-tissue being produced both inside and outside with collateral bundles embedded in it.

**THE PROBLEM OF SPECIES** (Anderson, E., "The Problem of Species in **Iris versicolor** L. and **Iris virginica** L.," Ann. Missouri Bot. Gard. xv. 241-382 (1926)).—This paper, intended as a contribution towards solving the problem of species, is, in the words of its author, "an intensive and extensive survey of two closely related species" and "an attempt to present a fairly complete picture of the variation within two natural groups of individuals over their entire range." The plants chosen for the study were the blue flags of eastern North America (**Iris versicolor** of Asa Gray's *Manual of the Botany of the Northern United States*, ed. 7, which were selected primarily because they were a comparatively simple, stable, and well-marked group, and also because, being common, conspicuous, colonial, and perennial, they possessed features which materially reduced the labour involved in locating and studying large numbers of individuals. An attempt was made to visit as many as possible of the range of the flags during their flowering season, and over a period beginning in 1923 numerous colonies were studied in detail and measurements made on twenty to fifty individuals of the characters chosen for study. Representative plants were taken from each of the colonies and established in an experimental plot at the Missouri Botanical Garden, where they were subjected to genetical, morphological, and cytological studies. This work was supplemented by taxonomic studies in various herbaria.

The **Iris versicolor** of Gray's *Manual*, ed. 7, is really made up of two distinct species. These are **I. versicolor** L., a northern and eastern species, and **I. virginica** L., a predominantly southern and western plant, the two having a narrow zone of contact in Michigan, Wisconsin, and Minnesota. An account is given of their history, geographical distribution, comparative morphology, and taxonomy, including for each a full synonymy and enumeration of herbarium specimens examined.

Wherever either species was studied, the individual plants of a colony were found to vary strikingly among themselves in every conceivable characteristic, both vegetative and floral. In order to summarize and average such differences a few were selected for concentrated study. The characters chosen were picked so as to fulfill the three conditions of being easily measurable, of showing some variability, and of not being easily affected by environmental influences. They included such characters as length, width, and taper of both sepal petals, and length of anthers and stigmatic crests. Tables are given summarizing the first five years' measurements of these characters. It is at once evident from these tables that no single measurement will serve as a criterion for separating the two species, and so, after pointing out the limitations of biometry in its application to taxonomic work, the author re-presents some of his data in the form of ideographs. These consist of a white rectangle, representing diagrammatically the length and breadth or petal, superimposed on a black rectangle similarly representing a sepall. In this way four distinct measurements are combined in a simple figure so as to show at a glance the size and relative proportions of sepal petals for any single flower. A set of such ideographs is given for each of twelve representative colonies of **I. virginica** and four of **I. versicolor**, each set comprising twenty ideographs drawn for as many individuals. The sets of ideographs demonstrate the striking variation in both size and proportion within every colony, and, in marked contrast to this, the general resemblance between colonies of the same species. While certain colonies have slight individual tendencies, there is practically no differentiation between the colonies from one region and another, the only generalization that can be made being that **I. versicolor** becomes on the average a little smaller towards the south and **I. virginica** a little larger. When composite "average" ideographs are formed by combining the average measurements for the individuals of each colony into a single diagram, the close resemblance between colonies of the same species is again evident, while at the same time the difference between the two species themselves is clearly brought out.

From experiments so far carried out in the experimental plot, whereby sister seedlings were grown side by side and the variation between them observed, it is concluded that **I. versicolor**, though usually self-fertilized, is frequently cross-pollinated under natural conditions. Other experiments show that **I. versicolor** and **I. virginica** are only partially fertile in crosses with each other, and that such hybrid seed as results has a low percentage of germination and produces seedlings showing hybrid vigour. Of the various crosses made only two have flowered, these being reciprocal crosses between the same two plants. The hybrids, though varying slightly amongst themselves, were remarkably uniform in general aspect. They were intermediate in all the differences which serve to separate the parent species, but on the whole resembled **I. versicolor** much more closely than **I. virginica**. They were partially sterile. Natural hybrids resembling those produced in the experimental plot were found at several points where the ranges of the two species overlap. These would be of more common occurrence but for the barriers which exist between the two species, including geographical barriers such as the extensive limestone areas west of the Alleghenies in which neither species is common, and physiological barriers which prevent them being wholly fertile with each other. At two localities, St. Ignace and Engadine, specially large hybrid colonies had arisen, and these were studied in greater detail. Descriptions of these two colonies are given, illustrated by ideographs which show the remarkable mixture of types to be found in such hybrid populations. The hybrid is accorded a special name, **I. robusta**.

As a result of his investigations, the author concludes that the
Linnaean species is a natural and permanent group, and that it, and not the Jordanian species, should therefore be the most effective one for purposes of classification. He considers that those who have believed the Jordanian to be of prime importance, taxonomically and phylogenetically, have ascribed undue importance to the fact that it comes true from seed. He gives an argument, illustrated by diagrams, to show that the division of a Linnaean species into Jordanians is a mere corollary of the amount of inbreeding which has obtained in that species. The Linnaean species may retain its individuality, though submitted to widely differing environments, for long periods of time, whereas the Jordanian is a relatively temporary unit of little taxonomic or phylogenetic significance. *Iris versicolor* and *I. virginica* must have persisted as recognizable units since they spread into their present homes at the close of the glacial period.

Concerning the bearing of his investigations upon the question of the origin of species, the author claims to have shown that for the material studied the differences between species are of an entirely different order from the differences between individuals. There is no evidence that these differences between individuals might eventually be compounded into differences comparable to those between the two species studied. The hybrid colony found at Engadine was apparently composed of similar true-breeding hybrids of natural origin. In view of the possibility of hybridization having been an important factor in the evolution of species, the author considers this apparently new and constant form produced by the hybridization of two separate species as certainly very suggestive.—J. É. DANDY.

REVIEWS.


The great increase in our knowledge of the *Peridinien* (Dinoflagellata) which the first edition of the *Pflanzenfamilien* was published has necessitated a much more extensive treatment covering more than three times the original number of pages. The detailed oversight thus given over the manifold types of organisms belonging to the class is of considerable value at this juncture, since nothing of quite the same kind has hitherto been available. Lindemann deals with the class as an expert, at the same time the zoological point of view is rather more to the front than the botanical one. This is perhaps no great disadvantage in a work used mainly by botanists, but Lindemann hardly gives the more definitely algal types the importance they deserve. The inclusion of Klebs’ *Cystodinium* and *Hypnodinium* in the genus *Gymnodinium* is scarcely warranted in the light of a comparison with other classes of Protophyta. It is tantamount to an inclusion of forms like *Chlororococcus* and *Chlorella* in the genus *Chlamydomonas*. Nor is the scanty reference to Pascher’s *Hlaamobithion* and *Dinithria* satisfactory, in view of the importance of these forms for an understanding of the evolutionary tendencies within the class.

It would have been useful if the main characteristics of the various subdivisions had been given in the scheme of classification on p. 38; as it is, this appears rather redundant, as it affords no more information than can be gleaned from the list of contents. The *Peridinien* are grouped as *Adinifere* (with *Hoplodinium* and the *Prosocentraeae*), *Dinifere* (incl. all the other motile genera), and the *Phytofide* (incl. Klebs’ *Phytofideae*). The *Dinifere* are subdivided into *Gymnodiniales*, *Amphileptales*, *Kollikwittiales*, *Diaphytales*, and *Peridiniales*. The *Diaphytales* are thus ranked equal with other subdivisions of the *Dinifere*, and there are two new subdivisions, the *Amphileptales* (forms with an internal skeleton) and the *Kollikwittiales* (forms with an unsegmented envelope). The *Gymnodiniales* include all the naked types, or as they have a simple membrane; they comprise the *Prosocentraeae* and *Nottocentraeae* without or with imperfect furrows, the *Gymnodinaceae*, the *Variohiaceae* with a complex ocellus, the *Colinocentraeae*, and the important family of marine parasites, the *Blastodinaceae*. *Hemidinium* and *Gladi- dium* are placed among *Peridiniales*. Such a classification is in line with the modern point of view.

The greater part of the volume is devoted to the *Bacillariophyta* (*Diatomeae*), and no better man than Karsten could have been found to bring Schütt’s masterly treatment in the old edition up to date. The general account of this difficult class, which covers nearly one hundred pages, is excellent, and the detailed treatment of the reproduction of *Diatoms* by one who has himself contributed so much to our knowledge in these matters is most valuable. Karsten deals at considerable length with Schmidt’s recent investigations on the reproduction of *Biddulphia sinensis* and concludes that the latter has definitely established the occurrence of reduction in this species prior to the formation of gametes (microspores), as appears universally to be the case in the pennate *Diatoms*. Karsten suggests that his original hypothesis as to the occurrence of reduction during the germination of the zygote in *Corethron valdiviae* may still hold, but it hardly seems likely that reduction division should take place at two such different points in the life-cycle of rather closely related forms.

The movements of pennate *Diatoms* are dealt with in detail, but one could have wished for more particulars relating to the raphes of the *Nitzschioideae*. The raphes of *Eunotia* is regarded as primitive, which may be a correct point of view, but that does not necessarily mean that it is the forerunner of the raphes of *Naviculaceae*, as seems to be implied. In the section (p. 111 et seq.) devoted to the occurrence of *Diatoms*, one misses a reference to terrestrial forms, nor are either Petersen’s or Bristol’s paper cited in the list of literature on p. 147.

In the account of the periodicity of *Diatoms* (pp. 195–199) mention might have been made of Pearsall’s views and of the writer’s work on
the periodicity of epiphytic Diatoms. But these are slight deficiencies in an account that is most valuable for its mass of detail and the clear presentation of the subject-matter.

The system of classification adopted is one that has been worked out jointly with Hustede, whose detailed synopsis of European Diatoms in Rabenhorst’s *Kryptogenamenflora* is at present appearing. Practically no changes have been made in the grouping of the Centrales (Centricum of the last edition), save that among the Actino-
diaecia, a fifth subdivision, the Actinoelombe, has been added to accommodate Müller’s genus *Actinocysta*. The Pennales (Pennate) are subdivided into Araphidaceae (without a raphe), Raphidioideae (with the beginnings of a raphe), Monoraphidaceae (one valve with a true raphe), and Biraphidaceae (both valves with a raphe). The Araphidaceae comprise the Fragilariaeae with Tabellaridae, Meridioideae, and Frugilariidae, except for the Enactiniae which constitute the Raphidioideae. Ceratoniaceae and *Amphicampa* are, however, left among the Fragilaridae as members of a new subdivision, the Amphi-
campaceae. The Monoraphidaceae include the Achnanthaceae, while the Biraphidaceae comprise the remaining pennate Diatoms which are grouped as Naviculaceae, Epithemiaceae, and Nitzchiaceae. A special family (Rhopaliodioideae) of Epithemiaceae is created for the genus *Rhopalodia*. These changes are not considerable and are in part on the lines suggested by Forti. They afford a rather more logical classification than the original one of Schütz.

The short section on Myxomycetes (excluding Plasmodiophorae and Acrasieae) is contributed by the well-known expert Jahm. The general acception is brief, but adequate. The affinities of the Myxo-
ycetes are discussed in detail and the derivation of the group from Flagellata is not supported. The classification adopted is rather different from that of Schroeter. The members of the class are grouped in nine series, the first of which, the Hydromyzales, comprises *Vampyrella* and other aquatic forms. Next follow the Exopasonae (Ceratoniomeza), while the remaining seven classes belong to the types with internal spore-formation. *Chlamydomeza* is treated in an appendix.

The volume is throughout provided with a wealth of excellent illustrations. — F. E. FRITSCHE.

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The last two decades are remarkable for the rapid expansion of the margins of the material sciences. Of botany and chemistry this is especially true: the student of plant physiology invades the realms of chemistry in the hope of revealing the many secrets of the life of the plant. But before he is quit of his own domain, he meets the chemist, yclept biochemist or physical chemist, exploring in the vegetable kingdom. There is, in fact, no definite limit between the sciences: as the late Sir Wiliam Bayliss once said to the present writer, “There is but one science, and that is not a subject, but a method.”

This freedom of search has sometimes led to great results. Pflüger’s work on osmosis was the foundation-stone of a great physico-
chemical structure, and the work of Willstätter laid bare the structure of the anthocyanins and of chlorophyll; but although the wider technique has enabled a better understanding of some biological phenomena and has exposed new problems, the discoveries made pertain to isolated bits of machinery which often cannot be fitted into the complex mechanism of the living cell without invoking further hypotheses. Wherefore we are as distinct as ever from a sure knowledge of the fundamentals of life. Indeed,

“We are afflicted by what we can prove,
We are distracted by what we know.”

These thoughts were occasioned by reading Heilbrunn’s *Colloid Chemistry of Protoplasm*, in which the author has assembled the results of some seven hundred and sixty memoirs. In so doing, he has kept in the forefront what protoplasm is rather than what protoplasm can do; for although “there is one kind of flesh of men, another of fishes, and another of birds,” and, it may be added, another of plants, since “all flesh is grass,” there is a fundamental similarity of living organisms which means a fundamental basis of life. To quote Heilbrunn’s words: “Those characteristics of protoplasm which are universal are almost certain to be intimately related to the machinery of the living process, whereas a characteristic peculiar to a few cells must be related rather to the life of these particular cells than to life in general. The biologist whose primary interest is to gain an understanding into the mechanism of life can afford to neglect the specific properties of certain types of protoplasm in focusing his attention on those properties which are universal.”

The first method of studying the structure of protoplasm was the microscopic examination of living cells. This gave important results, one of which was the great observation by Robert Brown, who was the first to describe those movements of particles in protoplasm which are now termed Brownian; the study of these movements has advanced our knowledge of the colloidal state and has played a part in the elucidation of the structure of the atom.

With the advance of microscopic technique, methods of fixing, and staining, great strides were made in the knowledge of the morphology of protoplasm, so that cytology became a specialized branch of botany. It has given many certain results and others less certain, the interpretation of which may be a matter for dispute—as will be realized by those who have followed a recent controversy in the pages of *Nature,—for the methods of fixation in killing the protoplasm may give rise to structures which do not obtain in the living state.

The recent technique of the ultramicroscope and micro-dissection should yield more certain results, but the difficulties in interpreting observations are considerable and great mistakes have been made. Thus Heilbrunn, in criticizing an author’s work, remarks that “a method which even occasionally permits of an error of 20,000 per cent. can scarcely be regarded as reliable.”

The results obtained by the applications of modern technique may
be indicated by a résumé of some of the conclusions drawn by Heilbronn in his last chapter.

The activity of protoplasm is involved in changes in its colloidal structure; the change from gel to sol and from sol to gel; if either of these states is kept constant, protoplasmic activity ends, and the cell is in a condition of anaesthesia or else it is dead. In general terms, the formation of an irreversible gel results in death.

The numerous types of protoplasmic activity have certain common features: thus, stimulation by mechanical pressure or by an electric current produces a rapid reaction which may be prevented by fat solvents, such as ether in 1 to 2 per cent. concentration. The reaction induced by the external agent is an increase in the viscosity of the protoplasm, which may amount to gelation or coagulation; on the other hand, the low concentration of fat solvent results in a decrease in viscosity.

The increase in the viscosity of protoplasm is accompanied by vacuolation: three stages may be distinguished: the first is the liberation of free calcium, the second is the union of the calcium with another substance to form a reactant, e.g., ovotrombin in the egg of the sea-urchin, and the third is a reaction between ovotrombin, or a comparable reactant, and protein to form a precipitation membrane, in which reaction calcium is set free and is available for a repetition of the reaction.

Substances like ovotrombin lower surface tension—that is, they are surface active and may quickly travel over surfaces. This is of importance in questions relating to the transmission of stimuli. Thus it has been shown that the reaction following a traumatic stimulus of a plant-tissue radiates from the wound: first, there is a movement of the nuclei of the cells adjacent to the wound towards the wounded surface; this is followed by a wave of increased viscosity which travels from the wounded part to the neighbouring cells; and, lastly, there is a wave of vacuolation of the protoplasm.

These conclusions are based on observations on the viscosity, elasticity, and electrical charges of protoplasm; the changes effected by temperature and other physical factors; and the action of acids, alkalis, salts, and fat-solvents. These, together with other matters, are considered by Heilbronn in *his Colloid Chemistry of Protoplasm*. The author has done his work remarkably well, and has achieved a valuable and very welcome result. The arrangement is logical, the writing is clear; there is an extensive bibliography and a subject and an author index. Naturally, there are features to which exception may be taken; the continuance of Loeb’s term “cytolytic,” for example, and the inclusion of some observations which are almost certainly incorrect. Further, it would have been of great help to those who are not specially versed in the subject, if greater use had been made of the judicial summary, especially when the evidence is more than ordinarily intricate. But these are matters of individual opinion, and their commission and omission do not detract from the high assessment of the work.—T. G. Hill.

FIFTH INTERNATIONAL BOTANICAL CONGRESS.

We have received the following notice from Dr. Briquet, from which it will be observed that the time for submitting motions on the subject of Nomenclature has been extended to the end of September next:

Motions on the subject of Nomenclature for consideration by the Congress should be in the hands of the Rapporteur général, Dr. John Briquet, before September 30, 1929.

Motions must be presented in the form of additional articles (or amendments) to the Rules of 1905-1910, drawn up in the form adopted in the International Code, and must be drafted as briefly as possible in Latin, English, French, German, or Italian. At least 100 printed copies must be presented.

According to the decisions of the Brussels Congress of 1910, only motions relating to new points which were not settled in 1905 and 1910 can be presented. Motions which do not answer to these conditions shall only be discussed if the Cambridge Congress of 1930 decides to take them into consideration.

For further information about the programme of work for nomenclature, apply to the Rapporteur général, Dr. John Briquet, Conservatoire botanique, Geneva (Switzerland).

BOOK-NOTES, NEWS, ETC.

Linnean Society.—At the General Meeting on February 14th, the President announced that the Hooker Lecture would be delivered by Dr. E. J. Allen, F.R.S., Director of the Marine Biological Laboratory, on March 14th.

Mr. G. Taylor exhibited a series of lantern-slides of Scottish plants growing in their natural habitats.

It was pointed out that the alpines which are distributed over the range of Lawers-Carleochan schist are sometimes peculiarly local. Slides of many of the more interesting of these plants were shown, and, in addition, photographs of the rarer plants of the Pine-wood association and of rare Scottish plants with extremely limited distribution.

Mr. E. G. Baker called attention to the disappearance of the rarer Scottish alpine plants, and mentioned as an example that he had failed to find *Eriophorum alpinum* in Scotland, although there were a large number of specimens in the British Museum collected in bygone days.

Mr. H. W. Puglsey endorsed Mr. Baker’s remarks regarding the growing scarcity of the rarer Scottish alpine species, and suggested that the depredations of rock-garden collectors might have something to do with it. He commented on the unusually large size of the specimens of *Listera cordata* shown in one of the photographs.

In his reply, Mr. Taylor, in reference to the questions regarding the relation of *Primula stricta* to *P. scotica*, stated that the latest view, as set forth by Prof. W. Wright Smith, was that *P. scotica*
itself was merely a subspecies of *P. farinosa*. He also stated that *Eriocaulon septangulare* was not found on the Scottish mainland, but occurred on some of the islands, and was identical with the North American plant.

The Botanical Secretary summarized a paper by Prof. S. R. Bose on "The Biology of Wood-rotting Fungi." The paper deals with twelve species of woody fungi, including *Trametes gibbosa*, *Polyergus adustus*, *Polystictus velutinus*, and *Stereum hirsutum*. The speaker commented on the attention that recently had been paid to the cultivation of the larger fungi. This is usually much less successful than the cultivation of microfungi, where all groups except rusts and millies may be said to have proved amenable to methods similar to those used in bacteriology. Whereas with microfungi it is usually possible to obtain normal fruit-bodies, these are comparatively rare in cultures of the larger fungi; when sporophores are obtained they are frequently abnormal.

**Botanical Appointments at London University.—** We have pleasure in noting the following appointments at University College:—

Dr. T. G. Hill to the University Chair of Plant Physiology, and Dr. E. J. Salisbury to the Quain Chair of Botany. Our good wishes on his retirement are also accorded to Prof. F. W. Oliver, who relinquishes the Quain Chair after nearly forty years of strenuous and eminently successful work.

**Royal Society.—** Among the fifteen candidates recommended by the Council for election into the Society we note the name of Prof. A. H. R. Buller, Professor of Botany, University of Manitoba, Winnipeg, Canada. Professor Buller is well known for his work in Mycology.

We are glad to note that the Empire Marketing Board has made a grant to the Royal Botanic Gardens, Kew, to assist in the preparation of floras of East Africa, British Guiana, and Trinidad and Tobago.

We hear with regret of the death of Prof. V. F. Brothers, of Helsingfors, the eminent Bryologist. Some account of his work will be given in our April number.

The London School of Hygiene and Tropical Medicine (University of London) have recently instituted courses in Tropical Hygiene for non-medical men and women proceeding to the tropics. A course, of nine lectures, will be given from April 24th to May 9th. Further courses will also be arranged later.

Full particulars and a synopsis of the lectures can be obtained from the Secretary, Malet Street, W.C. 1.

**A Correction.—** The "Notes for Students" in the *Botanical Gazette* for December last, p. 473, contains an erroneous reference to our "Supplement" on Gossweiler’s Plants from Angola and Portuguese Congo. The list itself is attributed in error to Gossweiler, who is also referred to as having “described a new genus of Leguminosae, *Dalbergiella*.” Mr. E. G. Baker is the author of the genus, as is clearly shown by reference to the publication.
POLLINATION OF AN AUSTRALIAN ORCHID, CRYPTOSTYLIS LEPTOCHILA F. MUELL.

BY MRS. EDITH COLEMAN.
(With Note by Col. M. J. GODFERY.)

(Plate 590.)

Since publishing a paper on this subject (Victorian Naturalist, May 1927), I have read with interest several articles in the Journal of Botany by Colonel M. J. Godfrey on the fertilisation of certain Ophrys species.

It is interesting to note how similar have been the observations of Monsieur Pouyanne in Algeria and those of Colonel Godfrey in France to those made here in Australia. As in the Algerian and French instances, an Australian orchid is pollinated in an extraordinary manner by a hymenopteron, which enters the flowers "backwards," thus removing the pollen on the tip of its abdomen instead of on its head!

The orchid, Cryptostylis leptochila F. Muell., occurs only in Victoria and New South Wales. The insect, Lissopimpla semipunctata Kirby, $\sigma$, belongs to a large family of ichneumon-wasps which parasitise the larvae of other insects.

Only males visit the orchids, in circumstances that leave no doubt that they are stimulated by sex-instincts, and enter the flowers under the misapprehension that these are females of their kind.

Though the orchid increases in the vegetative manner it relies on the collaboration of insects for an occasional cross, and its method of achieving this end is one of the most remarkable cases of adaptation.

The shape and colour of the labellum suggest the body of the female wasp, the glistening glands corresponding with the brilliant white spots on the abdomen of the insect. The narrow sepals and petals possibly suggest the antenna, ovipositor, and guides.

The colour of the labellum varies. In a freshly-opened flower it is often of a pale pink with dark reddish-brown lines and glands. If not pollinated it may remain open for weeks, when, as in several other species of our terrestrial orchids, the colour deepens into a rich red.

The female wasp has never been seen near the orchids, yet one may expose a few spikes in a locality where they are not known to occur, and in a few moments they are visited by the male insect.

During January large numbers of these males frequent the flowers, suggesting that the females have not yet emerged, or that they are busily engaged in carrying out their own special functions.

Apart from the resemblance of the flowers to the female wasps it is fairly certain that their perfume, though almost imperceptible to us, is conveyed to the male wasps over quite long distances.

In entering the orchid the abdomen of the insect takes a sickle-shaped curve and its tip possibly penetrates the stigma. Its upper surface, at the last segment, rests on the prominent rostellum, on which, when ready to emerge, the wasp exerts pressure.

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This pressure releases the pollinia and they are withdrawn on the body of the insect. They adhere at right angles to the abdomen, the curve of which has allowed their withdrawal clear of the stigma.

The usual depression of the caudicle and the straightening of the insect's abdomen bring the pollinia parallel to it, slightly projecting beyond the tip, in the exact position for striking the stigma of the next orchid visited.

If not disturbed the insect undoubtedly effects cross-pollination of the most beneficial type, for, before the impulse again prompts it to enter a flower, it will most likely have flown to a distant spike.

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A. Ichneumon (Lissopimpla semipunctata) visiting flower of Cryptostylis leptochila. The insect with abdomen inserted is clasping the labellum.

B. Flower. S, sepals; p, petals; L, labellum showing the paired dark spots (G) which suggest the markings on the abdomen of the insect; b, anther; r, rostellum; St, stigma.

C. Enlarged view of base of labellum and the column. f, fleshy fold of labellum; a, anther; d, viscid disc; s, stigma seen behind the anther; r, pair of nectarial on base of column; p, lateral petal.

(From drawings by Mr. Tarlton Raymont.)

But if disturbed it may enter a second, and even a third, flower on the same spike—not quite such a desirable cross as that from a distinct plant.

Very occasionally a disturbed insect has re-entered the same flower, in which case it impregnates the orchid with its own pollen, removed on the first visit.

During January the wasps are particularly eager. On two occasions a flower, with its visitor, has been dropped into a killing-bottle. Becoming disengaged from the flower it was tipped out of the bottle on to a table, where it lay apparently dead. In a few seconds it revived, swiftly entered another flower, and removed a second pair of pollinia.

The case is not so singular as was at first supposed, for observation of several other Australian orchids points clearly to similar partnerships.

Note.—Lissopimpla semipunctata appears to visit Cryptostylis leptochila exclusively, for, although Cryptostylis subulata Labill. sometimes grows in close association with the latter, the insect does not appear to visit it, for no hybrid has been found between them. Dr. K. S. Rogers, the leading authority on the Australian Orchidaceae, has never seen a hybrid in the genus Cryptostylis. In this respect it resembles the North African Ophrys spectabilis, which is solely visited by Dielis ciliata (Journ. Bot. 1925, p. 84). The removal of the pollinia on the end of the insect's abdomen is exactly parallel with the case of Ophrys fucua and O. lutea, in which the species of Andrena concerned assume the same reversed position.

Some doubt has been expressed as to whether the resemblance of the lip of the flower to the female Lissopimpla is sufficient to deceive the male. It seems to be agreed that the vision of insects is very inferior to ours. But so long as one or two salient points are suggested, exact resemblance to the insect concerned is unnecessary. The metallic blue centre of the lip and its fringe of red hair in Ophrys speculum are quite enough to convince the male Dielis ciliata that he sees the sheen of blue wings and the red-fringed abdomen of his long-looked-for mate. The shadowy and indefinite markings on the lip of O. fucua and O. lutea (which only suggest an insect to us when viewed from a distance) are quite enough to persuade an Andrena that he has found what he wants. In her second paper in the Victorian Naturalist, 1925, p. 334, Mrs. Coleman says:—"A glance at the strange labellum . . . with its double row of dark glistening glands that gleam in the hot sunshine . . . is perhaps sufficient to justify the theory of an attraction based on the resemblance of the flower to a female wasp. Even to our eyes the likeness is apparent. To the inferior eyesight of the insect the resemblance may be still more convincing." Further, in all the above cases, insects are attracted to the flowers from a distance, showing that by the emission of scent or of some other attractive agency, the flowers are able to convey knowledge of their existence. That the appeal is not to the desire for food, but to the strong sexual urge of the male, was sufficiently evident in the case of certain species of Ophrys, and is confirmed in a remarkable manner by Mrs. Coleman's discovery that the sexual claspers of the male actually become engaged with the base of its labellum, so that resistance can be felt when the insect is pulled away.—M. J. Godfrey.

Explanation of Plate 330.

(Drawn by W. H. Nicholls.)

Fig. 1. Flower fully expanded, slightly enlarged. Fig. 2. Flower-spike, nat. size. Fig. 3. Leaves showing upper and under faces.
NEW AND NOTEWORTHY SPECIES OF COMBRETUM FROM WESTERN TROPICAL AFRICA.

BY A. W. EXELL, M.A., F.L.S.

The following paper contains descriptions of some new species of Combretum from Western Tropical Africa and notes on various points of taxonomy and nomenclature—the area dealt with extending as far south as the boundary between Portuguese Congo and Angola proper. I have followed, in this work, the sections proposed by Engler and Diels in their Monograph of the African Combretaceae. These sections seem to represent, in the main, natural groups; and, though the discovery of many new species since the date of the monograph may lead to some reorganisation of the sections, I find myself in general agreement with the system of classification proposed in it.

I have also indicated, in a few instances, the relationship of some of the more recently described species from the area.


C. Butzki De Wild. in Ann. Mus. Congo, v. i. 196 (1904). This is undoubtedly the same as the earlier C. laxiflorum Welw., thus extending the range of that species to the Belgian Congo, where it is widely distributed. Native name "Zoati" at Katompe, Belgian Congo (fide De Giorgi) and "Maaqsoo" in the Territory of the Lobanguile, Angola (fide Markes).


Native name "Swatchi" (fide De Levoy) or "Swaadschi" (fide Robyns). "Employé pour faire les ustensiles utilisés pour faire la bouilli de farine" (Robyns).

Leaves 5.11–2.4 cm.; petioles 5.12 mm. long; inflorescences composed of elongated spikes 4–8 cm. long forming axillary and terminal panicles up to 15 cm. long; lower receptacle 2 mm. long; upper receptacle 2 mm. across, or 4 mm. across including the calyx-lobes when fully expanded; petals 1.5–5 mm.; stamens 1.8 mm. long; style 1.5 mm. long; fruit 2×1.8 cm. (somewhat immature), with wings about 6 mm. across.

This species belongs to Sect. Hypocrateropsis Engl. & Diels, and must be placed in the vicinity of C. imberbe Warw., C. primigenum Marloth, C. podoides Engl. & Diels, and C. contractuum Eng. & Diels, all of which agree with C. Giorgii in having a pilose disc. C. Giorgii can be distinguished from C. imberbe and C. primigenum by its paniculate inflorescences, absence of thorns, and less densely sealy leaves; while it differs from C. podoides and C. contractuum by its much larger leaves and inflorescences.


C. Obanense Hutch. & J. M. Dalz. in Fl. West Trop. Afr. i. 221 (1927). (C. paucinerium Engl. & Diels var. obanense Bak. fll. in Cat. Talbot's Nigerian Pl. 38 (1913).) This is undoubtedly correctly regarded as a distinct species rather than a variety of C. paucinerium Engl. & Diels, although certainly related to it and belonging to this section.


Leaves 11-12 x 3-8 x 5 cm.; petioles 10-12 mm. long; inflorescences composed of spikes up to 8 cm. long forming panicles about 8 cm. long; lower receptacle 1.5-2.5 mm. long; upper receptacle 2.5 mm. across, or nearly 5 mm. across including the calyx-lobes; petals 1.5-2 x 4 mm.; stamens 3-3.5 mm. long; style 2 mm. long.

This species has distinctly larger flowers than any other of this section.


Sect. **OLIVACEAE** Engl. & Diels.


The following new localities may be cited for this species:—


C. **APEZEEI** Engl. & Diels in Mon. Afr. Fl. iii., Combretaceae (1899), 22, non G. Don. Up to the present known from Upper Guinea and the Cameroons, this species is now recorded from the


Leaves 7-9 x 3-4 cm.; petioles up to 1 cm. long; inflorescences forming terminal panicles up to about 10 cm. long and 7 cm. across; lower receptacle 1.5 mm. long; upper receptacle 2.5 x 5 mm., including the calyx-lobes, the latter measuring 1 x 8 mm.; stamens 2 mm. long; petals 1 x 2-3 mm.; style 5 mm.

This species is near to *C. cuspidatum* Planch., under which name it was distributed. It differs in having inflorescences with reddish scales, while those of *C. cuspidatum* are almost tomentose, and smaller more gradually acuminate leaves with the principal nerves fewer and relatively wider apart.

**Combretum calviformia** Exell, sp. nov. *Frutex* scandens f., ramulis primo fulvo-tomentosis demum glabrescentibus. *Folia* petiolata, petiolo primo fulvo-tomentoso demum glabrescente, late elliptica vel oblongo-elliptica, apice breviter acuminata basi rotundata, omnino juvenitae fulvo-tomentosa mix glabrescentia demum glabra vel fore glabra, costa lateralisibus utrinque 8-9 supra parum impressa subtus prominentibus. *Flores* tetrameri in spicis valde ramosas panicu-


Leaves 9-14 x 4-8 cm.; petioles 10-15 mm. long; bracts up to 3 mm. long; lower receptacle 1-1.2 mm. long; upper receptacle 1.5-2 mm.; petals about 1 mm. long and 1.2-2 mm. broad; stamens 3-5 mm. long; style 4-4.5 mm. long.

This species is nearest to C. Afzelii Engl. & Diels, but can be distinguished by the leaves, which are slightly acuminate and not rounded at the apex, and by the tawnyomentum which covers the young parts of the plant. This tomentum apparently wears off very completely, as the older leaves and one inflorescence are almost glabrous. It seemed at first probable that Vanderyst 4148 in the Brussels Herbarium and a small piece in the top right-hand corner of the sheet of the same number in the British Museum Herbarium did not belong to the same species as the remainder of the specimen in the British Museum Herbarium; but I am of the opinion that they are different states of the same species. If future collecting should show that there is a mixture under Vanderyst 4148, the name C. colvense is to go with the larger glabrescent specimen in the British Museum Herbarium.


Leaves 8-14 x 3.5-7 cm.; petioles up to 12 mm. long; spikes 4-6 cm. long; lower receptacle 1.5 mm. long; upper receptacle 1.5-2 x 2 mm.; stamens: longer ones 3-5 mm. long, shorter ones 2-2.5 mm. long; style 3-5-4.4 mm. long.

Native name “eke.”

This species is nearest to C. Afzelii Engl. & Diels, from which it can be distinguished by the shiny acuminate leaves. It can be readily distinguished from most other species of the section by the conspicuous yellowish-white scales on the upper receptacle which seem usually to be densest towards its apex.

(To be continued.)
Yorkshire, mid-west; v. c. 64. Ribblehead, 1891 (J. Beanland). Durham; v. c. 66. Near Winch Bridge, Teesdale, 1888 (H. T. Mennell).

Our ordinary British plant appears to be this subspecies and not Soó’s “typus,” which he describes thus—“Caulis: 15–35 cm. altus, perennatus, internodis numerosis, brevisi ramis horizontaliter patentibus vel procumbentibus vel ascendentibus. Folia caulina 5–8 mm. lata, intercalaria 0–2 paria. Inflorescetieae ininitum ad nodum 5–8. situm. Bracteae plerumque integerrimae, cotyledones desunt.”


f. Ovatum Spenn.

“Folia ovato-lanceolata, 20–35 mm. lata.”


Subsp. Oligocladum (Beauv.) Soó.

“Caulis 20–30 cm. altus, simplex vel ramorum paribus 1–2 brevibus varo florigeris, internodis elongatis. Folia 6–8 mm. lata (cfr. formas) intercalaria 0, rarius 1 paria (f. rigidum Beauv., M. 494 pro subvar.). Cotyledones desunt. Inflorescetieae ininitum ad nodum 3–4. situm. Bracteae uti spp. ovatae.”


Subsp. Purpureum (Hartm.) Soó f. Scotianum (Beauv.) Soó.

[In the Monograph this form is placed under subsp. montanum (Johnst.) Soó.]

“Folia paulo latiora, 2–3 mm. lata, inflorescetieae ininitum ad nodum 3–4. situm, corolla purpurescens? (sec. diagnosim Beauv. hoc partinere videtur, anno spp. propria?). Scotia.”


Subsp. Montanum (Johnston) Soó.


Var. Eriococcus D. Oliver.

“Ramis elongatis, patentibus vel areatae, folia latiora, 4–5 mm. lata, intercalaria 0–2 paria (annae spp. propria?).”


Subsp. hians (Druce) Beauv.


f. Platiphyllum Beauv.

“Folia 10–15 mm. lata.”

Somerset, S.; v. c. 5. Porlock Weir, 1898 (C. E. S.).

f. Britanicum Beauv.

“Folia usque 20 mm. lata, inflorescetieae ininitum ad nodum 3–4. situm.”

Yorkshire, N.W.; v. c. 65. Near Winch Bridge, Teesdale, 1911 (C. E. S.).

DURLEI ITER ASTURICUM BOTANICUM.

BY C. C. LACAITA, M.A., F.L.S.

In 1835 Durieu de Maisonanneau* explored the western part of Asturias, the Province of Oviedo, on the north coast of Spain, which then was a region botanically unknown. His collections were studied by that meticulous botanist Jacques Gay, and, when published in the following year, were distributed with labels drawn up by Gay.

* This is the usual spelling, but Gay spells it Maison-Neveu, and Desmoulins spells Du Brie, and consequently gave the name Corsiæum Brie instead of Durieœ to one of Durieu’s plants.
containing the original diagnoses of 32 species, new, or at the time thought to be new.

The *Annales des Sciences Naturelles* for 1836 (ser. 2, vol. v.) contains an account by Gay of Durieu's journey, written in Latin, under the title of *Duriei Iter Asturicum Botanicum*, which breaks off at page 355 of that volume. Although a continuation is there promised—"continuatio"—no more ever appeared, nor can I find any more in the original MS., which may be seen in vol. xvi. of Gay's MSS. preserved at Kew. What happened? Was no more written?

The intention to publish the diagnoses is evidenced by the existence of certain uncorrected printer's proofs, attached to the specimens from herb. Gay at Kew, and marked by the author "December 23rd, 1837, ined." It is odd that there should be no reference to the missing sequel in later parts of the Ann. Sci. Nat. Was there a quarrel?—The subject is referred to by Desmoulins in Cat. Dordogne, (1840) 41, "la publication de l'Iter Asturicum ayant été suspendue, au grand détriment de la science et sans espoir de reprise."

In the *Iter* Gay mentions the plants collected by Durieu, without any formal list, giving names to sundry new species, but as there are no diagnoses these are *nomina nuda*, although regularly quoted in *Index Kewensis*. Even Willkomm, in *Grundzüge der Pflanzenverbreitung auf der österreichischen Halbinsel*, p. 11, inaccurately says that Gay described the species in Ann. Sci. Nat. It has therefore been more usual to refer to them as "Gay in Durieu Pl. Astur. Excise, no. —", the diagnoses or descriptions being printed on the labels. As these are only accessible where sets of the Pl. Astur. Excise. are to be found, and as later authors—e.g., Willkomm—have frequently substituted their own descriptions for Gay's original ones, it may be useful to publish those that are preserved in Gay's MSS. at Kew in the same volume as the *Iter*. These are mostly identical with those on the labels, though occasionally with some slight verbal difference, but a few are much fuller. Five out of the whole number described are missing from the MSS. which Gay, more suo, wrote on little scraps of paper; some may have been misplaced in another of the many volumes of the MSS., but so far I have been unable to trace them. These missing descriptions can be recovered from the printer's proofs mentioned above; but for one of them, *Capsicum Rutili*, no. 30, Gay does not appear to have drawn up any diagnosis, for the curious reason explained under that number.

**Extracts from Gay's MSS.**

1. *Avena sulcata* Gay (December 23rd, 1837, ined.) [Durieu, Pl. Astur. 176.]

A. radice perenni, fibrosa; culmis brevissimis; folia brevibus, planis, late linearibus, obtusiusculis, margine scariosculis, vaginis glabris, levissimis; panicule simplici, contracta; spiculis 3–5-floris; glumis brevissimis, inferiori 5-nervi, superiore paulo longiori, trinervi; flocculo gluma longioribus, rachilla sub flocculo villosissima; paleis

* By kind permission of the Director of the Royal Botanic Gardens.
3. Carex filifolia Gay. [Durieu, Pl. Astur. 204.]

C. spicis sexu distinctis; mascula solitaria; femineis 1-2, sessilibus, breviter bracteatis, paucifloris, fructiferis echinatis, apice summo masculis; squamis femineis ellipticis, obtusisimis, muticis; utriculis squamis dimido serè longioribus, glabris membranaceo-marginitatis, ex ovata basi longe acuminato-rostratis, rostro scabriculo, longiusculo bidentato; stigmatibus 3; nuce acute trigono; folis illiformibus triquetris, calmo graciol obtusè trigono dimido brevioribus, radice repente.

Habitat in decliviibus paludosis montium Asturicorum humiliorum (speciatis in monte del Chorro et in Sierra del Aguilar propé Gradum), ibi Junio ineunte fructificans (Durieu).


Obs. Prorsus nova mihi videtur, nec ulla quan noverim aut descriptam inveni ætatem cognata.


C. spicis sexu distinctis, mascula solitaria, femineis 2-3, remotis bracteatis paucifloris, erectis, omnibus externè pedunculatis; squamis femineis oblongo-ellipticis, obtusissimis, muticis; utriculis squamis paulò longioribus, glaberrimis, levissimis, elliptisœ, obtusè trigonis, abruptè brevissimè rostratis, ore integro; stigmatibus 3; nuce elliptisœ, obtusissimè trigona; folis planis; gramineis, calmo trigono ferè triplò brevioribus; radice repente.

Habitat in montium Asturicorum (pie de Canellas, pie de la Sarratina, pie d Arves, puerto de Leitariegos, etc.) pasceis alpínis, ibi medio Julio fructifera (Durieu).

Radix repens, multos steriles foliorum fasciculitis emittens. Culmi pedales, erecti, trigoni, striati, lavissimi, basi foliati. Folia calmo triplò ferè breviora, 5-6 uncatas longa, rigidula, plana, graminea,

6. SERAPIAN OCCULTATA Gay. [Durieu, Pl. Astur. 226.]

S. folis linear-lanceolatis, inferioribus patulis, una alteravis superiores breviusculi; bracteis erectis, ovato-lanceolatis, acuminatis circa 4 mm., floribus brevioribus, bracteis patulis. Flora brevissima, ovata, perennis, anguste lanceolata, circum 3–4 mm. longa, 1–1 ½ mm. lata. Racemosus segmenti 3 superioribus in unum ovario angustius densitatis; labellis trilobis parte dimidia inferioris lobis lateralibus breviores, inclusa, medio lobo exserto, dependente, brevi, anguste lineari-lanceolato.

Habitat in Asturiae pascuis siccis maritimis circiter portum Gijon, nominatis in promontori Ponta del Corono, ibi exsurgent Maii floribus.

Statura Serapiacum longum, que differs, (1) floribus paulo brevioribus, majoribus breviusculis spicatis, liberis, patulis, non caulis adpressis et bracteis involutis, (2) bracteis brevioribus, membranaceis, patulis, non erectis, opacos, flore quod aquasibus, (3) shorini segmentis superioribus in unum latæ ovatum, ovario longius, non anguste lanceolatum et ovario ovulorum, (4) labellis dimidio parte inferiore eum lobis laterales (lapidatorium Rich. patula, semi-exserta, non erecta inclusa, (5) lobe medio (epichydrum Rich.) tripus longior et latior. Foliis inferioribus vaginis rubro-maculatis, floribus 3–12. Labellis lobis laterales purpureis, ovatis, bracteis omnino inclusi; lobis medius angustissimis, ferre linearis, testiculon-liridis, majori quam in Lycopsis pilosus, anthesi ineunte recte dependens florique adpressis, postea fruticulosa (Durieu, ex viei).

Fruco dulce, genuina species, quam ego inter descriptas (preter Cordigaram et Lycopsis verisimiliter omnibus spurious) non inveni.

7. REMEX SUFFRUTICOSUS Gay. [Durieu, Pl. Astur. 230.]

R. caule nanissimis, inermi ligneo; foliis rameis omnibus petiolaribus lanceolatis, lineari-lanceolatis hastatis, lobis subulatis, indiscis; florebus diaeicis, femineis racemosis, paniculatis; pedicellis infra medium articulatis; sepalis exterioribus longè supra pedicelli articulum nascentibus, denum patulis, non reflexis, exterioribus cordato latai ovatis, obtusissimis, integerrimis, reticulato-renosis, neutro graniferi; stylis ovario adnatis; caryopsis sepale internis dimidio breviori, oblongo, apice basique equiliter attenuato et acutata.

Habitat in petrosis alpium Asturiarum, videlicet in meridionali declivitate et paulo infra caunem montium altissimorum pic di'Arvo et pic de Canellas, exsurgent Julio fructiciens (Durieu).}

Radix non viscosa. Caulis pedalis et ulterius, adscendens, lignosus, nudus, purpureo-fuscus, nanissimus, ramis intertextis, 7–8 uncias longis, herbaceis, foliosis, tetragononis, glanduis, lateribus unistriatis. Folia radicalia et caulina nulla; ramea omnia petiolarata, petiolo supputato pollicaria, viridia, utrinque glandulosa, omnia hastata; petiolo filiforme, apice parum dilatato; lamina paulo longior, uninervis, anguste linear-lanceolata, 6–8 lin. lata, maximum unum lin. lata, margine subrevoluta; lobis laminae dimidio brevioribus; dimidio anguste linear-lanceolatis, oppositis, apice semper acuminatis. Ostii, apice sepe aurum arneta. Ochreae ad foliorum basi parva, membranaceae, truncatae. Flores dioici; masculi hexandri, minutù, remotè verticillati, in unoquoque verticillo 2–3, antheris filamento brevissimo majoribus; feminei majoris, in unoquoque verticillo 3–6, verticillii racemosis, racemis in ramorum apio 6–8, paniculatis, panicula fructifera satis conferta, oblongo-obovoida, 2–3 unciae longa, ovata. Femaerum pedicelli capillares, paulo infra medium articulati. Perigonii fructiferi segmenta exteriora a pedicelli articulo longe remota, parva patentissima, nunc quam verò reflexa; inferioria plus triplo longiora, unam et dimidiam lineam longa, libera (basi non conata), erecta, lateris cordata, obtusissima, integerrima, membranacea, reticulatum venosa, primum purpurea, demum pallida. Stamina rudimenta nulla. Corolla perigonii interiori dimidio breviore, parva, libera (cum sepala inferioribus basi non concreta), oblongo, acute trigona, apice basique equiliter attenuata, acute acuta, hastata, castanea. Stamina cum caryopsis angulis longè conatis. Stignata in suppetentibus jam lapsa.

Obs. Pertinet ad Acoptosum subgenus, in quo species ferè omnes sepalis exterioribus gaudent demum sponte reflexis. Quæ paucissimae ablatund (R. Acetosella, R. multifida et similis) caulem habent tenum, totum herbaceum, flores minutisimis, pedicelli apice summo articulatis (malum Camperda (Rum. p. 129 et s.), S. et multifida pedicellis inarticulatis tribuit), sepalis interioribus ovatis, neutræque cordatis, longitudine et latitudine cariosae, basi cum cariosae concretae, exteriora sepalis interioribus arcût adpressa, ideoque verò erecta, non patentia, cariosae demineque ellipticoide-triquetra, non oblonga, quibus notis dicte species a nostris omnino abhorrunt. Hae itaque nova est sensenda et ab omnibus tum in Campdenii monographia, tum in Schultesii Studiis et Veget. descriptis distincta. Paniculæ ejus R. Acetosella et affines non nullæ repertae, qui tamen caulis herbaceis, sepalis interioribus graniferis, exterioribus reflexis pedicelloque adpressis diversissimi. Nostra propria fortè sibi poscit sectionem inter Camperdiannus § et §§ (Monogr. p. 68) locandam, sepalis exterioribus non reflexis ab §, habitu et sepalis exterioribus non omnino erectis a §§ distinguentem. Folia recentia inspida, neutræ qua acidis (Durieu in litt.), quæ nota ab omnibus aequalibus differt noster.

(Toc be continued.)

JOURNAL OF BOTANY.—VOL. 67. [APRIL, 1929.]
SHORT NOTES.

Wood Walton Violets.—After much recent study of this group and a renewed sight of those I collected at Wood Walton twenty years ago, I have come to the conclusion that there are three prominent species, producing endless varieties—(1) *canina* with its rigidity, (2) *stagnina* with its laxity, pointed leaf-blades, and very round flowers, and (3) *montana* with its laxity, unsymmetrical leaf-outline, and narrower, longer, more ragged petals. And that all three are represented in most of the plants, especially in those which I ventured to name provisionally "triple hybrids." This conviction has been strengthened by some drawings recently received from Mr. R. W. Butcher of Cambridge. —E. S. GREGORY.

**Asplenium Adiantum-nigrum** Linn., Near Goathland, North Yorks.—On the 17th November, 1928, Dr. W. Arthur Sledge of Leeds found *Asplenium Adiantum-nigrum* growing on masonry near Goathland. A specimen of this fern has been submitted to Dr. G. C. Druce, and he refers to it as "an obtuse form" of the Black Sphegwort. It is not included in Canon Fisher's *List of the Whitby Flowering Plants* among the cryptogams given therein, and to the best of my knowledge and belief it has not been recorded in the Whitby district. Baker includes it in all areas. Now the Esk area covers a tract of country from Marske to the south of Robin Hood's Bay along the coast, and to Rosedale inland. Canon Fisher's Whitby district is, therefore, a large portion of this area. I consequently conclude that *Asplenium Adiantum-nigrum* is a rare plant in Baker's Esk area, No. 4.—R. J. FLINTOFF.

**The Economic Possibilities of Rice Grass (Spartina Townsendii).**—James Bryce (Journal of Ministry of Agriculture, Dec. 1928) describes the experiments carried out by the East Anglian Institute of Agriculture in Essex. The experimental plantations of *Spartina* were only begun in 1926, so it is early yet to form any conclusions on the erosion or accretion problems. Meanwhile, the aim has been to introduce the plant to as many and varied situations and conditions as possible and to watch developments. The plantations at Northey Island near the head of the estuary of the Blackwater have been the most successful so far. The main objects of these plantations were to establish a type of vegetation more suitable than that already in possession, for the purposes of fodder and to counteract erosion. Out of the three plots laid down, two were successful, one inside and the other outside the sea-wall. The unsuccessful plot was on a wide "pan" of soft bare mud in an angle between the sea-wall and the saltings. The owner of the island was so satisfied with the progress of the two plantations by the end of 1926 that he has now planted about 15 acres, and has reason to hope that before long he will be able to increase considerably his head of stock as a result.

In 1926 Rice-grass was introduced on some of the more exposed mud flats in the Blackwater estuary. Four small plantations were made, two of which were complete failures. These were both on the lower Zostera flats, where the mud is very soft and the plants are exposed to strong currents and heavy wash. At Goldhanger, however, three plants out of a hundred managed to survive, and these by July 1926 had doubled their number of shoots, flowered for the first time, and were at last beginning to spread. At Bradwell, where the site chosen resembles the sites at Northey, the results are distinctly promising.

In April 1927 the sloping lower face of a new section of sea-wall at Mundon was planted up, and, although there has been a small mortality amongst the plants, the remainder have grown well. The results of these experiments have aroused considerable interest among occupiers of land along the Essex coast, and there is consequently a demand for more information on the subject, but the work will have to be continued and extended before it will be possible to draw up hard-and-fast rules for the guidance of those desirous of utilizing *Spartina Townsendii*.

The same Journal, for January 1929, contains an article by F. Knowles on the composition and nutritive value of the grass. A sample obtained on July 4th, 1927, was chemically analysed and was found to have a somewhat similar composition to good or very good meadow-hay, but the mineral composition was somewhat unusual, as might be expected from its habit of growth.
Feeding trials as to the digestibility of the animal nutrients present when made into hay proved that the hay had no deleterious properties, but a nutritive value equal to that of poor meadow-hay. As the Spartina hay used for these trials was made under bad conditions, it seems reasonable to suppose that it could be equal to good meadow-hay if made under favourable conditions. It is also suggested that Spartina silage might be better suited for stock than either the green plant or the hay, as a good deal of the salt would probably be expelled during ensiling.—Doris Powell.

Epiactis atrorubens Schultz in Devon.—Remembering that the late Dr. D. St. Brody did much botanical work in the Bristol district, as noted in my Flora, Mr. C. E. Salmon has kindly sent me a portfolio of twenty-four pressed orchids—admirably prepared and mounted—collected by St. Brody during the last ten years of his life. The set had been presented to a person at Plymouth shortly before his death. Its main interest attaches to a specimen of Epiactis atrorubens Schultz from “moist ground, Crown Hill, Plymouth.” If this be reliable, and the plant seems right, a rare species is added to the flora of Devon. Before acceptance, however, one would like to clear up a few mysteries. To begin with, this orchid is a plant of dry limestone, not of moist ground on slate and granite. Then Briggs who, so far as I know, left nothing in his area to be gleaned after his day, records E. latifolia only from the vicinity of Crown Hill. The labels on these specimens bear St. Brody’s name in print, but were not written by him. Together with the accompanying list, they are in a schoolboy hand. Moreover, there are one or two misnomers, errors for which we cannot believe the Doctor to have been responsible. As the sheets all bear the same serial number, it may be conjectured that similar sets had been prepared for sale, St. Brody being destitute of means, and that this one was put together during his last illness. Should this surmise be correct, some reader of the Journal may possess material needed to substantiate the Devon claim.—J. W. White.

JOHN RAY'S LETTERS*

The Ray Society has now devoted a third volume to the life and correspondence of the great naturalist whose name it commemorates. The first, Memorials of John Ray, issued in 1846 under the editorship of its Secretary, Dr. Edwin Lantock, was followed in 1848 by The Correspondence of John Ray, prepared by the same editor. The present volume is the outcome of a rediscovery in the Bodleian library of a number of letters of John Ray which supplement the volume of The Correspondence. For, as Dr. Gunther explains in his Preface, “whereas some four-fifths of certain parts of that volume are devoted almost exclusively to the letters of his correspondents to him, the Bodleian collection consists of the more important of Ray’s own letters to his two Oxford correspondents, John Aubrey, the antiquary, and Edward Lhwyd, Keeper of the Ashmolean Museum.” In addition, “an enquiry at the Royal Society resulted in the finding of a series of nine letters in Ray’s holograph addressed to the Secretaries, Henry Oldenburg, Waller and T. Robinson, between 1670 and 1683.” The contents of these letters were probably reported at the meetings of the Society, and some were published in the Philosophical Transactions; others, however, have never been printed, and none are noticed in the Correspondence. In compiling the latter work “Dr. Lankester appears merely to have reprinted the collection of letters edited in 1715 by Dr. William Darwin under the title of Philosophical Letters, with many omissions, and to have added thereto the correspondence between Ray and Sir Hans Sloane,” now in the Sloane MSS. in the British Museum. Many of the original letters which were in part included in the Philosophical Letters of 1718 are fortunately available. After passing through several hands they were presented (not sold) by Mrs. J. D. Enys to the Trustees of the British Museum, and are now in the Botanical Department. Dr. Gunther has therefore been able to include the missing passages which from their personal details have often a special interest. Thus there is ample justification for the publication of this third volume for which our thanks are due to the Ray Society. And the Society is to be congratulated on having had the services of so able an editor as Dr. Gunther.

The text is preceded by a chronological table of Ray’s letters included in the two volumes of 1848 and 1928 respectively. They cover a period from January 3, 1658-1659 to January 7, 1704-1705, and represent therefore the greater part of his life—Ray was born in November 1627 and died Jan. 17, 1704-1705.

The arrangement of the text is as follows:—

I. Two short lives of John Ray. The first, probably the original draft (in the Bodleian library) for Life of Ray, by his great friend the botanist, Samuel Dale of Brantree; and the second by James Petiver, an intimate friend of Ray, now in the Sloane MSS. in the British Museum. Both have appeared in the Essex Review.

II. The Correspondence between Ray and Peter Courtice of Danny, 1658-1673. This, the earliest series of letters, was not known either to Dr. Darwin or Dr. Lankester, but extracts were published in 1858 by the Sussex Archaeological Society, from whose Journal the present account has been taken. “The original letters are believed to be preserved in the fine old house at Danny, the residence of Ray’s friend and college pupil, Peter Courtice,” but the manuscripts “at present are unfortunately not available for study.” Dr. Gunther gives extracts from seventeen letters, the first of which was written when Ray was Junior Dean of Trinity College, Cambridge. He asks his friend’s advice as to entering the priesthood, which would mean “farewell to my beloved studies and employments” and taking “to the study of that which they call divinity.” Ray was however ordained, but refused to “conform” at the Restoration
in 1690; in the second letter (Sept. 1690) he explains his position to his friend. The other letters, some of which are from Cambridge, indicate the struggle between conscience and interest, which ended in his refusal to subscribe to the Act of Conformity and his loss of preferment.

III. Ray—Willughby Correspondence. Unfortunately, the correspondence between Ray and his pupil and friend Francis Willughby cannot now be traced.

IV. Ray and the Royal Society. These communications cover a period of more than thirty years and illustrate Ray's versatility and wide interests. The first—observations at Rome on the comet of 1664—was communicated by Samuel Dale after Ray's death. The earliest reference to any contribution by Ray, who had been elected F.R.S. on Nov. 7, 1667, was on the motion of sap in trees, describing experiments by his friend Willughby and himself. Seven letters by Wray (as he still spelt his name) to the Secretary are preserved in the Society's archives. The earliest, Jan. 5, 1670, communicates experiments by Dr. Hulse and Mr. Fisher on the effect of the juice of ants on blue flowers. Another (1671) describes at length his dissection of a young porpoise—it was read at the meeting of Nov. 9, 1671, and the writer being present received the thanks of the Society. Ray's two discourses on the Seeds of Plants and the Specific Differences in Plants (read Dec. 17, 1674) are also reproduced, and are well worth perusal. Dr. Gunther also includes letters and references to letters bearing on Ray's work in completing and arranging the publication by the Society of his friend Willughby's History of Fishes. Willughby died in 1670, the book was published in 1675.

V. Letters from Ray to Martin Lister, Fellow of St. John's College, Cambridge (1666–1676), and VI. to Dr. Tancred Robinson, Secretary of the Royal Society (1690–1694). These are the letters presented by J. D. Enys to the Botanical Department of the British Museum. A number of extracts are included, many written in Latin. The later ones are from Black Notley, to which he removed in 1679 into a house of his own erection (previously occupied by his mother, who died in 1678), where he lived until his death. The letters include references to his botanical journeys, botanical and other notes, and, later, references to his magnus opus, the Historia Plantarum, which the Royal Society ordered to be printed Sept. 18, 1685. The first volume was published in 1686, the second in 1688, and the third—the Supplement—about six months before his death, in 1704.

VII. Letters from Ray to John Aubrey the Antiquary (1676–1685), including fourteen letters by Ray, now in the Bodleian library. These, which Dr. Gunther prints in full, contain various botanical notes; Ray's Notes to Aubrey's MS. Natural History of Wiltshire are also included. In 1678 Ray writes: "The study of plants I never look upon as my business more than I do now, but my diversion only; why yet since I am not qualified to serve God & my generation in my proper function [Divinity], I have been more bold to bestow a good proportion of my time on." In the last letter, from Black Notley, May 7, 1695 (which he describes as, "a corner of ye World barren of Wits"), he writes: "My Synopsis Method. Stirpium Britann. is now printing ye 2d time, with ye Addition of above half an hundred new species of Mosses and of Fungi and Fungi together almost as many." (The first edition appeared in 1690.)

IX. The correspondence between Ray and Edward Lhwyd (1680–1708) is printed for the first time—the originals are in the Bodleian library. Lhwyd succeeded Dr. Plot as Keeper of the Ashmolean Museum in 1690 and died at his post in 1709. This, by far the largest section, occupies just one hundred pages and is full of botanical notes and references to his works, botanical and zoological, projected or in preparation. In 1691 he refers to his Miscellaneous Discourses concerning the Dissolution and Changes of the World," published in 1692. The presence of "formoci stones"—fossil shells, bones of fishes, etc.—was a great problem for naturalists in view of the orthodox history of the Creation. Ray found himself unable to accept them as "derius natura or as the results of subsequent dispersion by the Great Deluge. He recurs to this subject on several occasions, and in the last letter (Feb. 1708), where he pleads his "present uneasy condition" as an excuse for negligence in correspondence, he writes "I can hardly shake off my former opinion," that the beds of Oyster-shells formed in Kent, Surrey, and other places "were originally beds of living oysters, breeding and feeding in the places where they are now found, who were anciently ye bottome of ye sea."

X. Finally, Dr. Gunther prints a list of notes from Ray to Dr. Robinson, from a long list of letters (1683–1704) to and from Ray in the handwriting of Dr. Derham, which is among the Ray letters in the Department of Botany. Dr. Gunther remarks: "They provide us with accurate dates for many events and are a monument to Ray's assiduity as a letter-writer."

The collection concludes with a few extracts from unpublished letters of several contemporary men of science, which shed interesting sidelights upon Ray's heroic struggle for life in which to complete his great Historia Plantarum and also upon the difficulties of its production. We have said enough to indicate the remarkable interest of this volume, which, however, is not to be regarded as a final contribution. Dr. Gunther writes in his Preface: "The time for a final biography of the great East Anglian savant can, however, hardly be said to have come, for there is a rumour of yet other materials still unpublished, and at the present moment inaccessible."

The illustrations include a frontispiece portrait of John Ray, from the portrait in the National Portrait Gallery, a reproduction from an engraving of Ray's house at Black Notley, a photograph of his tomb in the churchyard, and also a portrait of Samuel Dale, a letter from whom to Dr. Hans Sloane, Secretary of the Royal Society, giving an account of what manuscripts were left by Mr. John Ray, was published in the Philosophical Transactions two years after Ray's death.

A. B. R.
In the present volume, the third and last of the series, the modern ferns, the Leptosporangiate, are discussed in detail. They comprise six main groups—Davallioideae, Pteridoideae, Gymnogrammioideae, Blechnioideae, Dryopteridoideae, and Aspleniaceae—and we are shown how they may be presumed to have arisen. To put it shortly: (1) the Schizaeaceae represent the source of the ferns with marginal sori [marginales], the line being carried on by the Dicksonioideae with two main branches leading to the Davallioideae and the Pteridoideae, and some smaller branches—Hypolepis, Leptolepis, and Monachosorus. In the Pteridoideae the sori have lost their individuality and become fused into a continuous marginal line. (2) The Osmundaceae and Todeoidea suggest a source from which the Gymnogrammioideae may have arisen through such intermediate links as Plagiopodium and Laeaea, and from the Gymnogrammioideae it is presumed that the ephiphytic group of the Vittarioideae have branched off. (3) The Gleicheniaceae represent the source of a larger ramification of ferns with dorsally situated sori [superficialis]. Of the primary derivatives, one, Matoniaea, forms a blind end; another, Dipteridoideae, leads on to the Dipteroides (Platycerium, Pteris, etc.); while the third, Protocystotherideae, gives off two branches—one of its genera, Metasea, pointing the way to Symphyroideae and Elaphoglossaceae, whilst the other genus, Lophosoria, leads on to the Cystotherideae; and from the Cystotherideae are derived the Oncosporoideae and Blechnioideae on the one hand, and on the other the Woodsioidae, which lead on to the Dryopteridoideae; and from the latter are derived the Aspleniaceae.

The bare outline of results sketched above becomes much easier to follow when plotted down on paper, after the fashion of a family-tree. It makes no mention of the vast amount of research and critical investigation undertaken by Professor Bower, and embodied in his three volumes with the skill of a keen thinker and clear-cut exponent. The arguments are ably set forth and, based as they are on verifiable facts, they should stimulate the student, not merely to accept, but to examine for himself and carry forward the phylectic research on the lines laid down in this work. The author has been peculiarly happy in the discovery of various important links in little-known or obscure species and in his ingenious adaptation of them to his building up of his scheme.

During the perusal of this far-reaching treatise one naturally bears in mind the position which our British ferns occupy in the system. But it is surprising to find that the common Polydophyllum and, indeed, the subgenus Eupolypodium to which it has always been referred are not included in the survey. It is a pleasure therefore to call attention to Professor Bower's able address on "The Evolutionary Relations of our British Ferns," printed in the "Notebook of January 1926, pp. 15-20," where he has much of interest to say about our native ferns and discusses the case of Polydophyllum vulgare in the light of some recent work by Dr. Carl Christensen. That author has come to the conclusion that this species does not, in fact, belong to Eupolypodium, but to another subgenus, Goniopteris, of which
it is an extreme nummber with free veins. Professor Bower does not give it a definite place in his scheme, but drops a hint that along with Goniopyleium it may prove to be of kin with the Diteroids.
—A. G.


There is a marked lack of a modern text-book of plant physiology in a comparatively small compass; in England and America workers have mostly been satisfied with translations. Plant physiologists will therefore look with sympathy on an author who comes forward and shoulders a difficult task that others have shirked.

The title of this book is no doubt meant to suggest that the work is not a text-book, but no attempt is made to enumerate these principles; it is doubtful if such exist or if they are anything more than general biological principles. The book, however, presents a number of commendable features: for example, the first and last chapters, which are unusual in works on plant physiology. Chapter I. deals with the position of plant physiology in biology and its relation to the natural sciences generally. The last chapter is entitled "Mechanism and Vitalism," and deals with these opposed views in a way which will be illuminating to most students; the author makes clear that in his work of investigation the biologist must be a mechanist. Chapter II. deals with the cell and colloidal conditions; Chapters III.—V. are concerned with chlorophyll and the process of photosynthesis, and VI. and VII. with other methods of obtaining food-materials such as chemosynthesis, and IX. with nitrogen assimilation and the nitrogen cycle. Succeeding chapters review nutrition and the "balancing function" of salts and the biochemistry of carbohydrates, fats, and proteins. The diffusion of gases, osmosis and imbibition, ascent of sap, storage and translocation, digestion and respiration are other subjects to which chapters are devoted. The book concludes with a chapter on growth, two on the phenomena of irritability, and one each on movement, reproduction, and death.

It is a pity that the book is marred by such numerous mistakes of fact and of interpretation. On p. 29 Sachs's experiment with double-walled bell-jars is said to show that red rays are more important in photosynthesis, whereas in such an experiment the energy values of the red and blue light are so different that little comparison is possible. In Chapter VI. too much stress is laid on Baly's results and theories in relation to photosynthesis. On pp. 112 and 114 there are mistakes concerning sugars and their optical activity, and on p. 166 as to the authochropic nature of litmus. In dealing with the wilting coefficient of the soil, although reference is made at the end of the chapter to papers which insist on the dynamic aspect of wilting—the result of a want of balance between the two rates of respiration and of absorption,—yet the problem is treated as a purely static one. On p. 175 the expression "passing 110 volts of electricity between metal electrodes" is misleading, suggesting as it does that volts are a measure of quantity rather than of intensity. The treatment of osmotic pressure is unsatisfactory. A volume-normal solution of sucrose gives an osmotic pressure of about 34 not 22.4 atmospheres. Pfeffer used volume-normal solutions, and the results he obtained were all too low owing to the fact that his membranes were leaky and allowed some sugar to escape. In this chapter the illuminating conception of the suction pressure (sometimes erroneously called the water-absorbing power) of the cell is very cursorily treated in nine lines; no student could gain from this a clear picture of the relationship of absorption to the osmotic pressure and wall-pressure of the cell. On p. 226, when dealing with the ascent of sap, the author neglects completely his earlier reference, and speaks of an "osmotic gradient" between the root-hair and the central cylinder, when all that is required is a suction pressure gradient. One may point out that there is a mistake in defining Sachs's "grand period" of growth; and surely a student should not be encouraged in loose thinking by the form of question 8 at the end of Chapter XXXVII. There gravity is described as "attracting a root with a force X and moist soil at one side is attracting it with the force Y." The attraction of gravity on the root as a whole has apparently little to do with geotropic movement, and moist soil certainly exerts no force at all on a root. All the moisture can do is to alter the growth of the root as to cause a curvatura.

The mistakes and misconceptions occurring in the book are unexpectedly numerous, but they do illustrate the difficulties with which any single author is faced who sets out to survey the whole complex field of plant physiology. They must not be taken to detract unduly from the value of the book, which is a useful survey of a field in which text-books are too few. The author has, however, often been unduly handicapped by attempting the impossible task of reviewing within a comparatively small compass a large body of often conflicting data.—V. H. B.

Plant Pests.


The botanist who loves his garden will find much of helpful interest in the above volumes.

Of the three sections comprising the subject-matter of the 'Principles of Applied Zoology,' the second, entitled "Agricultural and Horticultural Zoology," is the largest. This includes a chapter on Soil-organisms—a discussion of the groups of animals whose activities bear upon the question of soil-fertility, namely, the soil protozoa and the earthworms, or which are directly inimical to the plant-growth, notably the cut-worms, slugs, termites, ants, and certain types of insect-larvae. Succeeding chapters deal with Insect-pests, the various types of which are described, and as effective control of an insect-pest cannot be achieved until "an accurate and comprehensive conception has been established concerning the four groups of data which deal respectively with the life-cycle, the distribution, the behaviour, and the mortality factors of the pest under review," these four subjects are discussed in some detail. A perusal of these chapters on the life and habits of the enemy will render possible a more effective attack than would otherwise be the case. Chapters on Vermin Repression and Bird Encouragement have also an interest for the plant-cultivator. The other parts of the volume deal respectively with Medical and Veterinary Zoology and Animal Industries. Finally, there is an extensive bibliography, the items of which are grouped under subject-headings.

'Agricultural Entomology' comprises, first, a general account of the structure, life-history, and system of classification of insects, and, secondly, an "Economic Section" in which individual insects which are important pests are described under their respective orders. The varieties of plants attacked and the nature of the damage which are indicated and control measures, where such exist, are also described. The descriptive matter is clear and concise, and the numerous illustrations are a helpful adjunct to the text. A chapter is devoted to the principles of insect control, the methods of which are classified as Direct, Indirect, and Biological. Direct methods aim at the actual destruction of the insect, in which insecticides play an important part, and a chapter is devoted to their composition and application. Three Appendices deal respectively and briefly with pests which are not insects, namely, other Arthropoda of economic importance—wood-lice, spiders, mites, centipedes, millipedes; Eel-worms; and Molluscs (snails and slugs). Finely ground copper sulphate is recommended as a deadly specific for slugs; young ducks are also "very effective."

The object of the third work is to supply a rough and ready method of determination of the cause of injuries to fruit trees, due mainly to injurious insects. The determination is effected by means of a series of keys based on the characters of the damage effected or of the injurious agent. Some assistance is given by means of a number of rather crude drawings. The keys are preceded by a short general account of the structure, life-history, and classification of insects.

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LENINNAN SOCIETY.—At the General Meeting, on February 28th, three papers were read on the occurrence of natural hybrids in plants. The first paper was by Dr. A. W. Hill, on "Hybridization in the New Zealand Flora, with special reference to Gaultheria."

Some 280 groups of wild hybrids have now been noted in New Zealand by Drs. L. Cockayne, H. H. Allan, and Messrs. G. Simpson and J. Scott Thomson. These belong to 42 families and 22 genera, and the majority consist of great polymorphic swarms. They are found abundantly in such genera as Hebe, Celmisia, Olearia, Ranunculus, Myrtus, Aristotelia, Nothofagus, Phormium, &c., and in the last genus open up questions of great economic importance. Species which cross are usually of the same growth-form, but this is not always so, for the tree-form hybrids with the divaricating bush-form, as seen in Plagiostigma betulinae × divaricatus, and the eucraioid Hebe Astoni with the leafy H. buxifolia.

Three species may sometimes hybridize, and intergeneric hybrids are known. A specimen was shown of the hybrid Uncocenes evaginatus × Boscia pyroides. Dr. Allan has synthesized two hybrids, producing plants like those found in the wild state, and the seed from hybridized plants has produced a polymorphic progeny. This also is the case with the seed of hybrid Gaultherias, collected by the speaker in New Zealand, from which numerous seedlings have been raised at Kew.

Examples were shown of the hybrids resulting from the cross Nothofagus cliffortiorum × N. fusca, and also a series of specimens of the hybrid Myrtus bullata × M. obtusifolia exhibiting every gradation from one species to the other.

Life-size prints of the actual leaves taken from wild hybrid Ranunculus swarms, made by Messrs. G. Simpson and J. Scott Thomson, were also exhibited. These included a series of leaves of Ranunculus lyrata × Buchanania var.; Cheesman's R. Matthei was described from similar hybrid material.

A long series of Gaultheria hybrids, collected by the speaker on Rainbow Mountain and at Waimairino (North Island), and elsewhere, supplemented by specimens collected by Dr. Cockayne and others, was exhibited. These showed the gradual passage from G. oppositifolia to G. antipoda; from G. oppositifolia to G. rupestris, thence to G. perplexa, and a series of hybrids between G. perplexa and G. antipoda; and G. rupestris and G. antipoda.

Most of the hybrid Gaultherias produce viable seeds. Gaultheria fragifolia Hook. f. is one of the hybrid swarms of either G. oppositifolia × antipoda or of G. oppositifolia × rupestris.

The second paper was by Mr. E. M. Marsden-Jones and Dr. W. B. Turrill, on "Hybridization in certain Genera of the British Flora." The results of genetical experiments and field-investigations on certain British plant-genera were outlined. Crossing Salsify voceae and S. graminifolia, a non-segregating F₀ generation was obtained with a chromosome-number double that of its parents. The special interest of this tetraploid was discussed.
Contrasts in the behaviour of Silene and Centaurea as found in the British flora were detailed. Wild hybrids between S. maritima and S. vulgaris are now known from several English counties, but crossing between these species has little or no effect on general populations. In Centaurea, on the contrary, hybridization has been rife in the southern and south-central counties of England, and has affected whole populations. Many of the so-called “species” of Centaurea included in recent British plant lists are of hybrid origin, as proved by synethetical and analytical experiments and by extensive field-work.

The conclusion was stated that hybridization has been an important factor in the origin of polymorphism in such genera as Centaurea and it has had to the making of what have been regarded as species by some taxonomists. On the other hand, in such genera as Silene interspecific hybridization is, at least now, of secondary importance, except for its parental interest. It follows that, in the authors’ opinion, hybridization is one, but only one, of the factors of organic evolution, using that term in its widest sense.

The third paper was by Prof. C. E. Moss, D.Sc., on “Some Natural Hybrids of Clematis, Anemone, and Gerbera from the Transvaal.” Clematis brachiate Thunb. is a rather common plant around Johannesburg, and a local plant near Pretoria; it has the habit of C. vitata Linn. C. Staeyeri Hook. is abundant in the same districts, and in the same general type of habitat. This species, in the speaker’s opinion, should be transferred to the genus Anemone Linn.

In a few places near Johannesburg, numerous intermediates occur between these two very different species; and these intermediates connect up all the distinguishing characters of these two plants. The intergrading plants are absent from those situations where only one species occurs. The speaker had no doubt that the intermediates are fertile natural hybrids which cross with each other, and with the putative parents. It is fair to regard them as bigeneric hybrids.

A third species, C. Oenecia Harvey, is abundant around Pretoria, and rare near Johannesburg. This species is very closely allied to C. brachiate, of which it has the habit. Sometimes C. brachiate and C. Oenecia grow together, and then intergrading forms may occur. These forms have not been found where only one of the species occurs; they are doubtless hybrids. The two species themselves are rather difficult to identify, and the natural crosses are also difficult to detect.

When all three species occur together, the hybrids become as complicated as the hybrids of Primula in the woods of Cambridgeshire, where the primrose, the cowslip, and the oxlip form a medley of abundant hybrids.

Gerbera discolor Sond. is common in marshes and by streams near Johannesburg and Pretoria. It is a herbaceous perennial, almost resembling Leonotis hirsutus Linn. in habit and size. It has leaves which are green and glabrous above, and snow-white with felted hairs underneath. It has a head of yellow flowers and a brownish pappus.

G. plantaginea Harvey is also common in the same districts; but it occurs on the dry grass-veldt. It is of the same size and habit as G. discolor; but its leaves, though hairy, are green on both sides.

Its flowers are pink and white, as in Bellis perennis Linn., and its pappus is purplish. Sometimes the two species occur cheek by jowl; and then a connecting series of very beautiful natural hybrids occurs.

This case also is complicated by the existence of a third, undescribed, species, and again hybrids occur, in which three species join. In the Woodbury Mountains, Transvaal, the speaker found evidence of hybrids in which at least four species seemed to join.

A study of natural hybrids in such cases as the above has led to the following general conclusions:

Bigeneric hybrids occur in nature, but, in the case of “good” genera, are probably rare. Bigeneric natural hybrids may be fertile.

Hybrids between well-defined species also occur in nature, but are not common. These hybrids are often fertile.

These two classes of hybrids, when they do occur, are often very striking, and can be easily detected.

Hybrids between closely-allied species are abundant in nature, and are usually fertile. They are rarely striking, and are usually difficult to detect. The more closely allied species are, the more difficult it is to detect their hybrid progeny.

There is no theoretical limit to the number of putative parents which may take part in the formation of natural hybrids in a given locality. The more species taking part in the formation of a medley of natural hybrids, the more debatable becomes any determination of the possible parent species of any given specimen.

The view that two “species,” when linked up by intermediates, really constitute only one variable “species” is not of general application. The theory cannot be applied with certainty in any particular case until it is known that the intermediates are due to “real” variation or are a result of hybridization.

The speaker has come across no case of natural hybrids which has led him to suppose that natural hybrids may give rise to species.

Dr. R. Lloyd Praeger gave an account of his experience of the occurrence of natural hybrids in Sempervirens group of plants, especially in the Canary Islands. Out of some fifty species, at least thirty-five are known to cross, and the group is the most hybrid-producing one in the Canary Islands. Examples were given of the characters of some of the hybrids. Barrenness of the hybrids in the group is uncommonly general.

Dr. C. L. Hackin drew attention to the fact that Lot's theory of evolution by hybridization includes the possibility of "hybridization" within a single nucleus. In 1920 Lot's suggested that the mutants of Enotera might have arisen through parts of chromosomes being broken off and attached to other chromosomes. Since that date cytological evidence of such changes has been found in Datura and in Drosophila. By this means new characters may appear in a manner which simulates gene mutation. This feature, which we may call "internal hybridization," may be as important or even more important than ordinary hybridization in producing variation, because it does not commonly affect viability to the extent that ordinary species-hybridization may do.
At the General Meeting, on March 14, the Hooker Lecture on "The Origin of Adaptations" was given by Dr. E. J. Allen, F.R.S.

The Gardner's Year Book, 1929.—The Editor (Mrs. D. H. Moutray Read) has again brought together a great deal of information interesting and useful to gardeners and garden-lovers. Part I. contains a very full chronicle of events of interest in 1928, obituaries, notes on botanical expeditions, reports from experimental stations (a new feature), descriptive lists of Botanic Gardens, Horticultural Institutions, Colleges, etc., and Societies, and lists of New and Noteworthy Plants taken from Horticultural Publications. There are several articles, including a chatty description of several gardens, each of some special interest, an account of the Horticultural work of the Ministry of Agriculture, by J. Lockton Bryan, and a somewhat pessimistic article on 'Our Fruit and Vegetables,' by S. L. Bensusan, deploiring the waste of production due to lack of co-operation between the grower and the salesman. Part II.—Cultural—is a series of special articles on various subjects: Mr. C. B. Tabourdin relates some of his experiences in the cultivation of British Orchids, and a chapter on "Garden Enemies" contains much useful information; there is also a chapter on pruning, with a calendar. A series of Appendices contains "tabular matter," calendars of planting, various lists, and horticultural fixtures for 1929. The volume contains 319 pages, and some good photographic plates. The price is 5s. (Philip Allan & Co., London).

Botanical Society of South Africa.—The recently issued Journal for 1928 (Pt. XIV.) refers to the steady growth of the Society, the membership of which now reaches 1000. Mrs. Bulos contributes an article on "Gladiolus as represented in South Africa." The South African species are the source of the innumerable garden varieties—about 130 wild species are already known in South Africa, and these include blue-flowered species and species with a delicious fragrance. Two coloured plates reproduced from drawings by the late Mary Page and Miss B. O. Carter illustrate the article. The Editor supports a plea by Sir James Rose-Innes for the proclamation of the whole of Table Mountain as a Native Reserve for the protection of the flora. The completion of an aerial cable-way up the mountain, which will bring troops of excursionists, adds a new danger.

Professor F. O. Bower, F.R.S., has been nominated by the Council of the British Association to preside at the Bristol meeting in 1930. Prof. Bower is one of the most eminent exponents of plant-morphology, and his nomination will be welcomed by his fellow-botanists. On two occasions only in the history of the Association has the highest office been held by a botanist—at Norwich in 1868 by Sir Joseph Hooker and at Dublin in 1908 by Sir Francis Darwin.

Drawings of West Australian Plants.—A small exhibition of coloured pastel drawings by Miss Maud Egremont of typical West Australian plants has been placed in the Department of Botany, British Museum. The drawings have been kindly lent by the artist.
McNab's specimen in the Edinburgh Herbarium. Grisebach regarded this plant as conspecific with that figured in Sloane's History, tab. 151, f. 3, but later on (t. c. p. 379) he claims the same figure for Calea jamaicensis L. On Sloane's tab. 151 are figured, and in his history i. 257 are described, two plants under the name Conyza fruticosa Cistis odore &c, one (t. 151, f. 2) with smaller heads and achenes ("capitulis et semina minoribus"), the other (f. 3) with those organs larger. On referring to Sloane's Herbarium, the former of these is seen to be Eupatorium villosum Sw, as Grisebach himself notes, while the other is Calea jamaicensis L. These two plants are fairly similar in general appearance, although of course different in respect of style-arms and pappus; but the resemblance between E. schizanthum and C. jamaicensis is so extremely slight that it is difficult to understand how Grisebach could confuse them; evidently he afterwards found out his mistake, and by inadvertence allowed the reference to E. schizanthum to remain unexempted.

In the Jamaica Herbarium are specimens of a Calea with leaves markedly smaller than those of C. jamaicensis, and deserving of a varietal name. It is proposed to call this

*C. jamaicensis L var. parvifolia, var. nov., a typso distans ob folia manifeste minor, et solum modo 10-15 x 5-8 mm.

Senecio.

Senecio dolicanthus, sp. nov. *Frutex glaber usque ad 80 dm. alt.; ramulis robustis longitrosum striatis; foliis petiolatis obovatis vel obovato-oblongis mucronatis basi obtusis nisi rotondati margine ultra medium grosse calloso-dentatis pergamaceae pag. utrvris nitidis costis lat. utrinque circa 10 un duum costa media reticuloque lazo optime visibiliibus; corollis foliis circa æquilongis pleiochaulis subcongestis; capitulis radiatis 6-floris luteis; pedunculis propriis quam involucrum plane brevioribus sparsim bracteatis; involucro subhyalinico, superne sepe leviter contracto phyllis 5-6 oblongis obtusis apice sphecalatis piliferisque coriaceis margine angustae membranaceae; receptaculo firmifloro; radiis flocculis 2 ligulis exsertis late oblongis 3-dentatis; discis flocculis 4 horum corollis extortis; styli ramis obtusis penicillatis; acheniis lineari-oblongis basi prominentibus callosis 10-costatis obscure puberulis; pappi setis scabridis albis.—S. Fadenii Griseb. var. dolicanthus Krog & Urb. Symb. Ant. i. 470.


Ramuli aliquanto complanati, circa 5 mm. crass. Folia in sicco grisco-brunnea, 10-14 x 4-5 mm.; petiolis planatis, 2-5 x 4-5 mm. long. Corymbi circa 10 cm. long., 6-12 cm. lat.; horum rami pauci ± 4 mm. long. Pedunculi proprii plumereque 2-3 mm. long. Involucrum 9-10 mm. long., 2-6 mm. lat., in sicco fuscobrunneum; calyculi phylla perpauca, subulata. 1 mm. long, ligulato (lumina) 5 mm., at disi corollis 9-10 mm. long.; harum lobus triangulares, acuti, 1-5 mm. long. Acheniis 2 mm., pappus 8 mm. long.

NOTES ON JAMAICA PLANTS

The affinity of this species is plainly with *S. Fadenii Griseb., hitherto, it is believed, found only by Macfadyen, although an unsatisfactory specimen at Kew of Miss Perkins's gathering (Blue Mts., near Vinegar Hill, 1244) probably belongs here. *S. Fadenii has membranaceous leaves, in the lower third gradually narrowed into the petiole, and with less conspicuous toothling, markedly smaller heads with short and loose instead of closely imbricated involucral leaves, shorter receptacular palae, flower smaller in all respects, and nearly smooth pappus-seta.

A Few General Remarks.

Of the genera of Composite, numbering now well over 800, not one is confined to Jamaica, and only 47 are native there, excluding *Zania, *Tithonia, *Tagetes, *Lobata, *Crepis, and *Hypochorhis, which are introductions from the Old World or escapes from cultivation. A point of interest is the relatively high percentage of endemic among representatives of the three great genera *Vernonia, *Eupatorium, and *Senecio, each numbering about 1000 known species, as contrasted with the low percentage of Jamaican species in each of those cases. Thus *Vernonia is represented only by 8 species, but all are restricted to Jamaica except *V. anthelmintica Willd., an Indian introduction, and the common weed *V. cineria Less. There are 25 species of *Eupatorium, 10 of them unknown outside Jamaica, while only 6 species of *Senecio are Jamaican, but all are endemic, thus giving percentages of 75, 64 and 100 in respect of endemic. This certainly seems remarkable, considering the admirable adaptation to wind-dispersal possessed by the achenes of these plants. Further, of genera with 10 to 400 species, *Baccharis (400 species) has but 2 Jamaican representatives, of which 1 (50 per cent.) is endemic; *Bidens, 6 species, 3 (50 per cent.) endemic. On the other hand, none of the six Jamaican species of *Pectis is endemic; *Brickellia, with nearly 100 species, has but one in the Island, the widely-distributed *B. diffusa A. Gray; while only two of the 70 species of *Spiranthes are Jamaican, neither endemic. Moreover, *Trizis, a genus of some 80 species, has only one species in Jamaica, and that not endemic. Worthy of mention is *Chamaepeuce, a genus of 11 species, of which 5, all endemic, are Jamaican; thus little more than half its known species are found outside the Island. In contrast with this, *Calea, with about 100 species, has only 1, an endemic, in Jamaica.

Relatively small as the area of Jamaica is when compared with that of Hispaniola and especially of Cuba, and though considerable activity was shown so early as the 15th century over the Island and has continued, with intervals, till the present time, a botanist visiting Jamaica now might still hope to come across rarities and even plants new to science. As a fact, some of the old finds still

* But see on this Guppy, *Plants, Seeds and Currents in W. Indies and *Acres, pp. 42-439.
await confirmation by a modern collector. For instance, *Vernonia rigida* Sw., which Swartz says he found on limestone hills in the north of the Island; *Eupatorium tetranthum* Gries., not reported since the time of Purdie and Macfadyen (about 1850), *E. cordifolium* Sw., a find of the describer, and *E. schizanthum* Gries., discovered by McNab in the middle of last century and not obtained since; also *Mitonia Swartziana* Gries., since Wright’s time (1755-86) met with only by Purdie, and *Salmea sensibilis* Gries., a Westmorland discovery of Purdie’s, known only from incomplete material in the Kew Herbarium.

To anyone wishing to do floristic work in the Island, the following districts may be recommended as most likely to repay the necessary labour. The Blue Mountains, especially the extreme eastern portion; the Upper Clarendon district, still yielding novelties; the Cockpit country, where, taking Troy at its entrance as a type, many rare and most probably new species await to be found; and the western districts, including Westmorland, the scene of many of Purdie’s discoveries.

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**NOVITATES AFRICANE.**

(Continued from Journ. Bot. 1928, p. 233.)

**Gladilus Louwii** L. Bolus (*Dracocephali* (Iridaceae-Ixieae)). *Planta* florifera 25-60 cm. alta, caule florifero stricto sat gracilis, ad 4 cm. diam., 4-foliato, internodio supremo per 7-8 cm. exserto. *Folii* caulina viridis, influmin vaginiforme, ad 4 cm. longum; tertium longissimum, ad 15 cm, vagina vera ad 6 cm., lamina vera ad 3-4 cm. longa; folia radicula hysterantha, e gemma distincta producta, 7, sine vagina 2 basaliis pilosis, 6-9 cm. longis, quintum longissimum, ad 67 cm. longum (cum extrae longius), lamina vera 35 cm. longa, ad 1-3 cm. latum, nervo medio prominenti, cum marginibus vix inconcasis viridis, lamina superior glabrescente, inferne cum vagina pilosa. *Spicae* 16-23 cm. longae, laxe 4-6-fl., floribus secundis. *Bracteae* erectae, obscure carinato, 6-4 cm. longae, bracteolis fere ad apicem coalescentibus, 4-1-3 longas. *Perianthium* luteum, crebre minute rubro-maculatum, interne rubro-vittatum, tubo 3-5 cm. longo, segmento superno obtuso, 3-2 cm. longo, 2-6 cm. lato; latemilibus imbricatis, galea parallella, 48 cm. longis, 27 latis, ovariis, acutis, segmento infimo ovato-oblongo, obtuso, 2-2 cm. longo, ad 1 cm. lato, latemilibus obovato-oblongis, obtusi vel abrupte acutis, 1-7 cm. longis, 9 mm. lati. * Stamina* ad galeae adpressa, per 1 cm. ejus apicem deficientia, antheris purpureis, 1-7 cm. longis. *Stylus* apicem antherarum attingens, stigmatibus inclusis, 5 mm. longis, ovario acute angulato, 1 cm. longo.


Described from several living specimens which flowered at Kirstenbosch, January 1929. The produced leaves were taken at the end of February. No seeds were set, the copious nectar suggesting bird-pollination. The nearest affinity appears to be with *G. sulphuranas* Baker, with which the flowering stem agrees, except that the bracts are much longer, the perianth is red rather than yellow, and the hood is longer than the tube. No mention, however, is made of the hysteranthous leaves, which probably also occur in *G. sulphuranas*.

**Gladiolus Vogtsii** L. Bolus (*Iridaceae-Ixieae*). Glaber, ad 1 m. altus. *Caule* omino vivo, nisi internodio supremo leviter exserto. *Vaginae* basales 8-15 cm. longae. *Folii* basalia 4, nervo medio, cum nervo primario utrinque, prominenti, viridii, 42-60 cm. longa, 2-2 cm. lata; caulina 2, 33-16 cm. longa, vaginis 17-10 cm. longis. *Spicae* simplex vel rarius ramosa, spathe 7 cm. longa; floribus 11, secundis, sat densi. *Bracteae* erectae obtuse, 4-6 cm. longae; limboae 3-7-2 cm. longae, parte libera acute, 2 mm. longa. *Perianthium* sordide luteum, dense rubro-maculatum, mere sectionis *Dracocephali*; tubus internus erectus, e medio ascendentibus, griseis, superne vix infundibuliformes, apice 7 mm. diam., 4-4 cm. longis; segmenta acuminata; externe lateralia porrecta, demum leviter recurva, fere ovalis, 3-4 cm. longa, ad 2 cm. lata; interna e medio recurvata, 2-5 cm. longa, ad 1-2 cm. lata; suprema adscendentis, haud vel vix cuculatum, ad 3-2 cm. longum, ad 1-5 cm. latum; inferior lateralia recurva ovalo-lanceolata, 2 cm. longa, 8 mm. lata. *Stamina* adscendentia, haud adpressa; antherae pallidae, dimidio segmento attingentes vel parum ultera, 1 cm. longa. *Stigma* stamini leviter superantia, 7 mm. longa; ovarium 9 mm. longum.

*Hab.* Transvaal, L. R. Vogts (National Botanic Gardens, No. 017/25).

Described from several living specimens flowering at Kirstenbosch during February, 1920. The corms were sent by Mr. Vogts as being from the north-eastern parts of the Transvaal. The nearest affinity appears to be with *Antholoyza laxispora* Baker, which, in the first instance, was published as *Gladiolus antholoyzoides* Baker, and is no doubt on the border-line between these two genera. Our species differs in having much broader leaves, longer perianth-segments, and shorter stamens. The perianth-tube, although unusually cylindrical for *Gladiolus*, has not the lower lipiform portion more or less abruptly differentiated from the upper cylindrical portion, as is characteristic of *Antholoyza*. The colouring of the perianth and the recurved lower segments suggest *Dracocephali*; but the set of the scarcely concave hood would seem to exclude it from that section.


**Ixia rochensis** L. Bolus, comb. nov. *Tritionia rochensis* Ker; *Ixia paniculata* Delaroche, var. rochensis Baker.

**Watsonia Stanfordsi** L. Bolus (*Eu-Watsonia*). *Planta* ad 80 cm. alta, caule sat gracili. *Cormus* 3-5 cm. diam., tunici e fibris tenuibus compositum. *Folia* radicula producta 2 vis., ad 40 cm. longa, 1-6 cm. lata, nervo medio leviter, marginibus vix, inconcasis,
nervis intermediis crebris inconspicuis, caulis 5, infimum 5 cm. supra basin positum, radicalis superana, 30 cm., vagina vera 4 cm. longa, secundum 18 cm., vagina vera 8 cm. longa, cetera vaginiformis, 7-3 cm. longa, internodis 3 supremis bene exsertis. Spicis terminalis 9-fl., floribus distichis, axi fructiferi conspicuus flexuosus. Bracteae et basi ab axi divergentes (in vivis angulo 40°), purpureascens, omnino membranacea, 17-18 cm. longae, bracteolis aquilongis, fere ad apicem cohaerentes. Perianthium fere strictum, deinde curvatum, saturate roseo-purpureum, ad 7 cm. tubo parte filiformi 1 cm., parte cylindrico 3-8 cm. longa; segmenta oblonga, externa 5 mm. longa, interna 1 cm. lata. Stamina arcuata, param ultra dimidium segmenti attingentia, antheris atratis, stigmati leviter superanturn. Capsula rostrata, inferne angustata, ad 2 cm. longa, ad 8 mm. diam., seminibus 6-8 mm. longis.


Described from one complete living specimen and a partial one. The two radical leaves seen were perfect, and there were burnt-off remains probably from a previous year's growth.

_Watsonia Starkae_ L. Bolus (En-Watsonia). _Planta_ 1-5 met. alta, caule basin versus ad 1-2 cm. diam. _Folia_ radicalia producta 8, glauca, nervo medio marginibusque inconspicuis cum nervis intermediis crebris, ad 50 cm. longa, ad 8-9 cm. lata, caulis 5, infimum ad 62 cm. longum cum vagina vera 9 cm. longa, supremum 8-5 cm. longum cum vagina vera 6 cm. longa, axillo ramulorum floriferorum gerente, internodis 2 supremis bene exsertis. Spicis terminalis ad 40 cm. longa, 30-fl., ramulis 4-5, ad 12-fl., 4 et spatlia bracteolorum (sine vagina vera) orientibus. _Bracteae_ et basi ab axi divergentes (angulo 90°), 1-4-6 cm. longa, bracteolis parum brevioribus vel aquilongis, omnino cohaerentibus. _Perianthium_ externae pallide salmonic, internae pallide roseum, 4-5 cm., tubo 2-8 cm., parte filiformi 1-8 cm., longa; segmenta concaeva, obtusa, exteriore 1-5 cm. longa, 9 mm. lata, interna 1-9 cm. longa, ad 1-4 cm. lata. _Stamina_ arcuata, fere ad apicem segmenti attingentia, antheris atropurpureis, 1-1 cm. longis. _Stigmatas_ anthers leviter superantia, alba, ramulis 2 mm. longis; ovarium 5 mm. longum. _Capsula_ subaequior, ad 1-5 cm. longa, ad 8 mm. diam.


Described, together with the variety rubra, from several living specimens flowering at Kirstenbosch during December 1928, fruiting February 1929.

_VAR. RUBRA._ A forma typica foliis caulinae 7, bracteis ad 1-8 cm. longis, perianthio rubro, leviter minor, differt.

_Watsonia soccnum_ Mathews & L. Bolus (En-Watsonia). _Planta_ 57 cm. alta. _Cormus_ parvus emacidudis, utrinque cormum novum emittens, tanis paucis, et fibris tenuioribus compositis, vaginis basiibus ad 2-5 cm. longis. _Folia_ radicularia producta 4, 2 brunnea rigidis, tamen immo basi herbaceae, ad 39 cm. longa, 2 omnino viridis,

Subsistentia, nervo medio leviter, marginibus haud incrassatis, nervis intermediis crebris inconspicuis, ad 40 cm. longa, ad 1 cm. lata; caulis 7, infimum 8 mm. supra apicem cromi oris 10 cm. longum, lamina 2 cm. longa, 5 mm. lata, secundum 18 cm. longum, lamina 6-6 cm. longa, cetera plus minusve vaginiformis, 18-3-6 cm. longa, omnino internodis longiora. _Spicis_ simplex, ad 87 cm. longa, sat dense ad 18-fl., floribus erecto-patentibus. _Bracteae_ axem dimidio inferiores angustantes, deinque leviter divergentes, ventricoso late oblongo-ovato, parum supra medium attenuato, acutae vel superiores obtusae, herbaceae, marginibus apice membranaceis exceptis, 3-1-5 cm. longe, 1 cm. lat., inferiores bene, cetero leviter internodio excedentes; bracteolis omnino cohaerentibus, 2-1-1-5 cm. longe. _Perianthium_ rubro-aurantiacum 8-8-6 cm. longum, tubo 4-5-5-5 cm. longo, parte filiformi 2-2 cm. longa, apice ad 1 cm. diam., segmentis exterioribus ad 1 cm., interioribus ad 1-4 cm., latis, omnibus basi auriculatis, ovali-oblongis obtusis apiculatis. _Stamina_ arcuata, ultra dimidium segmenti attingentia, antheris purpureis, 1-1 cm. longis, staminodialis 3, 1 mm. longis. _Stigmatas_ apice segmenti attingentia vel parum ultra, circa 3 mm. longa.


The collectors write in 1928:—“The Swartkop Watsonias we dug up from dry ground were not more than 15 or 16 inches high, and now after two or three years' cultivation they are 3 ft. high with thick stems and much finer flowers.” Described from several living plants which flourished at Kirstenbosch, Oct.—Nov. 1926.

_Watsonia Cooperi_ L. Bolus, comb. nov. _Tritonia Cooperi_ Baker.

_LAPETRUSIA GRAMINIFOLIA_ L. Bolus, comb. nov. _Tritonia graminifolia_ Baker.

_Trionia Nelsoni_ Baker includes _Tritonia petrophila_ Baker.

_Gethyllis multiformia_ L. Bolus (Anamaryllidacea—Amaryllidae). _Bulbus_ ut videtur in sicco 4-5 cm. diam. _Vagina_ basalis subtruncata, 4-5 cm. longa. _Folia_ 25-30 in fasciculo, anguste linearia (in vivis fortasse subteretia), superne laxe spiraliter torta, tubescientia, setis spiralis, bracteis brunnecis, supra terram ad 15 cm. longa, 1 mm. lata. _Perianthium_ pallide roseum, glabrum; tubus supra terram per 2-5 cm. exsertus; segmenta oblongo-lanceolata acuta, inferne leviter angustata, 3 cm. longa, ad 1 cm. lata. _Stamina_ 12 monanthosa; filamenta 4 mm. longa; antherae 7 mm longae. _Stylus_ strictus, ultra tubum perianthii ad 1-6 cm. exsertus, dimidium antherarum attingentes; stigmas 1 mm. diam.


Described from dried and living specimens which flourished in our garden, Dec. 1908.

_Gethyllis unilateralis_ L. Bolus, _Bulbus_ haud visus. _Folia_ marcescensia tantum visis, in fasciculo ad 20, anguste linearia vel
subtereta, levier spiraliter torta, inconspicue ciliata, ad 12 cm. longa, 1 mm. lata. *Perianthium rosseum* vel pallide roseum; tubus ad 11-5 cm. longus vel ultra supra terram exsertus, 3 mm. diam.; segmenta acuta vel abrupte acuta, ad 3-5 mm. longa, 1-1'8 mm. lata. *Stamina* 6, monantha; filamenta gracilis, 3-5 mm. longa; anthera demum valde circinato-revolvuta. *Stylus* unilateralis, filamenta bene superans; stigma cum atate 1 mm. diam. vel ultra.

*Hab.* Cape Province: sandy places along the railway line between Oudtshoorn and Montagu Pass, fl. Nov. 1917, G. S. Oettle (Bolus Herbarium, No. 14465).

**Gethyllis linearis** L. Bolus. *Bulbus* ca. 1-5 mm. diam. *Folia* 8-10 in fasciculo, linearia plana, e parum supra basin arte spiraliter torta, glabra subglauca, ca. 6 mm. longa, 2-3 mm lata. *Perianthium* roseum; tubus 8 cm. longus vel ultra; segmenta oblongo-ovata, sat abrupte acuta, 3-3'5 mm. longa, ad 1'4 mm. lata. *Stamina* 6, monantha; filaments antheris aquilongo, 4-5 mm. longa. *Stylus* unilateralis, ultra tubum perianthi per 1'6 cm. exsertus; stigma demum ad 1-5 mm. diam.


Described from living specimens. Leaves were produced in my garden from July—September 1919.

**Gethyllis grandiflora** L. Bolus. *Bulbus* 5-5'5 mm. diam.; tunica collis membranaceae tenissima, consiquie transversae nervosis, ecolata. *Folia* sepius per anthesin emarcida sed tamen in fasciculo unico viso contemporaneo cum flore 46, fere omnia herbacea, anguste linearia, glabra, superne spiraliter torta, supra terram ad 14 cm. longa, 2-3 mm. lata. *Perianthium* glabrum, album plus minusve roseo-suffusum; tubus 6 cm. longus, basi 4-5 mm., apice 9 mm. diam. breviterque infundibuliformis; segmenta acuminata, interna semper exterioribus lata, ovata, ad 8'5 mm. lata, vel oblongo-ovata, 2 cm. lata, 5-6'5 cm. longa. *Stamina* 6, 8-11-anthera, antheris breviter stipitatis, vel stipite ad 5 mm. longo, 1'2 mm. longis, filaments multo multo longiora. *Stylus* strictus ultra tubum per 8 mm. exsertus; stigma parvum.


Described from dried specimens. In one flower the stamens appear to have stout filaments bearing several shortly-stalked anthers, and in others the primary filament is so much reduced that the stamens might be described as numerous and arranged in six groups.

**Gethyllis longituba**, L. Bolus. *Bulbi* 2-5 mm. diam., 2-3 e caule incassato, 6 mm. diam., orientes. *Folia* suprane purpureomaculata, ad 4 cm. longa, 1 cm. diam. *Folia* in fasciculo ad 18, longies linearia, spiraliter 1-torta, glauco-viridii glabra politaque, nisi marginibus ciliatis, ciliis patentibus vel ascendentibus, vix rigidis, albis, supra terram 18 cm. longa, 8-6 mm. lata. *Spatha* 7-3 cm. longa, per 3 cm. vaginas. *Pedunculus* 3 cm. longus. *Perianthium* glabrum; tubus ad 17 cm. longus, apice 1 cm. diam.; segmenta linearis-lanceolata, suprane gradatim attenuata, interna pallide, externe satorate rosea, ad 5-5 cm. longa, inferius ad 1-2 cm. lata, exterius parum angustiora. *Stamina* ad 36, monantha; filaments 2-3 mm. longa; antherae demum nepulviso-revolvuta, 1-3 mm. longe. *Stylus* strictus per 1 cm. ultra tubum exsertus; stigma parvum. *Fructus* oblongo-ovalis, 4 cm. longus, 1-7 mm. diam.; semina obovata, ad 3 mm. longa.

*Hab.* Cape Province: Clanwilliam Div., Klaver, D. Davis (National Botanic Gardens, No. 2256/26).

Described from living species which flowered at Kirstenbosch in December 1927, fructed May 1928, and produced leaves in June.

**Gethyllis campanulata** L. Bolus. *Bulbus* globosus, 4-5 cm. diam. *Folia* in fasciculo 8-10, hysteraanta angustae lineariae, vix spiraliter torta, marginibus nerviosis parallelo-setulosis, setis canis, supra terram 5-7 cm. longa, ad 1-5 mm. lata. *Perianthium* niveum vel rarius externae pallide roseo-suffusum; tubus 5 cm. longus, basi 4 mm., apice 3 mm., diam.; segmenta erecta convivientia imbricataque itaque campianulam, 3-5 mm. diam.; formantia, oblongo-elliptica acuta, 4-8 cm. longa, exteriort ad 2-2 cm., interna ad 2 cm. lata. *Stamina* 12, in 6-paria disposita, filaments parsi breviter connatis, patentiibus, 6 mm. longis; anthere 1-2 cm. longe, nunc spiraliter torta, nunc circumferentia-revolvuta. *Stylus* strictus, per 1'3 cm. ultra tubum exsertus, in stigma minute pilose pilis dilatatis.


Described from living species which flowered at Kirstenbosch in November 1927 and 1928.

**Forbesia Galpinii** L. Bolus (Amaryllideae—Hyacinidae). Planta 3-4 cm. alta. *Corpus* australis, 6 mm. diam. *Folia* 5, infimum dimidio inferiore membranacea vaginantes, anguste linearia, pilosa, pilis longis albis in fasciculis sparsis, sepius proprie marginis revoluta, disposita, lamina sepius ad 2 cm. longa, vix ad 1 mm. lata. *Pedunculus* 1-1'5 cm. longus. *Perianthium* ad 3'2 cm. longum, tubo gracilimento, apicem versus ad 4 mm. leviter ampliado, albo ad 2-5 cm. longo; segmenta lilacina, 1'6-2'2 mm. lata. *Stamina* 2-seriate, antheris ovatis, dorsoflaxis, inferioribus fere vel omnino sessilibus, superioribus exsertis, filamentis brevisissimis, *Spatha* brevisssima, crassaque ad basin antherarum inferiorior (interiorum) attingentia.


Described from three living specimens sent to Kirstenbosch. The mauve and white perianth and the small size distinguish this species at a glance from the rest of the genus.

**Haworthia variegata** L. Bolus (Liliaceae—Aloeceae—Chloraeceae). Caulis abbreviatus, multiflorae 20-30-foliati, basi reliquis
Novitates Africane

Brevillius. *Folia* fera erecta, apice incurva, imbricata, sparsa vel subquinita, linearia acuta, obscure ciliolata, glandulis sessilibus interjuxit, 5–7 mm. longa, cum petiolo 1–2 mm. longo. *Flores* rite b-nati, vel ramulis floriferis abbreviatis, interdum approximatis, quasi inclusi. *Pedunculi* sat graciles pubescentes, 6–8 mm. longi. *Bracteae* lineares herbaeae, infima medio vel bene supra medium pedunculi posita, cetera subapproximata vel approximata, 4–5 mm. longa. *Sepala* linearia, inferne leviter ampliata, glabra vel puberula, interdum glandulis sessilibus marginibus onusta, 4 mm. longa. *Corolla* urceolata puberula, 5–6 mm. longa, cum lobis obtusis, 1 mm. longis. *Filamenta* linearia, apicem versus ampliata; antherae manifestae vel inlucete, terminales oblongae acutae, basi oblique, ca. 1 mm. longae, lobis ad basin distinctis, aristulae aristis patentibus, poro dimidium lobi aequante vel minore. *Ovarium* demum globosum puberulum, setis canis patentibus; stigma manifestum vel breviter exsertum, capitatum.


New and noteworthy species of *Combretum* from western tropical Africa.

By A. W. Exell, M.A., F.L.S.

(Continued from p. 104.)


C. Smethmanni G. Don in Trans. Linn. Soc. xv. 424 (1827). This antedates the name *C. mucronatum* Schum. & Thonn. ex Schum., in Kong. Danske Vid. Selsk. Naturvid. og Mathem. Afhandl. iii. 204 (1828), which is erroneously in use for this species.


C. Kwinkiti De Wild, in Ann. Mus. Congo, v. iii. 237 (1910). The following new locality may be cited for this species:—


C. Gueinzii Sond. in Liitse, xxxii. 43 (1850). This species has been recorded over a wide area of Tropical Africa, often under the name of *C. splendens* Engl. After examination of a wide range of material from Angola and Rhodesia, I am unable to find any constant distinction between *C. Gueinzii*, *C. holosericeum* Sond., and
C. arbuscula Engl. & Gilg. The species is apparently rather variable and of considerable range. It just enters the area dealt with in this paper.


C. pascoorum Gilg & Ledermann ex Engl. in Veg. der Erde, Pflzw. Afr. iii. 2, 698 (1921), sine diagn. lat. A short Latin diagnosis is appended:


*Sec. Glabripetala* Engl. & Diels.

C. dolichopodium Gilg ex Engl. in Veg. der Erde, Pflzw. Afr. iii. 2, 700 (1921), sine diagn. lat. A short Latin description is appended to amplify the brief citation by Engler:


*Hab. Cameroun*: "Galerie mit grossen breiten Baumen an einem felsigen Bach, alt. 700 m.: Strach 1-5 m. Blumenblätter weiss, Blätter zart grün," Gauro Putjue, Dodo, Ledermann 3020 (holotype, Herb. Berlin). Engler states that the species also comes from Yogoza.

C. crotonooides Hutch. & J. M. Dalz. in Fl. W. Trop. Afr. i. 220 (1927) et Kew Bull. 1928, 224. *Hendelot* 386 (Herb. Paris; Herb. Mus. Brit.), though the leaves are still somewhat immature, has young fruits as well as flowers. A study of this specimen leads me to the opinion that *C. crotonooides* is perhaps the flowering stage of *C. lamprocarpum* Diels (in Engl. Jahrb. xxiii. 500 (1907)), hitherto known only in the fruiting stage.

C. Kerstingii Engl. & Diels in Engl. Jahrb. xxiv. 490 (1907). This species was considered by Hutchinson and Dalziel (op. cit.) to be a synonym of *C. ghasalense* Engl. & Diels, from which it differs in having leaves which are densely covered with white scales below. It is, in fact, very close to *C. lamprocarpum* Diels. The mistake apparently arose owing to the fact that various Kersting specimens were sent to Kew erroneously named *C. Kerstingii*. The true *C. Kerstingii* is represented by *Kersting* 615 (type), 188, 189 (Herb. Berlin).

**COMBRETTUM FROM WESTERN TROPICAL AFRICA**

*Combrettum Englerianum* Exell, nom. nov. *C. tenuepis* Engl. in Veg. der Erde, Pfluw. Afr. iii. 2, 703 (1921), non Engl. & Diels. A short Latin description is appended to amplify that given by Engler:


*Hab. Cameroun*: "Dicker Baum, Blth. gelblich," in grassteppen, Bosum, Lemaun 2253 (lectotype in Herb. Berlin); Sang-Allah, Jada Placeu, Elbert 350 (Herb. Berlin); at an alt. of 500 m., Mbessu, Kongolo, 6° N., 14°-15° 20' E., Mildbraed, 9118 (Herb. Kew); Buor, Uham, Mildbraed 9425 (Herb. Kew).

This species, which should not be confused with *C. tenuepis* Engl. & Diels, which belongs to the sect. Hypocrateropaes Engl. & Diels and comes from the Transvaal, is near to *C. lamprocarpum* Diels, from which it can be distinguished by the almost glabrous receptacle with reddish scales, which are very dense on the lower receptacle and quite sparse on the upper.

This species is very near *C. Welwitschii* Engl. & Diels, from Angola, but it seems to be distinguishable by the nearly glabrous receptacles. Only young leaves and flowers are known.

C. Elliotii Engl. & Diels in Mon. Afr. Pl. iii., Combrettaceae, 42 (1899). The range of this species is extended to the Guinseal region by the identification with it of *C. brunneum* Engl. & Diels, loc. cit. p. 48. The latter species was described without flowers and placed by the authors in their Sect. Glabripetala, but I have little doubt of its identity with *C. Elliotii*.

C. nigricans Leprieur MS. ex Guill. & Perr. Fl. Seneg. i. 290 (1833). This species, at present known only from leaves and fruits, was placed by Engler & Diels in Mon. Afr. Pl. iii., Combrettaceae, 19 (1898) at the end of their Sect. Paucierneses following the statement in the original description that it was near to *C. altaum* Perr. After examining the specimens in the Herbarium of the Paris Museum, I am of the opinion that it should come in Sect. Citrifietales Engl. & Diels; near to *C. Elliotii* Engler & Diels, from which it can be distinguished by the larger leaves, which are finely tenaxose below. Flowers of the species are needed accurately to determine its position.

C. Gossweileri Exell in Journ. Bot. 1928, Suppl. Polyoph. p. 166. According to the present classification this species would come into this rather heterogeneous section. It may be included here for the present until some reorganisation of the sections can be attempted. This distribution is extended to Katanga by the identification published below:

*BELGIAN CONGO*: at an alt. of about 4000 ft., Elisabethville, F. A. Rogers, 32348 (Herb. Kew).
C. Zezehri Sond. in Linnæa, xxii. 46 (1850). The citation recorded below extends the distribution of this species into Katanga. Hab. Belgian Congo: Prince Leopold Farm, Katanga, Quarrel 400 (Herb. Brussels).

C. dilemiense De Wild. in Fedde Rep. xi. 515 (1913). This species certainly comes near to *C. Zezehri* Sond., from which it seems to be just distinguishable by the almost glabrous upper receptacle and pubescent but scarcely tomentose lower receptacle. In *C. Zezehri* the upper receptacle is distinctly hairy and the lower receptacle thickly tomentose. *Ritehardia* 1491, from Mukulakulu, is probably a mature specimen of this species. The fruits seem indistinguishable from those of *C. Zezehri*, but the leaves are acute at the apex and slightly acuminate, while those of *C. Zezehri* are obtuse or rounded. If acuminate, they are rather abruptly so.

*Sinuatipetalum* De Wild. in Ann. Mus. Congo, ser. iv. 215 (1903). This species was placed by the author in *Sect. Ciliatipetalæ* Engl. & Diels, but from the shape of the petals it seems to have affinity with *Sect. Spathulipetalæ*. If the fruit turns out to be very large it should undoubtedly come in this group, but up to the present only flowering material is known.


Leaves 5-9 x 2.5-4 cm.; petioles 4-5 mm. long; peduncles up to 2.5 cm. long; inflorescences about 2 cm. in diam.; lower receptacle 5-6 mm. long; upper receptacle 2.5-3 mm. long and 5 mm. across at the mouth; petals 2 x 1 mm.; stamens 5-6 mm. long; style 5-6 mm. long.

This species strongly resembles the genus *Pteleopsis* in appearance, but I can find no trace of male flowers. The fruits are unfortunately unknown. The affinity with *C. Wakefieldii* Engl., which ranges from the Zanzibar Coast region to Nyasaland, is sufficiently close to warrant its inclusion in *Sect. Lasiopetalæ*. The constriction of the upper receptacle is much more marked in *C. capitatum* and the leaves are nearly glabrous below, except on the nerves.


*Heudelet* 45, in the herbarium of the Paris Museum, is apparently identical with the South American species *C. Fruetosum* (Loebl.) Stuntz (*C. Loeflingii* Eichl.). There is no evidence that there has been any confusion of ticket, the sheet bearing a label with the words "Herbarium Richard, Sénoval, Heudelet 45," and another blank ticket with printed heading "Herbarium E. Drake," indicating that the specimen was originally in the herbarium of Drake del Castillo. I have seen no other specimen of this species from Africa, and there is no means of deciding, at present, whether we have a remarkable but by no means unparalleled instance of discontinuous distribution, whether the species was introduced into Senegal from South America, or whether there was an original error in attaching the tickets to the wrong specimen. Even if I prove to be wrong in identifying the plant as *C. Fruetosum* (the specimen has two fruits), the geographical distribution would remain just as striking; for there can be no doubt of the very close affinity. No other African species is at all closely related.


Leaves 8-17 X 6-10 cm.; petioles 10-12 mm. long.; lower receptacle 5-6 mm. long.; upper receptacle 5-6 mm. long and 4 mm. across at the mouth; petals 4 X 3-5 mm.; stamina 11-12 mm. long.; style 12 mm. long. This species is closely allied to C. paniculatum Vent. and to a whole complex of forms which may eventually be reducible to this species. It seems, however, to be specifically distinct in having very much larger petals which are quite conspicuous and exerted for a length equal to half the length of the upper receptacle. The leaves are also larger than any I have seen in C. paniculatum and its allies, and are distinctly cordate at the base.

While taking the name C. Lanarei, originally proposed by Dr. De Wilde for this species, I have made De Giorgi 1242 the type, as the material is in a much better state of preservation.


Leaves 7-9 X 3-5 cm.; petioles up to 5 mm. long.; bracts 5-6 mm. long, soon caducous; lower receptacle 4 mm. long; upper receptacle 3-5 mm. long to the end of the calyx-teeth, the latter being nearly 1 mm. long, 3 mm. across at the mouth; petals 2-5 X 1-5 mm.; stamina 6-7 mm. long.; style 6-5 mm. long. This species is near to C. porphyrophytus Exell. & Diels, but can at once be recognized by the densely tawny-pilo-se inflorescences.

Sect. FUSCÆ Exell. & Diels.


Leaves 8-12 X 3-5 cm.; petioles 5-8 mm. long; spikes up to about 7 cm. long; lower receptacle 1-12 mm. long; upper receptacle 4 X 2.5 mm.; petals 2 mm. long and nearly 1 mm. across at the apex; stamina 5 mm. long; style 4-5 mm. long. This species is nearest to C. bipinendens Exell. & Diels, but can be distinguished by the much smaller leaves and the upper receptacle, which appears slightly constricted in the middle at the point where the disc becomes free. The style is only very slightly thickened, and it is doubtful whether this is a good sectional character. The species is remarkable for the very well-developed free margin of the disc. The stamens are all attached at the same level at the point where the margin of the disc becomes free.


Leaves 10-14 X 7-10 cm.; petioles 10-14 mm. long; spikes about 2 cm. in diam.; lower receptacle 2-5 mm. long; upper receptacle 5 X 3 mm.; petals 1-2 X 1 mm.; stamina 4-5 mm. long; style 5-6 mm. long. This species is nearest to C. bipinendens Exell. & Diels, from which it can be distinguished by the glomeruliform spikes with crowded flowers, the smaller petals, and the relatively broader, slightly shorter leaves. In spite of the considerable difference in the margin of the disc between this and the preceding species it seems best to include them both in this section at any rate until the fruits are known.

(To be continued.)
Cryptotomiopsis decipiens Norman, sp. nov. Herba gracilis glabra, 10-20 cm. alta; caule erecto nudò, radice tenui; foliis ommino basilariis, congestis, ambitu obtusse lanceloatis, pinna tium compositis, ois Æanthis Thompsoni sed minoribus simultinis; pinnaula ultimis brevissimis, obtusiusculis triradiis vel rarius bifidis vel integris; petiolo lamine subequales imo basi in vaginam brevem et amplam expanso; umbellis 12-20 radiatis, radis inequilongis apice emus versus attenuatis; involucro nullo; umbellulae 2-floris, pedicellis valde inequilongis, involucellis 2, minutis, pedicellis subdentatis; petalis conspicueulis albis, oblongis, basim versus attenuatis, apice leviter emarginatis, lobulo subnullo instructis; calycis dentibus angustis acutis persistentibus; fructu lavi glabroque, sub-globoso; stylodia elongato-conoide, stylis erectis brevisculosis, ceterum omnino generis; carposphoro ad basim bi-partito.

Hab. Yunnan: Forest, 17,908, 18,096 (type), 26,320.

Leaf 8-6 cm. long; ± 2 cm. broad at base. Petiole 5-6 cm. Rays of umbel 1-2 cm. Fruit 1 mm. long.

This species belongs to the Section Pteridophylla Wolff. It bears much resemblance to C. trichomanifolia (Franch.) Wolff, but it can be at once distinguished by the 2-flowered partial umbels—in C. trichomanifolia they are 3-flowered.

In C. decipiens the fruit is sub-globous, 1 mm. long, in C. trichomanifolia it is narrow oblong, 3 mm. long; in the latter the rays are more numerous and reach a length of 45 cm., while in C. decipiens they do not exceed 2 cm. There are also differences in the leaves.

Cryptotomiopsis viridis Norman, sp. nov. Herba gracilis erecta glabra, circa 35 cm. alta; caule solitario simplice, supra medium solutum folioso; foliis basilatis lato-viridibus, ambitu anguste lanceolatis, longe caulatis, tenuiter bipinnatisectis (pininis imis sepius tripinnatisectis) segmentis ultimis brevissimis linearibus, superrioribus integris obtusis minute apiculatis, inferioribus sepius trirefidis; petiolo lamine subequales, imo basi in vaginam latam membranaceam expanso; foliis caulitis ternato-bipinnatisectis subseccssilis ceterum basilaribus exacteiformibus; umbellis circa 20-radiatis, radis inequilongis; involucro nullo; umbellulae 3-4-floris congestis, pedicellis valde inequilongis; involucellis 1-2 minutis acutis; petalis ignotis; fructu ambitu lenticulari parvo; calycis dentibus nullis (calycis ?); stylodia inconspicueulis; stylis brevissimis; semine subtetrico; carposphoro ad basim bi-partito.

Hab. Western China: Mount Omi, Wilson, 4981.

Leaf-blade ±11 cm. x 8 cm. broad at base. Petiole ±11 cm. Rays 2-3 cm. Fruit ±2 mm. long.

This also belongs to the Section Pteridophylla Wolff, and is apparently allied to C. lepophylla Dunn. With this, however, it can hardly be confused, owing to the very different cutting and color of the leaves. No other species of the genus that I have seen exhibits the bright green color of the leaves of this species. Yet the type-specimen was collected in 1904.

Æanthis caudata Norman, sp. nov. Herba ramosa glabra; radice fibrosa; caule striato folioso; foliis conformibus ambitu acuto triangularibus, tenuiter tripinnatisectis, circa 5-7-jugatis, jugis 5-1-5 inter se remotis; segmentis ultimis brevissimis linearibus acutis integris vel triradiis, segmento terminali supra supremo ut utrusque jugi producto vel breviter caudato; petiolo quam lamina multo breviore; umbellis brevissimis pedunculatis oppositifolis sat validis, 6-10 radiatis, involucris tenuissimis 2-3, mox decidis; umbellulae multipedicellatis; pedicellis filiformibus valde inequilongis; involucellis tenuissimis; floribus polygamis; petalis albis minutis obovatis, apice parum emarginatis lobulo subnullo instructis; sepals acutis acutis; stylis elongatis patentibus; fructu globoso (nee a dorso nec a latere compresso); mericarpis semi-ornicularibus, jugis dorsalibus filiformibus inconspicuis, lateralisibus tumidis albo-suberosis; semine vix a dorso compresso, ovoidico, pericarpium ob jugis latae suberosae haud completae.

Hab. China: Szehuian: Henry, 7193 (type), 1897; Huphe: Henry, 951A; Wilson, 2251; Patschen Henry, 1709; 4874. Leaf-blade (stem-leaf) up to 10 cm. long, 5-7 cm. broad. Petiole 1-2 cm. Peduncle 2-4 cm. Rays of umbel 1-5-2 cm. Fruit 1 mm. long and broad.

Belongs to the Section Dasyioma (DC.) Benth. & Hook. fil, and is close to Æ. Thompsoni C. B. Clarke, with which it is apparently generally confused. It is, however, different in foliage and especially in fruit. In Æ. Thompsoni the fruit is very obviously dorally compressed; in Æ. caudata it is as nearly as possible orbicular and clearly smaller. Æ. Thompsoni occurs in Yunnan, but does not appear to reach Central China.

Torilis Henryi Norman, sp. nov. Herba alta primum pilis albis adpressis in partibus omnibus sparse obtecta, glabrescentes; caule ramoso terete; foliis ambitu triangularibus, acuta bipinnatisectis basilais et caulinis, ut videtur consimilibus, 3-4-jugatis (jugis inferioribus inter se plus minusve remotis); pinnis lanceolatis acutis, basi attenuatis profunde incisis, segmentis ultimis linearibus, terminali plus minusve producto; petiolo brevi, foliorum superriorum omnino vaginant; umbellis longissimis pedunculatis, axillaris, radiis inequilongis, crassis patentibus 3-4, involucro monophyllo, parvo acuto vel nullo (cadoeo ?); umbellulae 5-6-pedicellatis, pedicellis inequilongis crassissimis patulis; involucellis 4-6 filiformibus conspicuis; fructu oblongo pro genere grandi, supra apice vix attenuato, in sicco nigrescente, aeneis patulis minutae gladioliformi obso; mericarpis omnino pro genere; stylis brevissimis erectis.
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Leaves (of stem) 5–10 × 5–9 cm. (across the base). Rays 2–4× cm. Pedicels 3–10 mm. Fruit 5–7 mm. long.

The leaves of this species are much like those of T. nodosa, but it is very distinct and can be distinguished from the other Asiatic species by the few thick rays, the long and thick pedicels and the large fruit.

Two South African Cyperaceae.

Mariscus inflatus C. B. Clarke in Flor. Trop. Afric. v. 384 (1901). This species is found on a plant in the British Museum Herbarium, collected by the Rev. C. D. Day. It should, however, not be included in the Tropical African flora. Mr. Day was a Jesuit Missionary who left England with a view of proceeding to Nyasaland, and the small collection of plants which he sent home were presumed to have come from there. It subsequently transpired that, owing to his death by hush in health, he never reached Nyasaland, and that his plants were all collected in the Cape Province, chiefly about Graaff Reinet (in the Division of that name) and the Zuurberg (in Steynsburg Division). M. inflatus, so called from the swollen bulb-like base, was placed next to M. Schimperi Hochst., but comparison with South African material shows it to be very closely allied to M. albo-marginatus Clarke (Flor. Cap. v. 187, 1897), and M. binucifer Clarke (Kew Bull. 1908, 13), and perhaps inseparable from the latter, which is recorded from Transvaal and Natal. As in M. bi-nucifer, the spikellets of M. inflatus sometimes mature two nuts.—A. B. Rendle.

Kyllinga moncepha1 As in South Africa. This species is not included in the Flora Capensis. In the Flora of Tropical Africa, v. 272 (1901), Mr. C. B. Clarke says of this widely distributed Old World plant, “frequent in the Mascarene Islands, but only known in Africa by the two examples above cited” (one from Princo Island collected by Welwitsch, the other from Portuguese East Africa by Stewart), “which may easily have been introduced.” There is in the British Museum Herbarium a specimen collected by Oldenburg at the Cape in 1774. It belongs to a set of plants, all numbered, which were in Herb. Banks, but bore no indication as to the collector, though believed to be by Oldenburg. Their association with Oldenburg was subsequently determined by the late Mr. Britten by correlation with a manuscript list of Masson. The plant was not overlooked by Mr. Clarke when going through the material at the British Museum Herbarium, but at that time (1887) its association with Oldenburg had not been established. The number of the specimen is 1444.—A. B. Rendle.

Vepris Welwitschii Exell, comb. nov. (Glycosmis Welwitschii Hiern in Cat. Afr. Pl. Welw. i. 115 (1900); Vepris Gossweileri Verdoorn in Kew Bull. 1926, p. 399).

Työzakuró Tanaka, during a recent visit to the British Museum Herbarium, indicated that Welwitsch, 471, named Glycosmis Wel-witschii by Hiern, does not belong to the Auranticae. It is identifiable as the recently-described Vepris Gossweileri Verdoorn.—A. W. Exell.

ANNOTATIONES SYSTEMATIS.

ANNOTATIONES SYSTEMATIS.

By A. J. Wilmott, B.A., F.L.S.

I. New Primulas from Spain.

These and other notes which will follow in due course embody the results of my work on the Spanish Flora in company with Mr. T. A. Lofthouse in 1926 and Mr. C. C. Lactaia in 1927 (see Jourm. Bot. 1927, 64, 297). The specimens are in the Herbarium of the British Museum; the work was undertaken with the permission of the Trustees.

Primula hispanica, sp. nov.

P. intracuta Gres. et Godr. (Fl. Fraco. ii. 449) proxima, ab ea differt.—Planta major ad 30 cm. alta; folis magnis in plantis bene evolutis ad 20 cm. longis et 6 cm. latis, pedunculo plerunque subaquantibus vel excrescentibus, laminis oblongo-ellipticis apice plerunque fere rotundatis in petiolum longum lamina duplo breviorum usque subquaquum angusta-alatum attenuatibus; calyce adulto magno (12) 15–20 mm. longo et (in sicco) 6–7 mm. diam., paululum inlato, vix “tomentoso” tam etis densi glandulosi-puberulo; corolla lutea nec sulphurea.


Mr. T. A. Lofthouse and I have had both this and the Pyrenean P. intricata flowering in our gardens, and although the differences between them might possibly be due to differing environment or individual variation (e.g., flower-colour), such herbarium material as I have seen rather confirms their distinctness rather than otherwise. The following description is from a garden-specimen. The measurements given may be abnormal following the recent March drought, which kept the plant in a very reduced condition until the last week:

Flos (e specimene e Sierra Nevada orto in horto culto descrita) mediocris (corolla tubo c. 15 mm. longo, 2.5 mm. lati, limbo c. 7 mm. longo, 13 mm. diametro); calyce (12 mm. longo et 5 mm. lati) in totum dense glanduloso-puberulo, angulis viridibus acutis exceptis hyphis translucentibus, venis secundariis numerosis parvis et in parte viridi striatis, dentibus triangulariis brevibus (1.6 mm. longis); corolla tubi parte superiore limbique basi sparse glanduloso-puberula; limbo infundibuliforme nec poculiforme, segmentis fere rectis angulo subrecto divergentibus utroque mediana (ante evanescente basi in ore conspici) excepta uniforme saturata lutea (tubo pallidio luteo), ad ½ in segmenta fisso, segmentis angustis nec contiguis, elliptico-oblongis, quam latissimo aliquantulum longioribus, apice leviter sed plane emarginatis; antheris (saltam forme longistylis) filamento
brave conice albo sedentibus, anguste ellipticis subplanis quam latis. c. 3) longioribus; stylo gracile filiforme et stigmatic hemispherico lucide viridibus.

It is clear that this section requires further study in Spain, for a specimen in the British Museum from the Sierra de Guardarrama (as Primula elatior: Herb. Graells) has leaves 29–30 cm. long and calyces (apparently inflated) 20 mm. long.

A single specimen collected in fruit near Riaño has peculiar leaves with cordate-ovate laminas about as long as the narrow almost un-winged petiole. They are quite unlike those of any specimen of Primula veris or P. elatior I have ever seen, and resembling in a general way the leaves of an aculeatus Viola. Except at the apex they are only very slightly tomentose below, so it cannot be identified with P. suaveolens. The capsule is included in the inflated calyx, so it is either an aberrant form of P. veris or a new species. I therefore describe it as a new (at least, "taxonomic") species, since the inclusion of such aberrant plants in well-known species is to be deprecated. The continual inclusion and exclusion of doubtful plants makes the nomenclature of names so variable that taxonomic precision becomes almost impossible.

It is far better to describe a doubtful plant as a new (taxonomic) species than wrongly to alter and spoil the circumscription of a well-known species to include it. I therefore name this peculiar plant Primula legionensis, nom. nov. P. veris affinis cum qua induimento et calycibus fructiferis minus minus congruit, sed ab ea foliorum laminas cordate-oblongis (circiter 7 cm. longis et 5 cm. latis), petiolis (c. 7 cm. longis) angustissime alatis solum 1/5–2 mm. latis.


NOTES ON PAPERS OF INTEREST TO STUDENTS OF THE BRITISH FLORA.

TRANSACTIONS OF THE DEVONSHIRE ASSOCIATION OF SCIENCE, ETC. IX. 81–92 (1928); TWENTIETH BOTANY REPORT, EDITED BY G. T. HARRIS, RECORDE.—These twelve pages show that Devonshire has plenty of willing workers to investigate the botany of the County, the "Flora" of which we anxiously await. A large number of interesting records are here printed, and we extract the following, which are apparently new County or Vice-County records:

Lamium molleulellum Fr. (intermedium Fr.). Goodleigh (v.c. 4). Miss E. Young. An astounding addition to the County for this northern species. We trust it is correct; Devonshire has some remarkable plants already.

Carex striosa Ruds. Woodbury (v.c. 3). Major R. Orme.


FEATUCA uniglumis Soland. Exmouth (v.c. 3). Major R. Orme. Interesting historical notes on Geranium macrorhizum, Mertensia maritima, Omphalodes verna, Oxalis corniculata, and Leonotis napellus occupy two pages.—C. E. S.

TWO NEW VARIETIES.—Dr. W. B. Turrill (Gard. Chron. 1929, 144) describes a new variety of Malva silvestris, found in Somerset by Mr. H. Whitley, as follows:—Var. violascens Turrill, var. nov. Planta perennis ad 1–2 m. alta. Rami petiolarum pilosi, pilis et simplicibus et stellatis instructi. Folia numerosa, laminis usque ad 3–4 cm. longis et 4–6 cm. latis, lobis usque ad 1–1 5 cm. longis et 1–1 5–2 5 cm. latis. Calyx 9 mm. longus. Petala circiter 2 cm. longa, 1 5 cm. lata, violascens. Carpel glabrum.

A new variety of Geranium Endressii J. Gay, which Dr. Turrill has named var. Armitagei, cultivated by Miss E. Armitage, Danedor, Herefordshire, is also described (see Journ. Bot. 1928, 44, 88). There is also an interesting note by him on Vivipary in Dactylis glomerata and a note by C. E. S. on Listera cordata which had been sent to Kew by Mr. R. Findlay, who found it near Brockenhurst, Hampshire. This appears to be a new record for v.c. 11, Hants south.—C. E. S.


Dr. Paul Aellen here gives a careful revision of the American species of Chenopodium, and as this includes several species found in this country it should be consulted by students of this genus.

Under C. glaucum L. he has a new subspecies, eu-glaucum, with the following diagnosis:—Leaves shortly petiolate, oblong or oblong-obovate, usually obtuso, sinuate-dentato (sinuses distant) cuneate-attenuate to the petiole. There is also a subspecies salitum, founded on C. salitum Standley, with a new variety, var. pulchrum, and a subspecies ambiguum, founded on C. ambiguum R. Br.

Under C. rubrum L. there is a forma humile, founded on C. humile Hook. C. rubrum L. in America has been much confused with C. macropus Hoff. fi.

In all twenty-one species are enumerated, some of them, such as C. E. S. Berlandieri Moq., having numerous subspecies and varieties. It is to be regretted that the author does not give a key to the species.

—E. G. B.

DURLEI ITER ASTURICUM BOTANICUM.

BY C. C. LACAITA, M.A., F.L.S.

(Continued from p. 113.)

verticillii 6-floris, denæ spicatis; calycis faveae glabriuscula, dentibus è basi angustis unirame longe subulatis; corolla versicoloris limbo brevissimo, subequaliter quinquelobo.

Habitat in montium Asturiarum occidentali regione alpina, inter solutos lapsides, nominatim in Monte pice d'Araxes, ibi medio Augusto fructificans (Durius).


[laundry list of peduncles, secediodes, crambe, fragiles, pubescentes vel glabris, non crassiusculis, rigidi, solidi, plerumque villosi; pars inferior ramorum, inter petras latens, elongata, perinde tenuis et fragilis, quamvis indurata et ferre lignosa. Folia caulina \(1 \frac{1}{2} - 2\) pollices longa, 2-3 sin. lata, mollia, lanceolata, præter petiolum pascuum utrinque glaberrima, serraturis utrinque 5-9. Verticilli densè spicati, spicis \(1 \frac{1}{2} - 2\) uncias longis, brevioribus ovato-oblongis, longioribus cylindricis. Folia florales glaberrima, præter unium virida, nonnunquam cordato-latus ovata, sed oblongo-ovata; longiuncula acuminata, basi plus minus contracta (hinc quasi rhombica), acuminibus flores demum superante et arcum recurvo. Deutere marginalis utrinque 7-9, è basi angusti longi subulati, mollos, virides, non è basi latis, in spinae flavam pungentem abuentem. Calyces virginis nuda, non villis densissimis longis claue; deuteri è basi angusti unirame longi subulati, iucundi, non è basi latae trinervis subulati et pungentes. Corolla ex Duriis notis manuscriptis, Nicotiana Tubaci ad instar, livido-purpurea, quamque dilatate sulphurea vel sordide alba. In exsiccatis purpureas et tubus totus corollinum et partem limbus; cuius rei nullo indicium in scordii video, in quo, ni fallor, corolla perpetua flavescit. Tubus corollinarum præterea intus, in S. lurida, ad filamentorum originem multum minus villosus, pilis saltem multo brevioribus. Ultimum gravemque differentiam suspeditat limbus in lurida parvis, tubo triplo breviore, et subequaliter quinquemolis, in scordii admodum variis, semper tamen elongatus, longitudine tabi et valde inaequalis, lobis nempe 2 mediis dimidio brevioribus et ferre triplo angustioribus.


Habitat in paludosit ad lacum du pice d'Araxes, in alpibus asturiea occidentalius, medio Augusto fructificandis inimicis faciens (Durius).


L. caulibus 1-2, erectis, gracillis, ramosis in parte florifera viscido-pubescentibus, cæterum glaberrimis, infemn multifoliatis, supernæ longæ nudæ; surculas 2-3 brevibus ad basim fœnsitum; foliis surculorum linearis-lanceolatis, quaternato- et quinato-verticillatis, caulinis conquifertis, elongatis, linearis-subulatis, linearis-quaternato- et quinato-verticillatis, regibus alternis; floribus plus minus longæ laxaque racemosis; pedicelis filiformibus, glandulosos-pubescentibus, erectis; segmentis calycinis linearis-lanceolatis, acutis; corollae (violetae) labiis deflexis, superio ferre bipartito, inferiore latæ tríbiolo, palato obsoleto, albido; calcare corollam excedente, longæ subulato, acuto; stylo indiviso, apice dilatato; capsula valvulis 6 dehiscente, glaberrima; seminibus tetragono-ovario-prismaticis.

Habitat in Asturia inferiores, propò vicum Planas (non longè ad Grao oppugnato), ad rupes proxime supra pontem fluminis Nalon impositum, ibi in fluminis faeæibus frequens; medio Junio flores et fructificans. Alibi in Asturia a cl. Durieum non visa.

Pianta annua, habita et floribus coriis longës calcaratis sylvestre Delphinium Ajacis non male referens, superne in floribus viscoso-pubescentis, cæteram glaberrima. Radix exilis. Caulis ex una radicis 1-2, gracillis, maximum pedales, erecti teretes, infræ medium ramosi, ibique dense foliati, supernæ longæ nudæ, ramis 3-5, erecto-pedunculis, caule primario paulli brevioribus, basi remotè foliatis. Caulis basi ambitia surculi steriles 2-3, unciales vel brevioribus, erectis apice foliati, foliis linearis-lanceolatis 2-3 sin. longis, annibus villis verticillatis, verticillii 3-5, inferioribus 4- superiores 5-phyllis. Folia caulina multo longiora et angustiora, linearis-subulata, vix \(1 \frac{1}{2}\) sin. lata, glaberrima, erecto-patentia, inferiòra et media unciali, sesquieuncialia, superiore semianteriasia ima quaternato- rarius quinato-verticillata (verticellis 1-2, nunquam 3), regius alterna. Flores speciosi, in ramis 4-8, in caule primario sæpe 20-30, ibique longæ racemosi, laxissimæ, aeridentantes. Racemis cum pedicellis et calycibus dense viscido-pubescentibus, pilis mollibus, longiusculis, articulatis. Pedicelli floriferi patuli, capitales, \(1 \frac{1}{2} - 2\) sin. longi, fructiferi paulli longiores, filiformes, erecti. Bracteola subulata, pedicello duplo et triplo brevior. Calycina angusta aquila, linearis-lanceolata, acuta, univeria, membranaceo-marginata, viscido-pubescentia, fructiffera distincta rotuositscula, nervo carinali viridi, prominente. Corolla, calcare supputato, unciâm ferro longa; tubus cylindricis, pallidus, calycie dimidio longior, \(1 \frac{1}{2}\) sin. longus; labia tubo longioria, deloxa, pulchre violacea; superius \(1 \frac{1}{2}\) sin. longum, ultra medium bidentum, laciniis latæ linearibus, integerrimis, obtusis; inferius vis brevis, profundè trilobum, lobis obtusis, perindò obtusis, integerrimisque, calcare palido, longissimo (7 sin. longo), florœm excedente, subulato, acuto, apice plus minus falcato, in siecia albido, palato depresso, subtibilius pubescente, albido, non punctato. Stylus glaberrimus, indivisius, filiformis, apice in spathula dilatatus. Capsula in racemum laxum, supè 5-unciâlem dispo.
calyces non aut vix longiores, elipsoideae, emarginatae, glaberrime, utroque loculamento valvulis tribus, brevibus, ovato-oblongis, erectopatulis dehiscente. Semina nigra, minuta, obversa tetragonopterogyna, apice truncata, lateribus inequalibus, ruguloso-sericeulata.

Obs. Habitus L. bipartito, lino-gracce et sopphirinae quibus folio angustissimis, stylo indiviso et seminibus pyramidalis, non aut reiuniorum curvatis (sic in bipartito), aut elipsoideis et annuleatis transverso rugosis (sic in lino-gracce et sopphirinae ex Link et Hoffmann, Fl. Port. tab. 41 et 42) sunt superque differt. Locus ejus, in Chavannesii monographia, in Linnaeorum § IIIII. div. b (stilo apice increasato, stigmatibus submarginato, seminibus angulatis subprimatricibus), ante L. armeniacam (p. 147), cui soli habitus accedere videtur. Reliqua enim species in hac divisione descripte habitum nostra L. delphinioides totus cedet differens.

(Toto continued.)

OBITUARIES.

REV. ERNEST ELLMAN.

The Rev. Ernest Ellman died in Bath on Jan. 30 last, in his 75th year. Born and educated in the county of Sussex, where his father was Rector of Berwick for more than sixty years, and where his passion for wild flowers was kindled at an early age, Ellman went on to St. John’s College, Oxford, was ordained, and did clerical work for some years in Cornwall, Kent, and Sussex. These changes of residence helped him to become intimately acquainted with the more interesting plants of many areas and to note their soil preferences, environment, and ecological associations, a study that fascinated him and endured to the exclusion of species-definition and other problems of importance to field-botanists in general. At this period the poor health that had hampered him from boyhood became more serious, and thenceforward he passed much time in the Mediterranean region continually searching for plants that he had not seen before and which a remarkable memory enabled him instantly to recognize. It is probable that his note-books contain remarks on at least 4000 European species seen in situ. He himself never gathered anything, but on his annual tours he secured the service of a younger botanist who collected and pressed the plants to be preserved. Prior to the Great War his usual companion was M. Emile Jahandiez, the Var botanist and North African explorer. They visited the Balearic Islands, Tangier, Spain, and Portugal, and made two lengthy journeys in Corsica. Some results of the latter exploration are recorded by Dr. J. Briquet in his Prodrôme de la flore Corse. In later years some young members of the staff at Kew had the privilege of an introduction to southern vegetation under generous and stimulating guidance, and by their activities the Herbarium was substantially

enriched*. Among the species new to science, Teucrium Ellmanii and Juncus Ellmaniany fitly commemorate the discoverer.

In spite of his asthma, Ellman could walk long distances. His abounding energy on excursions and utter disregard of time-tables were often a little embarrassing to his friends. Yet the unselfish kindness of the man, his goodness of heart and quiet humour were ever dominant. Wherever he travelled the picturesque figure and frank genial address were welcomed. It is regrettable that dislike of self-assertion in any form was so ingrained in his nature that he could not be persuaded to write anything for publication, and as he preserved no specimens the gifts of this enthusiastic botanist were less widely known than they deserved.—J. W. WHITE.

MAX CARL LUDWIG WITTMAC.

The death, on February 2, is announced of this veteran German botanist, formerly Professor at the Royal University and the Royal Agricultural College in Berlin. Wittmack elaborated the family Bromeliaceae for Engler and Prantl's Pflanzenfamilien, and is commemorated in the genus Wittmakia Moz., of the same family. Wittmack's most important work was, however, on the economic side, his Gras- und Klee-samen (1869) is a useful descriptive account of common grass- and clover-seeds and also of various weed-seeds occurring as impurities in seed-samples. From 1887-1905 he edited Gartenflora, the well-known horticultural Journal, founded by Eduard Regel. He was born September 26, 1839.

SHORT NOTES.

Cystopteris fragilis Bornh. near Goathland, North Yorks. —On the 10th. September, 1928, Mr. Francis Druce, F.L.S., who was working on the flora of the Whitby district, discovered a form growing on the masonry of Goathland, which he named Cystopteris fragilis, and he very kindly brought a specimen to me. The identification he confirmed at the Natural History Museum on his return to London. Baker in the Flora of Yorkshire does not record Cystopteris fragilis as growing in No. 4. the Esk area, and it is interesting to find a lime-loving plant established here. The lime salts essential for the persistence of the plant will be derived from the mortar in the joints of the masonry, but how it became established here is somewhat of a mystery. This is the only station, so far as I know, for Cystopteris fragilis in No. 4 area, and as Baker makes no mention of it we must consider the record a new one.—R. J. F. FLINTOFF.

Polygonoa calcatum and Poa irrigata in Britain.—Dr. G. C. Druce writes to point out that Mr. Willmott's statement in his obituary notice of Carl Lindman (Journ. Bot. 1928, 301) that *See New Plants from Spain. By C. E. Hubbard and N. Y. Sandwith in Kew Bull. 1928, 155.
Lindman "introduced two new species to the British Flora" may mislead, as he did not collect them during the trip (see B. E. C. 1912, Report 170 & 181; Camb. Brit. Flora, 1914, 127). Mr. Wilmutt admits that he should have said that "as a result of his visit the two new species were added." *Polygonum calceatum* was identified by Lindman from a specimen sent by Dr. Moss. Lindman also recognized in Dr. Druce's herbarium a hybrid of *P. calceatum* and *aggregatum*, where also he identified *Poa irrigata*, the plant having been collected by Dr. Druce who himself suspected the identity. In each case the addition of the plant to the British flora was the joint work of the British botanist and Prof. Lindman, and the result shows the value of such cooperation.

**REVIEWS.**

*Handbuch der biologischen Arbeitsmethoden*, i. 5, Lief. 279.

This number of the *Handbuch* deals with some of the methods and underlying theories of ecological studies. Many of the papers are particularly useful, since they deal with aspects of field-botany which are undergoing rapid development. In the first paper, Drude deals, under the heading of "Plant Geographical Ecology," with a variety of subjects which include "adaptogeny," vegetation regions, life forms and their significance, and the physiognomy of vegetation-units. The methods and equipment required for ecological studies while travelling in wild countries is the subject of a paper by H. Handel-Mazzetti, while R. Scharfetter deals exhaustively with the cartographic representation of plant-communities. This is a comprehensive paper, which considers not only the ecological problems involved, but also the methods and principles arising in map-production. P. Jaccard contributes a full discussion of his statistical-floristic methods in plant sociology, a paper which is particularly welcome, as many of the original sources are not readily accessible. His concept of the "generic coefficient" receives particular attention. A second paper dealing with the graphical methods of analysing vegetation statistics treats more fully the empirical and theoretical relations between species and area, particularly according to the Scandinavian schools of thought. This paper (by A. Frey) also discusses the habitat variation-curves of Jenny, the presentation of rainfall and temperature data, and also the graphical representation of plant-succession and frequency in a given habitat. The last paper, by E. Rübel, considers the role of light and of light conditions in relation to vegetation. The treatment is in many respects excellent, and particularly useful in the original discussion of daily and seasonal light conditions in various European stations. The review of methods might profitably, however, include a fuller discussion of the sensitive physical methods of measuring light, which have been recently employed in this country and in America. The only general criticism of this volume is, indeed, that the English and American literature receives somewhat less than its due share of attention.—W. H. Peasall.


In this new book Sir Jagadis Chunder Bose describes the results of his experiments on various types of plant-movement. Some of the experiments are new, some the author has recorded before. The new experiments are as ingenious as the earlier works of the author would lead us to expect. The descriptions of the experiments and the results are lucid and adequate to the interpretation which Sir Jagadis chooses to make. The whole probably makes good reading for those already converted to or born with the outlook of the author. Anyone searching for a different type of interpretation, or desiring to repeat the experiments, would find the details too scanty in many cases. With such an array of experiments described in about four hundred pages this lack of detail is inevitable.

That many physiologists will not agree with the author's interpretation of the results of the experiments is certain. Perhaps more would agree that he goes too far in stressing the similarity of plant and animal movements.

To consider the experiments in detail might make a review longer than the book. The following quotation of the *explanation* of the changes of weight of a plant-organ, as it is gradually heated whilst suspended in water, will serve as a type: "It should be remembered that it is the real weight minus the weight of the volume of water displaced by the organ. Now, a physiological expansion of the organ must obviously increase the volume of water displaced by it, and an abrupt contraction or diminution in volume of the organ involves a reduction of the volume of water displaced, which causes a sudden increase in its apparent weight. The increasing loss in weight up to the critical temperature is therefore due to the physiological expansion of the organ; the sudden increase in weight and inversion of the curve are, on the other hand, due to the spasmatic death-contraction of the organ as a whole."

It is to be hoped that most physiologists would wish to probe a little deeper. Sir Jagadis does not appear to be interested in the wherewithal for the expansion; and if it is water, what happens to it in the organ to account for its change of density.

References to the work and views of others are few. The non-botanical reader would, perhaps, gather that Strasburger's text-book was the authority on transpiration.—G. E. Briggs.
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RECENT FLORISTIC WORKS.

1. Flowering Plants of the Northern and Central Sudan. By Grace M. Crowfoot. 8vo, pp. xxv, 163 full-page figs. from original drawings of the author, 1 map, and 9 photos. London: Whelkdon and Wesley, 1928. Price 7s. 6d. net.

Northern Sudan implies the country between Haifa and Khartoum, Central that between Khartoum and Talodi, the southernmost place visited by the author during her journeys between the years 1915 and 1925. The plants from which the sketches were made were identified either at the Government Herbarium at Khartoum or at Kew, and the sketches were subsequently re-drawn at home after careful comparison with authoritative dried specimens, and in some cases magnifications of details have been added. A useful introductory note on the vegetation of the area is supplied by Mr. A. F. Broun, late Director of Woods and Forests, Sudan Government. The rainfall in the area increases from practically nothing in the north, which includes the Nubian and Libyan deserts, to 20 to 30 inches in the south near the Nuba Hills, south of Kordofan. To the north-east the boundary is formed by the Red Sea.

The order followed is that of Hutchinson’s Families of Flowering Plants, and the plates will form a companion volume to the new List of Sudan Flora.

The illustrations are clear line-drawings which indicate the habit of the plant, of a small branch, and also the characters of leaf, flower, fruit, &c. They will be of great help to the student of the Sudan flora in the determination of his plants. The area in question, though not exactly a botanist’s paradise, is of special interest as exemplifying the struggle for existence against desert or semi-desert conditions.

A brief description and indication of locality is given below each drawing, in addition to the botanical and Arabic names.


The present instalment of the Flora completes the account of the Dicotyledones Archichlamydeae, and leaves for future parts the treatment of the Sympetalaeous Dicotyledones and the Monocotyledons. The form and arrangement follow that of Part 1, which was noticed in the Journal in 1927 (p. 290). By far the largest family is the Leguminosae, which are segregated as distinct families in their three natural groups—Cesalpiniaceae, Mimosaceae, and Papilionaceae. This is also an important family economically, including many of the forest-trees, the elucidation of which will be materially helped by means of the descriptions and figures.

Flora of West Tropical Africa. 159

Work on the Flora has revealed a good proportion of new species; these are cited as in Kew Bull. 1928 ined. (though the descriptions of some of the later ones did not appear until the present year).

The assistance of Miss M. B. Moss with the families Ulmaceae and Hippocrepitaceae and of Dr. Schellenberg with the Conaraceae is duly acknowledged.

It is hoped that the completion of this useful addition to the African Flora will not be delayed.


Parts 1 and 2 of Prof. Craib’s book were noticed in the Journal in 1927 (p. 80). Part 3, except for the few pages occupied by Conaraceae (where again Dr. Schellenberg’s help is acknowledged), is occupied by the Leguminoseae, and represents therefore an important step towards the completion of the work.

The book is not a Flora—no descriptions are given and there are no keys. The species are arranged in alphabetical order under the genera, the sequence of which is that of Bentham and Hooker’s Genera Plantarum. References under each species are given to germane floras and other systematic literature, specimens seen are cited, and the geographical distribution is indicated.

The late editor of the Journal would have “regretted” the lack of appreciation of the value of page-headings. “Leguminosae” on both right and left page-header is not very helpful, whereas the indication of the name of the genus, represented in the text below merely by an initial, would be a distinct gain.

A few new varieties and combinations are included; new species have been described by the author in previous numbers of the Kew Bulletin.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY.—At the general meeting on April 4, 1929, the President announced that the Council had awarded the Linnean Gold Medal to Prof. Hugo de Vries, F.M.L.S. This will be a fitting recognition of Prof. de Vries’s pioneer work in plant genetics.

At the meeting on April 18 Dr. G. C. Druce gave an account of the botany of Cyprus, which he had recently visited, illustrated by a large series of photographic lantern-slides, and a number of specimens of his own collecting. Dr. Druce climbed several of the mountains and also searched the salt-marshes and other areas. He was able to verify several records by Sibthorp, who explored the island in 1787, and other botanists. An interesting addition to the flora was Lamprothamnium papulosum J. Groves (Characeae).

POPULAR INTRODUCTION TO MYCOLOGY.—A recent addition to Benn’s Sixpenny Library is a readable and useful little volume by J. Ramsbottom, entitled Fungi, an Introduction to Mycology.
NEW OR NOTEWORTHY BRITISH GALLS.

By A. A. Dallman, F.C.S.

As various galls of considerable interest have come under my notice in different parts of England and Wales during the last few years, and as information has also accrued from other sources, it seems desirable that some of this material should be placed on record. The present paper adheres to the plan of my previous contribution ("New or Noteworthy British Galls," Journ. Bot. 1925, 98–104) and forms a continuation. As before, the following examples are zoecicula (i.e., galls incited by animal agency), unless in any of the few instances where the cause is at present unknown bacteria or fungi should be found eventually responsible.

Mr. H. J. Burkill has kindly supplied specimens or reliable data in regard to some of his interesting discoveries, which I am glad to be able to include here. Acknowledgment is due to Professor C. Hourd (Strasbourg) and to Prof. F. V. Theobald, the latter having reported upon various Aphid parasites, some of which have proved of interest to others whose cooperation is indicated in the following pages. It should be noted that the term "parasite" is used throughout this paper to designate the actual agent concerned in gall-inducement.

I. New Galls.

The following are unrecorded by Professor C. Hourd (9, 10, 11, 12), E. W. Swanton (15, 16), and the writer (3, 4, 5):

On Sistaphrium Thallanicum Gey. Plant dwarfed, only a few centimetres in height, with marked cladomation and phyllomation. The rosette leaves were unusually numerous and there were upwards of twenty inflorescence axes in the single example seen. The main axis of the rosette was somewhat thickened, and microscopical examination showed the presence of numerous nematodes. At first I took these to be members of the family Anguillulinae (Eel-worms) and was disposed to regard them as the insect. Through the kindness of Dr. A. B. Rendle, I was able to obtain the opinion of Dr. H. A. Baylis, the British Museum (Nat. Hist.) expert, who examined an excellent microscopical slide which my friend Mr. H. Britten (Man-chester Museum) kindly prepared. Dr. Baylis considers the Nema-todes to be "harmless free-living forms, belonging, I think, to the genus Plectus (near P. granulosus Bastian). They do not belong to the family Anguillulinae (=Tylenchidae), which contains the forms that are true plant-parasites. Plectus is commonly found about the roots of plants, but probably does no damage to the plants themselves, having no special piercing apparatus like the Anguillulinae." It is to be hoped that further examples of this gall may be found in order to elucidate the nature and identity of the incitative.

JOURNAL OF BOTANY.—Vol. 67. [JUNE, 1929.] M
Only one stunted plant was met with, but this had a curious aspect quite unlike the normal Thale Cress, so that at first it was thought to be some unfamiliar Crucifer. I am indebted to Mr. H. E. Green (Rock Ferry) for this example. It was found by him on a sandy bank near Irby, Cheshire (April 1928), but a subsequent search here revealed no further specimens of galled plants.

**Vinca major** L. Leaves, and especially the younger foliage, somewhat distorted. In some amount in several places in the vicinity of Abergele, Denbighshire, first noticed by Dr. F. P. D. Thomas, May 1921, June 1924, and subsequently; Meliden and Cwm, Flintshire, May 1921. In each case the plant was tenanted by abundance of aphids.

Specimens of the parasite were identified by Professor Theobald as *Myzus circumflexus* Buckton (*M. vinae* Gillett), and it is probable that the galls may have been initiated by this agent. As, however, there are at least two other aphids—*Myzus consolavi* Kaltenbach (*Aphis vinae* Walker) and *Rhopalosiphoninus latysiphon* Davidson—which frequent this host, and as I omitted to make detailed examination of the fauna of the plants, I cannot be sure that *Myzus circumflexus* was the only species present. As it is not unusual to find more than one species of aphid in company at times, the need for caution is evident. I think we may safely ascribe the present galling to aphid agency.

Professor Theobald found the American parasite *Rhopalosiphoninus latysiphon* (first described from California in 1912) in great abundance on both *Vinca major* and *V. minor* around his house at Wye, Kent, in 1923. He makes the interesting observation (Theobald, 16) that he noticed no leaf-distortion in the case of *V. major* even where this insect occurred in large numbers.

Houard notes a type of leaf-eleidium in *Vinca major* (originally recorded by Tavare) from Madeira and ascribed to a Paylidiid.

**Vinca minor** L. Leaves, and especially those of the growing points, curled and distorted. Caused by the aphid *Rhopalosiphoninus latysiphon* Davidson. Professor Theobald first records this from Wye, Kent (Theobald, 16), where it occurred in April 1928, and notes that the insects collected in greatest numbers in sheltered situations. I met with the galls and parasites (the latter determined by Professor Theobald) on cultivated plants at Barnsley (May 1925) and also at Doncaster, Yorkshire. Here also the parasite's predilection for shelter was well shown. Professor Theobald has figured the distinctive galling (Theobald, 16, 19).

II. **Galls new to Britain.**

The following are unrecorded for Britain by Houard (9, 10, 12), and are additional to the lists of Swanton (15, 16) and those noticed in my previous contributions (3, 4, 5):

* Fide Theobald.

**New or noteworthy British Galls**

On *Centaurea Scabiosa* L., Houard, 3980. Deformation of the capitulum. “A la base d'une pailleette de l'involucre, renflement ovoïde, uniloculaire, de 3-6 mm. de long sur 2-3 mm. de diamètre.” Due to the Cynipid *Aulastrum rogenhofferti* Wachtl. Recorded by Houard for Central Europe, France, and Italy. Mr. Burkhill informs me that galls were first sent him by Mr. R. S. Bagnall some years ago from the north of England. Mr. Burkhill then met them near Box Hill, Surrey, and near Harveysfield, Middlesex. In 1927 he found them on the South Downs, near Amberley, and subsequently in various places along the North Downs. He writes: “Last February (1928) I went out one day to get some for a friend who did not know how to look for it. I failed to find it after two and a half hours searching, although I had met with it in that region in the autumn. On my return home (Leatherhead, Surrey) I went into the garden where I had two roots of the plant, and there I found some of the galls, and also others due to *Aulax acabosone* Giraud. It is rather interesting to consider how the insects had found these two plants, as the nearest spot where I had previously met with the galls is about two miles away.” I am indebted to Mr. Burkhill for specimens which he found in an old capitulum on Fetcham Downs, Surrey (Jan. 12, 1928).

The same insect also affects the achenes giving cecidio of another type (Houard, 3979), which may also be expected to occur and should be looked for. Both types are easily overlooked at first. Mr. Burkhill writes that the galled capitula are not obvious by external inspection, the galling being within and at the base of the bracts. “They are disclosed by feeling round inside the old flower head after the florets have fallen, and one soon learns to detect the swelling with the thumb.”

**Euphorion angustifolium** L. Galling of leaf-margins well agreeing with No. 4348 of Houard (9)—“Plaurocoecidie déformant la feuille. Enroulement marginal par en bas, peu serré, teinté de jaune ou de rouge pâle; la partie entroulée, à peine épaisse, se desséchant après la migration, à 10-30 mm. de long. LARVA solitaire d'un blanc jaunâtre. Métamorphose dans la terre.” Between Hexthorpe and Spofforth, West Yorkshire, July 12, 1927. Although I unfortunately omitted to keep the larvae and breed out the mature parasite from these specimens, yet the resemblance of galls and the contained larve to Houard's description is so close that I have little doubt that the cecidia were the work of *Perissia kiefferiana* Rubs. Houard records this gall for Central Europe.

**Gentiana Amarella** L. Chlornathy and marked floral modification. This mite-gall was met with by Mr. Burkhill along the North Downs, near Dorking, Surrey, August 1927, and also in the autumn of 1928. As the galling is similar to that on the following species, there is good reason to suppose that the parasite concerned is *Eriophyes kernerii* Naii. Microscopical examination revealed the presence of gall-mites, and Houard has no record of any other species attacking the genus. Mr. Burkhill remarks that the mite is a large type.
Its life-history would be worth studying. As the host is an annual the mite cannot hibernate in the plant, or leave eggs there, with a certainty of getting a good start the next year. This suggests considerable mortality. As the plant appears late in the season, it is possible that the mites lie dormant for some months waiting for the new growth.

**Gentiana campestris** L., Hoard, 4695. Chloranthus with clado-
mania and phyllomania. I first met with this in August 1910 above
Bryn Llyd, Gwynffyllog, Denbighshire, and also at Rhos-y-deml,
near the Gwyrfawr, in the same county, in the autumn of 1911. In several
instances (near Gwynffyllog) a number of flowers were grouped in a
chrysalis-like manner and surrounded by an involucre. The in-
dividual florets were more or less imperfect and the androecium and
gynoecium were suppressed in the majority. One plant showed con-
siderable multiplication of the perianth members. Most of the floral
leaves were green and showed all stages of transition from sepal
stems to stamens and carpels.

Mr. Burkill informs me that he found instances in Yorkshire in
1917. Hoard suggests that the galling is due to *Eriophyes
cornueta* Nal.

**Helenium canum** Baum. An acrococcidium formed by the
thickly clustered leaves which show abnormal pilosity. Induced
by gall-nutes. This gall agrees with that recorded by Hoard
(327) at Theobald's终端 excrééta de feuilles agglomérées et convet-
tes de poils anormaux." This is apparently ascribed to *Eriophyes
rosolos*

**Hippocrepis comosa** L., Hoard, 3853. Leaf-galling. "Foli-
holes pliés en gousse; des deux moitiés hypertrophiées se relèvent
vers le haut en garnant autour de la nervure médiane." Found by
Mr. Burkill in plenty (1927) on the Downs near Dorking, Surrey.
Also seen here in 1928. Hoard records it for Central Europe. The
gall is induced by the Cecidomyid *Macrolabis hippocrepis* Kirby.

**Tanacetum vulgare** L. Modification of the leaf, the lamina
being somewhat crisped and curled. Probably induced by an aphid
parasite. The gallng appears to be identical with No. 3737 of
Hoard, recorded from Denmark and ascribed to an undetermined
aphid. The Llandulas plants were tenanted by a very distinctive
aphid, which gave a strong reddish colour when bruised on white
paper. This was identified by Professor Theobald as *Macrosiphum
tanacetaria* Kalt. Llandulas, Denbighshire, August 1924.

**Triglochin palustre** L. Flowers and young fruits deformed.
This type is probably that recorded by Hoard (161) from Germany,
no agent being specified. Dee Marshes, below Burton and Shotwick,
Cheshire and Flintshire, August 1926. My friend Mr. H. Britton
and I found an aphid on some of the plants, but, as the season was
somewhat advanced, this parasite was only in somewhat diminished
numbers. There was evidence that they had been here in some
quantity before this date (August 21). Careful search amongst
other plants elsewhere on the Cheshire coast — on a patch of salt-
marsh at Hilbre Point, near Hoylake, some nine miles lower down the
Dee Estuary — on September 10th revealed no living aphids, although
there were indications of their previous presence. The flowers were
practically over, and it seems that the associated Hemiptera are only
in evidence during the period of active photosynthesis and anthesis
when there is a relatively large supply of food-stuff available.

The same type of gall occurred at Marshside near Southport
(S. Lancs.) in August 1927, and again on the Dee Marshes in 1928.
There was no indication of this type of galling in the associated
*Triglochin maritimum*, which also occurs in abundance on the salt-
marsh in both places. Several aphid parasites appear to be asso-
ciated with the two species of *Triglochin*. One which I met with on
*T. palustre* at Marshside proved to be a new species which was sub-
sequently described and figured by Professor Theobald (Theobald, 20, 21)
der the designation *Aphidula palustris*. While examining the two
plants here on this occasion, a very dissimilar type of aphid was
obtained on *T. maritimum*. Curiously enough, this also proved to be a
hitherto undescribed insect of which Professor Theobald has given
an illustrated description recently (Theobald, 20, 21). There is no
evidence, as yet, that the latter (*Macrosiphum* *Triglochin*
*Theobald*) is a gall-inducer. It is possible that the galling of *Tri-

**Umulus campestris** L. and *U. montana* Stokes. Hoard, 2047
and 2065. The galls on the leaves of the two species appear to be
identical and are the work of the gall-nute *Eriophyes Heftorica* Nal.
Hoard characterises them as follows: "Des folioles irrégulières du
vertclair, plus tard brunes, ne faisant pas saillie à la face supérieure et
eauvant par un ostiole à la face inférieure qu’elles dépassent à peine.
It is recorded for Italy, Central Europe, and Denmark on the first-
named species, and for Denmark and Central Europe in the case of
*Umulus montana*.

The addition of these to the British list is due to Messrs. J. Ross
and Burkill. The latter writes: "I had seen these galls near Leather-
head, but had not thought they were such until J. Ross drew my
attention to the spots and asked what they were. I then put them
under the microscope and saw the mites, longish and narrow and
having almost parallel sides. It is quite distinct in appearance from
*Eriophyes ulmi* Nal., from which I had not identified it as separate
before this (Sept. 1927). The gall is insignificant, pale green at
first, then brown later, more like a fungus spot, and very slightly
raised from the leaf." Mr. Burkill has met with galls, on both hosts,
in two areas near Leatherhead and subsequently near Runmore Church,
Dorking. It should doubtless be met with elsewhere.
VIOLA LUTEA Huds., Houdart, 4298. The work of a gall-mite which affects the foliage. The margins of the leaves become tightly curled, slightly thickened, and somewhat deformed, but there is no obvious abnormal pilosity which is so usually encountered with Cecidia due to Eriophyidae. Houdart characterises it as follows:—"Enroulement marginal par en haut, très serré, sans pilosité normale."

Recorded for Central and Western Europe, it is rather surprising that it has not been previously met with in Britain. Buxton neighbourhood, Mam Tor, Eyam Moor, Derbyshire, June 1926. Rhos-y-Domen near Gwytherin, Denbighshire, August 1926. The galls were observed in abundance in the above stations, and will doubtless be met with in other districts in Britain where the host occurs. They are somewhat inconspicuous and easily overlooked. If the Cecidia are teased out, the gregarious parasites, an undetermined species of Eriophyes, are easily discernible on examination under the microscope.

III. NOTeworthy GALLS AND CECIOLOGICAL NOTES.

The galls to which an asterisk is prefixed have been added to the British list during recent years, but the present records represent additional stations and extension of range, or other information. Observations upon certain other Cecidia and additions to our knowledge of such are also noted here:—

ACHILLEA PARMICA L., Houdart, 5706. From galled capitula obtained at Askern Bog, West Yorkshire (June 11, 1927), mature specimens of the Cecidomyid Rhopalomyia particae Vallet emerged between June 15th and 20th.

*Bidens Cernua L., Houdart, 5047. Ditches on the mossland south-east of Ainsdale, S. Lancashire, August 1925. The causor, hitherto unknown, was detected on this occasion and found to be an aphid parasite. Professor Theobald, to whom I submitted specimens of the insects, informs me that they appear to be a new form of Anuraphis. I had met with the gall previously in Cheshire in 1919 (Dalman, 4, 5).

Coronaria Sanguinea L., Houdart, 4543. The distinctive galls induced by the Dipterous Oligotropus corni Girault, were observed near Cadeby, West Yorkshire, in September 1926. I am under the impression that the gall is more a southern type of England type, and this may represent a considerable northerly extension of its range.

Daucus Carota L., Houdart, 4529. Many plants on the great Orme’s Head, Llandudno, showed galling of the gynaeceia and fruits by Schizomyia Pimpinella F. Low at the time of my visit in August 1925. The Burnet Saxifrage, which is an alternative host for this parasite, and which is galled thereby in rather similar manner, was also here in quantity. It almost seems as if this gall-midge favours the Carrot, for I failed to find a single instance of galling in the many plants of Pimpinella Saxifraga which I examined.

Euryonymus Europaeus L., Houdart, 3960. Miss I. M. Roper met with this gall (due to Eriophyes convolvens Nal.) at Sea Mills, Bristol, W. Gloucester (May 1906), and I am indebted to her for specimens.

*Galium Verum L., Houdart, 5286. An acerocidium, the terminal leaves somewhat abbreviated and a little swollen and grouped into a distinctive bunch. This agreed with the Cecidium suggested above: "Cecidio terminale en artichaut, formée de 10-20 feuilles un peu raccourcies, charnues, vert blancâtre ou un peu veinées de violet, brunissant après la dessication." This is induced by Persisia gallscola F. Low. I have not identified the parasite in the case of the examples which were observed at Llysfaen Rocks, Denbighshire, August 1924.

*Geranium Sanguineum L., Houdart, 3801 and 3802 (Dalman, 5). Miss Ida M. Roper, of Bristol, has sent me plants showing the distinctive galling which she collected at Kynance Cove, The Lizard, Cornwall, in August 1902.

Halidrys Silicula L. The curious Cecidium which we found originally by E. T. Connold on this host on the Sussex coast in 1902 do not appear to have been met with since until November 1925, when I observed several examples on this Brown Seaweed which was obtained from the coast at Aberystwyth, N. Wales. As this type is not included in Houdart’s works, it may be well to quote Connold’s original notice (Connold, 2). He records that the "stems" of the alga were affected: "Twenty of these remarkable swellings were found... in a tangle of seaweed on the beach at St. Leonards in 1902. No more have been found. Sessile, glabrous, glossy, globular, ovoid, and irregular in shape and size. Colour same as the main stem. November to April, when rough seas cast a quantity of seaweed on the shore. Many efforts were made to determine the cause, but without success." Connold gives a figure (278).

The Aberystwyth examples, three in number, were undoubtedly the same type of Cecidium. Two of these were globular and about the size of a pen, while the other was rather irregular and resembled the upper specimen of Connold’s plate. I have no information as to the agent responsible.

Professor Houdart wrote me:—"... L’auteur (agent) en est encore inconnu. Cette déformation existe peut-être, en France, sur la côte de la Bretagne, à Roscoff ou aux environs."

Hydrocotyle Vulgaris L. The aphid parasite responsible for the gall described in my earlier paper (Dalman, 5) has been described by Theobald (Theobald, 20) under the name Myzus hydrcocotyle Theobald. This new species appeared under the designation Myzus hydrocotyle when the description was originally published by its author (Theobald, 18), but the specific name was subsequently amended. The gall and parasite may be expected to occur elsewhere, but are so far only known from Flintshire.
*Ligustrum vulgare* L. The galls previously described (Dallman, 5) were also found at Gladdaeth, Carnarvonshire, August 1923, on wild Privet on the limestone. Examples from Llandulas (1924) were placed in soil under a bell-jar and kept under observation indoors at living-room temperature. From the seven galls four flies emerged between May 28 and 29 (1925) and three more had emerged by the following day. In view of the problem suggested in my previous notes (Dallman, 5) I submitted these to Mr. H. F. Barnes (Wye), our British authority on Cecidomyiidae. He reported that, after careful examination with the original description of Schizomyza ligustris Rabs., he could find no difference, either structural or colour. Before certain identification he suggested that he would be able to compare the insect with the midge bred from the gregarious larvae of Privet galls. As I have so far failed to find this type of Cecidium (Houard, 4679), I have been unable to carry the question further.

**Phragmites communis** Trin., Houard, 288. The mature fly, *Liparia lucens* Meigen, emerged from two specimens (from Hatfield Moor, S.E. Yorkshire) which were kept under observation at living-room temperature on April 4 and June 9, 1926. Although the conspicuous cigar-like galls are not uncommon in various places in East and South-East Yorkshire and Lincolnshire, it almost seems as if the parasite scarcely extends to the other side of the country or is very local in the West. Repeated search in Cheshire, Flint, and Denbigh, in stations where the host has been abundant, and in some cases in the same latitude as the Yorkshire and Lincolnshire haunts, have so far failed to reveal the Cecidia. Mr. H. Bury has met with galls at Silverdale, N. Lancashire, and bred the fly from these (Lancashire and Cheshire Naturalist, xii. (1920) 302).

**Plantago maritima** L., Houard, 5148. In abundance in the saltmarsh at Marshside near Southport, South Lancashire, August 1927. A quantity of the galls were collected on August 22 and kept under a bell-jar, the imagines emerging in the course of the following fortnight. Specimens of the weevil were submitted to Mr. H. Britten, who vouches for the diagnosis (Dallman, 6). I was pleased to meet with galls and insects once more on September 1st, 1928, on the occasion of a visit to Bromborough Pool, on the Cheshire side of the Mersey estuary. Many of the Cecidia were occupied by larvae or pupae, and in several cases the recently-hatched imagos were found. Some of the galls which were taken yielded imagines during the next week or two. Both galls and beetle were only seen in relatively small numbers in the Cheshire station, in contrast to their abundance at Marshside the previous year (Dallman, 7).

These occurrences represent a considerable extension of the range of the insect as previously known in Britain. Canon W. W. Fowler (*Coloagptera of British Islands*) states that this beetle "is very local, and, as a rule, rare." The same authority records it from three English counties (Kent, Hampshire, and Lincolnshire). It is also known to occur in Ireland (Wexford). Miss J. M. Roper (Roper, 13) found galls and insect on the Somerset coast in August 1906. Further examples were found on the saltlings of the River Severn in West Gloucester in September 1910. The two latter records find notice in White's *Flora of Bristol*, 1912.

The occurrence of *Mecinus collaris* and its gall on our western coast is interesting. It may be added that the Marshside station represents its most northerly range in Britain according to our present knowledge of its distribution. Further search may possibly reveal galls of this species to be occurring elsewhere along the western coast.

**Salix fragilis** L., Houard, S. I. This interesting and conspicuous gall seems to be more abundant in South Yorkshire than when I first met with it in 1920, and it appears to be extending. Dencaster, Askorn, Sprotborough, Barnby Dun (Dallman, 5, 8).

**Salix herbacea** L., Houard, 1013 or 6442?. Mr. J. J. Smith records (Smith, 14) that on the tops of the higher hills at New Cumnook, Ayrshire, the host "has two sets of leaves during the season, the first set loaded with galls, the second set entirely free from them. If it were not for the second, it would certainly cease to exist in a short time."

In the absence of further information, identification of the gall is hardly possible. Two of the most conspicuous types associated with this willow are induced by the sawflies *Pontania proxima* Lepel (Houard, 1013) and apparently *Pontania salicina* Christ (Houard, 6442). The former gall is already known from Scotland and Cumberland, but the other is only recorded by Houard for Norway.

**Tamus communis** L. Cecidia of the type previously recorded (Dallman, 5) were again seen in July 1926 at Warrington, near Dencaster. So far as my observations went, the galls, as before, seemed to be restricted to the staminate plants of the host. A number of galls were collected in the previous July and placed in soil and kept under observation as in the case of the Privet cecidia. I failed to obtain a single fly from these even after 17 months (by the end of 1926). It is a reasonable surmise that the mature parasites might have been expected to emerge about May or June, when the flowers of the host are appreciably developed. The failure was probably due to the development of mould, a difficulty in rearing Cecidomyiidae of this type, to which Britten has recently called attention (Britten, 1). Possibly the substitution of coco-nut fibre might give better results.

**References.**

(1) Britten, H. "Galls of *Pterisica gali* H. Low on Lady's Bedstraw." *North Western Naturalist,* i. 213 (1926).


Sphagnum strictum Sulliv., and Sphagnum americanum Warnst. in Scotland.

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The peat-moss Sphagnum strictum Sulliv. (also known as Sph. domingense C. Müll., Sph. Garberi Lesq. & James, Sph. humile Schimp., Sph. mexicanum Mitt., non Sph. strictum Lindh.) is distributed over America from Newfoundland in the north to Mexico and Ecuador in the south (2, p. 11, and 8, p. 143). In Europe it was first recorded by C. Jensen in 1862 (3, p. 119). The specimen referred to by Jensen was collected in West Norway by B. Kaalas in 1899. Since then it has been discovered to be rather common in the west and south of Norway, where it was collected as long ago as 1827 by the Norwegian botanist S. C. Sommerfelt (Herb. Oslo, sub nom. Sphagnum squarrosum). It seemed natural to suppose that this moss would also be found in the British Isles, especially in Scotland, which resembles Norway in so many respects. This conjecture was first made by the above-mentioned Norwegian bryologist Bærd Kaalas (4, p. 48). That it has not been found before in the British Isles is certainly due to its being mistaken for other species which resemble it. There is every reason to expect that old samples of Sph. strictum will turn up in British herbaria under the name of Sph. squarrosum or Sph. compactum, as was the case with the Scandinavian herbaria.

During a visit to Scotland in the summer of 1926 I made a point of looking for this moss, which I had got to know and had become familiar with in Norway. I succeeded in finding it, first to the south of Tyndrum, then on the north side of Lochan Meall an t-Snìdh, near Ben Nevis, and lastly at Crianlarich, where it grew in greater abundance and displayed an altogether typical development.

Having once noticed this remarkable peat-moss, and the environment in which it grows, one can readily find it again in this kind of terrain where it occurs. Even at a distance it is recognizable by the bright bluish-green or bluish-white tufts. The colour may also be yellow with a tinge of green. A. LeRoy Andrews has given a good description of it (1, p. 25). In herbaria the specimens will in time lose their bluish-green tinge and assume a more or less whitish or darkish straw-colour. The coarse and open growth of Sph. strictum, with bristling leaves, reminds one more of Sph. squarrosum than of Sph. compactum, to which it is otherwise more akin. In colour, too, it is often very much like Sph. squarrosum. But the likeness is entirely confined to its external appearance. With the aid of a hand-lens one can easily distinguish them by the size of the stem-leaves. There is also a great difference in the places where these two mosses grow. Whereas Sph. squarrosum may best be described as a mesotroph moss which likes to grow where the soil is comparatively fertile, Sph. strictum is an oligotrophic moss which grows in places where there is a minimum of nutriment. I have never seen these two mosses growing together.

In their anatomical characteristics Sph. strictum and Sph. squarrosum are, as I have said, quite different. On the other hand, there is a marked similarity in this respect between Sph. strictum and Sph. compactum. In Sph. strictum, however, the chlorophyll cells of the branch leaves have a larger lumen, and are not situated in the middle of the leaf as in Sph. compactum, but a little nearer to the outer surface (see figure 1, e and d, where the upper part of the figures represents the inner surface of the leaf). In Sph. strictum the wall connecting two contiguous hyaline cells shows a decided thickness on the outer side of the chlorophyll cell. The inner wall of the hyaline cell where it overlies the chlorophyll cell is minutely papillose; in Sph. compactum the wall is absolutely smooth. The papillae of Sph. strictum are much smaller than those of Sph. papillosum, the Sphagnum in which the papilla are most striking, and they only become visible when highly magnified. The distance between the papillae of Sph. strictum is less than 1 μ, whereas the distance in Sph. papillosum is usually nearer 2 μ. Warnstorf was the first to find the papillae of Sph. strictum, but his figures (7, tab. 14, m, n; 8, p. 41, fig. 14 n) show no papilla. My Scotch specimens are all of them decidedly papillose (fig. 1, e, d). The specimens from Tyndrum have mature capsules with a diameter of 2 mm. The spores are granular-roughened, with a diameter of 94 μ (fig. 1, e).

In order to compare the places where Sph. strictum is found in Great Britain and Norway, I made a careful study of the plant asso-
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association in which *Sph. strictum* was found at Crianlarich. The habitat is an uneven slope of rather stony heather-covered ground about 300 metres south-west of Crianlarich Station (L.N.E.R.). In an association of *Calluna vulgaris* and *Scirpus germanicus*, *Sph. strictum* occurs here over a distance of some 50 metres. Immediately above there is a drier bordered-heathered heathery hill with *Pteridium aquilinum*, and down below the heath merges into a small grassy marsh with *Juncus acutiflorus*. The situation is precisely the same as that I know so well in Norway. Even the grazing sheep are there. I noted all the plants on carefully demarcated test-areas of this

*SPH. STRICTUM.*

Fig. 1.—Sphagnum strictum Sulliv. Specimen from test-area 6. Crianlarich, July 3rd, 1925. a. Branch-leaf, × 24. b. Stem-leaf, × 24. c and d. Parts of transverse sections of branch-leaves, × 500. e. Spore (from Tyndrum, June 20th, 1925), × 500.

association, and then estimated the quantity of each kind of plant on the test-area. Ten of these test-areas, each one square metre in size, were examined. The results are given in the Table (p. 173). The quantity is indicated according to the five degrees of the Hult-Sernander scale, the numbers of which show how much of the ground is covered. Thus, 5 indicates that the plant in question covers half or more of the test-area; 4, that it covers a quarter or more (but less than half);
3, that it covers one-eighth or more; 2, that it covers one-sixteenth or more; and 1, that it covers less than one-sixteenth. A large number of samples of moss and lichen were taken from the test-patches for subsequent examination.

I desire to express my gratitude to Mr. E. Jørgensen and Dr. B. Lyne for their assistance in identifying these specimens.

In going through the specimens of Sphagnum which I brought home from Crianlarich I have come across another interesting Sphagnum: viz., Sphagnum americanum Warnst. The moss, which is also known as Sph. molle Sulliv. var. limbatum Warnst., (8, p. 132), has, up to the present, been known exclusively as American. Quite recently, however, it has been discovered almost simultaneously in two widely separate places in Norway—by Hugo Osvald in Andoya, Nordland, 1923 (5, p. 29), and by myself at Granvin in Hardanger, 1923

**SPHAGNUM AMERICANUM.**

Fig. 2.—Sphagnum americanum Warnst. Specimen from test-area 10, Crianlarich, July 3rd, 1925. a and b. Parts of transverse sections of branch-leaves, × 300. c. Branch-leaf, × 50. d. Stem-leaf, × 30.

(leg. J. J. Havaas). At Crianlarich it occurred on test-areas 7 and 10, and was collected there on July 3rd, 1925.

Sphagnum americanum differs from Sph. molle in lacking entirely the re-absorption furrow at the margin of the branch-leaves. The border of the branch-leaves generally consists of a single row of hyaline cells. In the figures (fig. 2, a and b) there seem to be two rows of cells, but this is not really the case. Only the outermost cell is an ordinary hyaline cell; the next outermost is a reduced chlorophylllose cell. W. R. Sherrin observes (5, p. 18) of the branch-leaves of Sph. molle that they are "nearly always with re-absorption furrow." A. LeRoy Andrews says of the furrow (5, p. 21): "lacking, however, in some sections." As to this, it should be noted that if a considerable number of transverse cuttings of branch-leaves are made, some cuttings without the re-absorption furrow may be found even in Sph. molle. This applies more particularly to cuttings from the upper part of the leaf near the apex. Moreover, there is another noteworthy difference between Sph. molle and Sph. americanum. Sph. molle has in most cases stem-leaves of two kinds, large and small, on the same stem; but Sph. americanum has only one kind of stem-leaf, the smaller sort. The stem-leaves of Sph. americanum from Crianlarich are all 1-2 mm. in length (fig. 2, d), the hyaline cells being fibrillose only in the upper half of the leaf.

**LITERATURE CITED.**


**NOTE.**—For the convenience of British botanists, Mr. Sherrin has kindly added the names used in Dixon's Students' Handbook of British Mosses, where these differ from those in the list, as follows:

*Breutelia chrysocoma* = B. aurea Schimp.
*Dicranum apiculum* = D. scoparium var. apiculum Boul.
*Pleurostomum Schreberi* = Hygnum Schreberi Wils.
*Rhacocnium hypnoides* = R. lanuginosum Brid.
*Rhytidium pulchrum* = *Hylocomium squarrosum* var. calycosum Hook.
*Rhizobulbus lobatus* = *Hylocomium surosum* B. & S.


**NOTE BY MR. W. R. SHEEIN.**—Prompted by Dr. Johannes Lid's discovery in Scotland of two Sphagna new to Great Britain, I have examined the specimens of *Sph. compactum* var. *squamulosum* Russ. in my herbarium, and have had the satisfaction of finding *Sph. striatum* Sulliv. It had been collected in New Galloway by J. McAndrew, July 1885, and was presented by the Rev. C. H. Binsted. The identification has been confirmed by Dr. Lid, who also recognised as *Sph. americanum* specimens of "Sph. molle" collected on Wimbledon Common in 1900. A specimen of each has been placed in the British Museum Herbarium.—W. R. Sherrin.
NEW AND NOTEWORTHY SPECIES OF COMBRETUM FROM WESTERN TROPICAL AFRICA.

By A. W. Exell, M.A., F.L.S.

(Concluded from p. 145.)

Sect. CHIONANTHODES Engl. & Diels.


Hab. BELGIAN CONGO: "Liane à fl. blanches," in forest on the banks of the Ituri, Penghe, Begua 2118 (holotype in Herb. Brussels; Herb. Mus. Brit.); without locality, Begua 1688 (Herb. Brussels). The following specimen, which is rather immature, probably belongs to this species—

Duda 2035 (Herb. Brussels).

Leaves 10-17 × 2-5-5 cm.; petioles 2-4 mm. long; bracts 4-5 mm. long; spikes about 2.5 cm. in diam.; lower receptacle 1-5 mm. long; upper receptacle 7 × 3 mm.; petal 2-5-3 mm. long; stamens 8-9 mm. long; style 8 mm. long; fruit 4.5-5.5 × 1.5-2 cm., with wings up to 5 mm. broad. (Fig. 1, C.)

This species is very near to C. capituliflorum Fenzl, but differs in having shorter less profusely branched inflorescences. The rachis is more slender and often sparingly pubescent, while in C. capituliflorum it is covered with a thick tawny-yellow tomentum. The bracts in the latter species are shorter, stouter, and much more thickly hairy.


* Trombiformis—shaped like a modern trumpet, i.e., infundibuliform, but curving outwards towards the mouth.

COMBRETUM FROM WESTERN TROPICAL AFRICA

Hab. BELGIAN CONGO: in marshy forest, between Bantoie and Roya, on the left bank of the River Ruki near the water, Robyns 118 (holotype in Herb. Brussels); in marshes, Batoko, Classens 307 (Herb. Brussels); Lëbinge-rive, Ubangi, Mesdag 15 (Herb. Brussels); Bosotu, Nanan 38 (Herb. Mus. Brit.).

Leaves 10-18 × 5-8-5 cm.; petioles 8-12 mm. long; spikes up to about 6 cm. long; lower receptacle 1-2 mm. long; upper receptacle 3 mm. long and 1-5 mm. across at the mouth; stamens 4-4.5 mm. long; style 3.5 mm. long; fruit 11-12 × 5-6 mm. with wings 1-5-2 mm. in width. (Fig. 1, B.)

This species grows in the following notes:—"Liane, fl. blanches, en épi; fruits à 4 côtes; très commun le long de la Ruki où elle forme des sortes de rideaux protégeant la forêt contre l’intrusion de la lumière." Native name "Iukuba" at Batoko (fide Classens) and "Kimbo" at Bosotu (fide Nanan). Classens states that the plant is used for cleaning iron.

This species is characterised by its very small, narrow-winged fruit with four rather rigid wrinkled wings. It appears to be nearest to Sect. Chionanthoidea Engl. & Diels, but it may eventually require a separate section, as the fruit is quite peculiar, though perhaps to be related to the narrow-winged type characteristic of Sect. Chionanthoidea.

Sect. CAMYTOGYNÉ (Hemsl.) Engl. & Diels.

C. HENSI Engl. & Diels var. pyriforme, comb. nov. (C. pyriforme De Wild. in Ann. Mus. Congo, v. i. 296 (1906)). Apart from the pyriform shape of the fruit, there seems to be no other character separating this from the type species C. Henst. so that it appears best to consider it as a variety of that species.


**Sect. Trichofeles Engl. & Diels.**


**Leaves 5-12 x 4.5-7 cm.; petioles up to 14 mm. long; spines on older branchlets up to 6 mm. long; spikes more or less glomeruliferum, 6-7 cm. in diam.; lower receptacle 6-7 mm. long; upper receptacle 8-10 x 5 mm.; petals 3 x 1 mm.; stamens 16-18 mm. long; style 21-22 mm. long.

This species is allied to *C. Holstii* Engl., *C. affine* De Wild., and *C. Pynaertii* De Wild., all of which have practically glabrous receptacles. *C. landanaense* is at once distinguishable by the very characteristic ovate leaves with rounded bases and long acute acumen.

(Fig. 1, A.)


This cannot be separated from *C. platypterum* (Welw.) Hutch. & Dalz., and must be considered as a synonym of that species.

C. Nyctosum Engl. & Diels in Mon. Afr. Pl. ill., Combretacea, 101 (1899). This is also indistinguishable from *C. platypterum*.


I am much indebted to the Directors of the Royal Gardens, Kew, of the Paris Museum, and of the Brussels Herbarium for the loan of

x 2
specimens, and to the Director of the Berlin Museum for material of many species hitherto unrepresented in the British Museum Herbarium. My thanks are also due to Dr. Milibraed of Berlin, M. Pellegrin of Paris, and Dr. Robyns of Brussels for kind assistance.

I am grateful to the Trustees of the British Museum for facilities afforded me for visiting various continental herbaria. It is hoped to publish further results in due course.

Note.—Since the first parts of this paper were published, I have had an opportunity, through the kindness of Dr. Burtt Davy, of examining the West African Combretaceae in the collections of the Imperial Forestry Institute, Oxford. Amongst this material are flowering specimens of what I take to be Combretum lapicicarpum Diels. If this be so, C. crotonoides Hutch. & Daiz. and C. lapicicarpum Diels are not synonymous, as I suggested (p. 240) they might be from the insufficient material at hand. In flower C. lapicicarpum is apparently distinguishable by its hairy peduncles, those of C. crotonoides being glabrous, except for scales. The leaves in this alliance of species change so much between the flowering and fruiting periods that careful collecting of material from the same tree, at different seasons, is essential before flowering and fruiting specimens in the herbaria can be associated with certainty.

THE ORIGIN OF A LAND FLORA *

Professor F. O. Bower seized the opportunity afforded by the Huxley Memorial Lecture, delivered in the theatre of the Royal College of Science on May 3, to review the position taken in his "Origin of a Land Flora," published in 1908. The hypothesis then suggested was that the Mosses and Ferns sprung from green aquatic forms inhabiting shallow fresh water or the higher levels between marine tide-marks. Certain forms, perhaps thereby escaping competition, established themselves on land where the sexual process could only be effected at times of rains or copious dews. Thus less dependence could be placed upon sexuality for propagation, and an alternative method of increase of individuals had to be substituted. This was done by the production from the fertilised egg of a new phase, the sporophyte, in which the fertilised egg might divide into a number of portions, or carpospores, each of which would serve as the starting-point for a new individual, and dry conditions would favour the dispersal of the powdery spores. Increase in the number of spores entails increased nourishment, hence the sporophyte itself assumed the function of nutrition developing increasing differentiation of parts culminating in the free-living plant with distinct members, roots, stem, leaf, and sporangium, which characterise all the higher land-plants.


In 1919 Dr. Church, in his "Thalasiophyta and the Subaerial Transmigration," developed an alternative theory visualising large marine Algae as the source of the land-flora. He assumed at the outset a uniform ocean-surface covering the earth, with flagellate organisms living in it. Algle with a basal attachment were developed from the floating flagellates on the gradually rising sea-floor, and in the highly organised marine types which were evolved—the "Alge of Transmigration"—he finds the origin of land-vegetation.

Prof. Bower contests the preconceptions embodied in Dr. Church's hypothesis: (i.) that there was a pre-existent unbroken ocean-surface, all dry land being secondary; (ii.) that the morphological advance of land-vegetation could not, or at least did not, in its early steps, arise along free and independent lines, parallel to, but distinct from, the advances in marine vegetation, and (iii.) that large marine Algae are, or ever have been, open to a land-change, a point on which positive evidence is admittedly wholly wanting.

On the other hand, the work by Kidston and Lang on the early Devonian Flora has constituted a new class, Psilophytales, which helps to fill the gap between Seaweeds and Ferns. The genera Rhiina and Horeoa have a basal region with nothing suggestive of the organisation of a root and a dichotomous aerial system of cylindrical branches without distinction of axes and leaves; large sporangia terminate the upper branches. Asteroscyllium is a larger type with branched rhizomes, while the forked aerial stems bear in the upper part numerous simple leaves. Prof. Bower suggests that the possible lines of origin of axis and leaf in the higher plants are here forefigured. The Rhiinaceae were clearly land-living plants, there is nothing that indicates a derivation from any well-developed stock of marine origin.

Prof. Frisch, in his recent discussion on the Green Algae and their relation to a land-flora, has suggested that there are no highly developed Green Algae, because at about the evolutionary level of the differentiated filament the transition to terrestrial life took place.

In the re-colonisation of Krakatoa after the eruption in 1883, when it was covered by hot volcanic ash, blue-green Algae were the first colonists, associated later with Diatoms and Bacteria. The gelatinous layer thus formed on rocks and in gullies gave a favourable nidus for the germination of Mosses and Ferns. Prof. Bower contemplates a similar nidus in the distant past serving a like purpose for the progenitors of the Archaeonitae, which may well have been green filamentous Algae, not unlike the protomeres of mosses or the prothallus of some primitive Ferns—that is, evolution in situ, not transmigration.

The most stable feature in plants possessing sex is the alternate succession of correlated events known as "syngamy"—the fusion of two sexual cells or gametes in which the number of chromosomes in the nucleus becomes doubled and the resulting individual "diploid"—and "meiosis": the reduction division in which the number of chromosomes in the nucleus becomes halved, and the resulting indivi-
dual "haploid." Though the two phases appear in regular succession in each normally completed cycle, both are not constantly present in highly organised Algae, as witness the haplobiontic Green Algae on the one hand, and on the other the Fucales where the individual is diploid only. Hence it may be concluded that the vegetative phases appear as subordinate incidents superposed upon the events of the cyclical type. These vegetative phases are: (i.) the gametophyte which intervenes between meiosis and syngamy and bears the sexual organs, and (ii.) the sporophyte which intervenes between syngamy and meiosis and bears carpospores. Provided the events of syngamy and meiosis have been constant throughout descent (as they are in any normally completed cycle), these phases will themselves have had a separate phyletic origin and cannot be strictly homostrophic, even though they are parts of the same life-cycle. In particular, the existence of haplobiontic Algae offers the opportunity for the interpolation of a sporophyte as a new formation: the suggestion is that this is what has actually happened in the Archegoniatae. By deferring the act of meiosis a diploid phase was interpolated, structurally suited to the sub-aerial conditions and bearing numerous spores. Three important biological advances would be achieved: (i.) a multiplication of possible combinations of hereditary characters, as suggested by Swedish; (ii.) an opportunity of securing a wide spread on dry land by the dissemination of spores; and (iii.) relief from dependence on repeated syngamy for numerical increase on land where the necessary medium of external liquid water is not always available. The superiority thus gained by the early plant-amphibians will have favoured a rapid advance of the sporophyte. The haplobiontic ancestors would be left hopelessly behind, as are the present Green Algae.

In passing to the comparative study of the archegoniata sporophyte, we are now acquainted with a sequence between two extremes. On the one hand the dependent spindle, without roots or branching, characteristic of the Bryophytes, on the other the independently-rooted and leafy plant characteristic of the Pteridophytes and of land-plants generally. Between these lie the Devonian fossils and their nearest recent allies, the Psilotaceae. Hence can be traced with reasonable probability the general course of evolution of the root, stem, and leaf.

In discussing the origin of the root and leaf, Prof. Bower suggests that the root of the early Pteridophytes originated by specialisation of subterranean exogenous branches essentially like the leafless chlorenches. The rationale of leaf-formation appears to be the solution of a general problem that arises in any enlarging shoot whose nutrition is through its exposed surface. With increasing size the surface enlarges only as the square, while the bulk increases as the cube of the linear dimensions so long as the form is unchanged. Leaf-formation is a means of levelling up the diminishing proportion of surface to bulk by change of form. Why should it be assumed, says Prof. Bower, that all plants must solve the problem in the same way? Our assumption should rather be that each phylum will solve its own problem in its own way. For instance, some appendages may owe their origin to "distal branching," which appears to have played a leading part in the origin of "megaphylls," such as the large leaves of Ferns which may thus be derived from the dichotomising axis of Rhytida-like fossils; others may originate by a process of "mutation" from the smooth surface of a pre-existent axis—such as the "microphylls" of Lycopsids which have exploited the type of Asteroscyphon with microphylls borne as appendages that fork dichotomously.

The single spore-capsule of the Bryophytes has been linked comparatively with the numerous sporangia of the Pteridophyta by the discovery of the Rhynie fossils which bear a plurality of distal sporangia. And it has been shown comparatively in living Ferns that the marginal position is primitive for them (see Ferns, vol. i., pp. 216–225). The Schizascales are an ancient family that still retain that position rigidly. The origin of the fertile parts of the microphyllous types is less straightforward, and we shall need to wait for new facts for its elucidation.

In conclusion, Prof. Bower emphasized the existence of the gap between any algal type and any Archegoniata plant, which is as wide now as it was in 1908. It is of little use to fill such a gap by theoretical types that have never been seen; a better course is perhaps one that taken here, namely, to contemplate physiological probability, or, as it is called, "survival value," though this cannot give more than partial satisfaction. But the demonstration of the Psilophytales has had the effect of closing the gap between the Bryophytes and the Pteridophytes, so that a more coherent and probable picture of evolution on land can be preserved than was possible two decades ago.—A. B. R.
Dr. Hermann Wolff.—We have received, from Berlin, news of the recent death of Dr. Wolff, who had devoted many years of study to the Umbelliferae. The first part of his elaboration of the family for the Eflazzenreich appeared in 1910, and others were published in 1918 and 1927. Prof. Fedde has, we are informed, taken charge of his manuscript, and we trust that it may be possible to complete his systematic account of the Umbelliferae.

Dr. Louis Trabut.—We learn from the Gardeners' Chronicle (June 1) that the Algerian botanist Dr. Trabut died on April 23. Dr. Trabut, who was born in 1853, is best known to botanists by his work with J. J. Battandier on the flora of Algeria—La Flore de l'Algérie, 1888-97, a Supplement to which was published in 1910. Dr. Trabut was appointed Professor of Natural History at the School of Medicine and Pharmacy in Algiers in 1880. He was instrumental in the introduction to the colony of many new forage-plants, cereals, fruits, and other plants of economic value. Dr. Trabut was a corresponding member of our Royal Horticultural Society.

We hear with much regret of the death of Mr. Arthur Bennett, on May 2, at the age of 85. Mr. Bennett was one of our leading authorities on British botany, and with Mr. C. E. Salmon and Mr. J. R. Matthews had just completed the Second Supplement to Watson's Topographical Botany, the first installment of which appeared as a Supplement to the last issue of the Journal. He was also a recognised authority on the genus Potamogeton. We hope to publish an appreciation of his work in a later number.

REVIEWS.


The botanical results of the expedition which was sent out by the Academy of Sciences in Vienna to South-west China in 1914-18 are being worked out by experts in the various groups under the editorship of Heinrich Handel-Mazzetti, who led the expedition, and who has himself undertaken the account of the ferns collected. These comprise over 250 species and some varieties; they add thirty-six species to the fern-flora hitherto recorded for the district explored. Among them are descriptions of seventeen new species and a variety. The largest number of novelties is found in the genus Selaginella, twenty-five species of which are recorded; and as many as eighteen of these are additions to the local flora, seven being also new to science. It should be noted that two out of the four species of Woodia are described as new. Fifty-eight genera are represented, and the genus with the largest number of species is Neproodium with thirty-six, followed by Polytrichum with twenty-seven, Selaginella with twenty-five, then Polytrichum and Asplenium each with twelve. The plates form a valuable addition to the text and contain figures of eleven new species, which are shown mostly life-size or somewhat enlarged; the figures of Selaginella are especially helpful, giving an excellent idea of the general habit of these difficult plants.

Though the present part is issued without any introduction, and, indeed, without an explanation of the abbreviations employed in the text, the meaning of these may be gathered from the publishers' prospectus, where it is stated that over 13,000 plant-specimens were collected by the author in the provinces of Yunnan, S.W. Sze-chuan, Kwei-chou, and Hou-nan, and a further 500 were added from Hounan, Kiang-si, and Kiu-kien by a native collector. Further, a number of collections made by various travellers in the region in recent years have been worked over in order to render the report as complete and correct as possible. A notice of the Musci follows; the other five parts of the work are expected to be all published by 1931.—A. G.


In an article published on the last day of 1928 the present reviewer mentioned with regret that the large number of mosses collected by Dr. Handel-Mazzetti in South-west China no record had appeared beyond descriptions, by Brothers, of the new species. The work now under review must have been at the time in the press, and supplies the desideratum; it is the last work to appear—at least during his lifetime—from the pen of the late Dr. Brothers, for many years facie princeps among bryologists.

It is one of seven parts to be issued on the botany of Dr. Handel-Mazzetti's expedition, and it makes a very important addition to our knowledge of the bryology of China. The fact that nine new genera are described, as well as a large number of new species unpublished in Brothers' earlier work, indicates the richness of the collection and the importance of the publication.

Some remarkable instances of geographical distribution appear, for example, among many others, the appearance of the Mexican genera Morinia Card. and Pringlea Card. in Asia. Perhaps, however, the chief interest lies in the remarkable combination of elements of a subtropical flora with others of a palearctic, almost boreal one. Thus species which with us are not, or rarely, found outside the Scottish highlands, such as Hyphila callithrae, H. hamulosum, H. proceraeum, H. turgescens, Dicranella secunda, Plagiobryum demissum, &c., are here side by side with subtropical genera, such as Hyphila, Rhizogonium, Thruxtonia, Meteorium, Puppilaria, and numerous others.

It may be worth while to point out one or two slight errors that have crept in. On p. 5, l. 8, Thuidium vestitissimum Bath, should read Th. vestitissimum (not, as Paris, Ined., has it, vestitissimum). And
on p. 26, Dicranum perflectum Broth. is antedated by the South African D. perflectum C. M. (1899). Brotherus no doubt considered the name available, since the S. African plant is now considered not to be a true Dicranum; but it is nevertheless rather unfortunate, since the fruit of C. Mueller's species has not been found, and its true position is still somewhat uncertain—it has been placed under Dicranodontium and Campylotus.—H. N. D.


During recent years the recognition, value, and limitation of the units of plant-sociology and the methods of investigating them have been very actively discussed. Owing to the largely independent development of several schools, there is a considerable scope for critical synthesis in the subject of synecology at the present time. The scheme of the paper reviewed here is happily conceived in that it is a summary of the modern conceptions and methods of study of plant-communities, with particular emphasis on the term "Assoziation," followed by an account of intensive research work on a very small area, before general conclusions are reached.

The Tanzboden in the Lauterbrunnenthal, in central Switzerland, is a piece of ground one-quarter of a square kilometre in area, partly flat and partly with slopes. Petrologically it is formed of limestone of two facies. All the soil-types have a very high humus content and a low carbonate content, and their pH values range from 5.7 to 6.9. The climate is humid with a rainfall of about 2000 mm. The vegetation forms a topographical unit with special plant-communities. No less than eighteen main communities are described in detail, in addition to a number of subordinate ones. The descriptions are accompanied by tables of the species found in a varying number of samples of each community, and by figures indicating constancy and vitality. The plant-communities are classified into three association-complexes corresponding to three succession types—on the south slopes, on the shady slopes, and on the ridged parts.

The portion of this paper of most general interest is the author's discussion of some of the problems of plant-associations. To him the term "Assoziation" indicates an abstract unity, while he uses "Lokalbestand" or "Einzelbestand" for the concrete examples of an "Assoziation." The reviewer has failed to find a satisfactory translation of the word "Bestand," as used in this paper, in spite of expert assistance. The "Lokalbestand" is a concrete plant-community of uniform floristic, physiognomic, and ecologic character which floristically shows the peculiar characters of a "Bestandetypus (Assoziation)." Three types of constancy are recognized: that within a local "Bestand," that within a "Lokalbestand" of a more or less extensive locality (local constancy), and the constancy over a wide area of divided "Lokalbestände" of an association (general or regional constancy). The higher grades of constancy are obtained by the combination of all relevant lower grades. By community-fidelity or exclusiveness ("Gesellschaftertreue") is understood the limitation of species to one association or, at least, their limitation as frequent constituents to one association. Three classes of community-fidelity are recognized. Within the area specially studied community-fidelity is not considered an essential attribute of an association, but this conclusion is not extended as a generalization. The vitality (prosperity) of the plant species and individuals in a community is of great importance in plant-sociology. The author rejects the introduction of succession principles into the definition of the association. Every association forms a more or less stable and durable phase in the successional series, but it is not necessarily limited to a successional series, and within the series its position is changeable.

Whatever success may have attended the author's laudable attempt to reconcile the methods, conceptions, and terminology of the Upsala and Zürich-Montpellier schools has been achieved by taking some ideas from one, some from the other, rather than in putting forward new suggestions. The result is an interesting and useful patchwork which lacks the unity, and some of the faults, of the systems from which it is mainly derived.—W. B. TURBILL.


The book is designed to provide a guide to a first course in practical botany, covering about one hundred hours of laboratory work. The subject is introduced by a general study of the structure and functions of seed-plants, which forms the first part of the manual. The second part deals with the study of the usual series of plant-forms employed as materials for a survey of the plant-kingdom. As the book is described as the outgrowth of a series of laboratory manuals which have been in use at the University of Wisconsin, the system is presumably the result of many years' teaching experience. It would appear to be specially adapted to a large class, the members of which are expected to work without very much assistance from the demonstrator. The somewhat detailed instructions are designed to draw attention to the important features of the specimens under examination, and their significance, with the minimum wastage of mental effort on the part of the student. Teachers engaged in planning or revising an elementary course may find here fresh methods of presenting facts and stimulating observation. In particular, the suggestions for the selection and preparation of material
for the course will be found useful. The majority of the plants prescribed are available in this country, and it will not be difficult to make the necessary substitutions in the few exceptional cases.—B. J. R.

Mr. H. H. Haines gave a paper on "Some Aspects of the New Forest, with special reference to the Changes wrought by Direct or Indirect Human Agency" (illustrated with lantern-slides).

Brief reference was made to the changes in ordinary grassland, heath, and commons if grazing, browsing, and fires are excluded. Exclusion in most cases leads to tree-growth, though the second-growth forest resulting may at first differ from what may be taken as the original forest. In a climate like that of Hampshire the land was probably covered with forest except where, possibly, wild animals, especially roe-deers on chalky or sandy soil, may have been sufficient to keep it in the condition of downland, and where hard pans occur close to the surface. In the New Forest the poverty of the reproduction of trees and the poor aspect of the young growth, where it exists in the open forest, is due chiefly to the grazing, browsing, and trampling of domestic animals, as also is the entire composition of parts of the vegetation. The first evident results of excessive browsing, as is even better seen in some other parts of the world, is the gradual reduction of the underwood to thorny, prickly, or otherwise distasteful species. In forest consisting purely of shade-bearing species reproduction and undergrowth may be altogether absent. As the trees die off, other forms of vegetation (differing according to soil, according to the intensity of the grazing, and according to whether the land is burnt or not) take possession in place of the original forest; and this is what has happened over a large area of the New Forest. Where fires are excluded, however, and the trees are species relatively distasteful, as with Pine, Yew, and perhaps Holly, woods of these species on suitable land might survive for very long periods. All these trees are eaten to some extent.

The herbaceous flora and fauna are also seriously affected by large numbers of grazing animals, though, in the New Forest, also very largely from collectors and from the direct action of man in clearing and draining. The impoverishment of the fauna and flora of the open heaths is partly accounted for by too much and too severe burning. In the latter case the soil itself gets burned away and the

BOOK-NOTES, NEWS, ETC.

LEINSAH SOCIETY.—At the General Meeting on May 2nd, the following Foreign Members were elected:—Dr. Theodor Mortensen, Superintendent, Zoological Museum, the University of Copenhagen; Prof. Carl Hansen Ostenfeld, Professor of Botany, the University of Copenhagen; and Prof. Bohumil Nemec, Professor of Plant Anatomy and Physiology, Charles University, Prague.

Dr. F. S. Russell gave a general account of the Great Barrier Reef Expedition and its aims. The expedition is based on Low Island, forty miles north of Cairns, N. Queensland, and situated eight miles from the mainland and midway between the coast and the great barrier itself. Lantern-slides were shown illustrating the main features of the island and the lines of research being followed up.

The work is split into two main sections, taken charge of respectively by the shore party and the boat party. The work of the shore party is concerned with an ecological survey of the island and adjacent barrier reef, studies in the growth of coral, and life-histories of economic products, such as pearl oyster, trochus, and bêche-de-mer. Experimental work on the feeding-habits of corals are being carried out in the laboratory. The sea work entails a complete seasonal survey of the chemical constituents of sea water and of the plant and animal plankton, together with physical observations such as temperature and transparency.

The expedition arrived on the island in July 1928, and will leave in July 1929, having completed a full year's observations—biological, physical, and chemical—on the life in a tropical coral reef area.

Mr. G. Tandy gave a preliminary account of the Vegetation, illustrated with lantern-slides. Low Isles present a very interesting set of problems for the botanist. As one comes from the southward they are the first of the "low and wooded" islands of the early navigators to be encountered. The arrangement of a mangrove swamp to windward (with Rhizophora mucronata the dominant) and a more or less variegated eay of coral sand to leeward is found in considerable numbers northwards from here. To understand the formation, the behaviour of the S.E. Trade Wind (pretty constant here from April to November) must be considered. In early morning it will be at S.S.E. and light, but as the day goes on it will shift to E.S.E. or even E. and freshen. This means that the heaviest seas will commonly be on the north side of the mangrove island. Here the drift of the coral shingle is driving the mangrove back. On the lee side of the swamp, however, they are extending in a westerly direction.
A paper by Mr. H. W. Pugsley, "A Revision of the British Euphrasiae," was read in title.

**Anniversary Meeting.**—At the Anniversary Meeting on May 24, the President, Sir Sidney Harmer, K.B.E., F.R.S., presented the Linnean Gold Medal to Prof. Hugo De Vries. In reviewing Prof. De Vries's work, the President pointed out that his earlier contributions were to plant-physiology, beginning with a "thesis" in 1870 on the influence of temperature on plants. His subsequent investigations were of a wide scope, comprising study of osmotic pressures and the general physiology of plant-growth. In 1890 he published the results of an ecological study of the animals and plants of the water-supply of Amsterdam. His work on the mechanism of heredity and the structure of the germ-plasm led on to the announcement of his Mutation theory of the origin of species, at the beginning of the present century. He was the first of the experimental evolutionists, and his output of work was enormous. Prof. De Vries was elected a Foreign Member of the Society in 1904, and more recently a Foreign Member of the Royal Society.

The Medal was received on Prof. De Vries's behalf by Dr. Hubrecht, son of the late Prof. Hubrecht, an eminent zoologist and a former Foreign Member of the Society. Dr. Hubrecht said that only his advanced age, eighty-one, prevented Prof. De Vries from attending to receive the medal in person.

The Assistant-Secretary reported the number of Fellows as 778, there were also 50 Foreign Members and 24 Associates. Including Fellows who had been elected but had not yet qualified, the number would approximate to the prescribed limit of 800.

The Fellows heard with much regret that Lt.-Col. A. T. Gage would resign his office of Assistant-Secretary and Librarian at the end of October. The President also announced that the Council had appointed Mr. Spencer Savage to succeed Lt.-Col. Gage. Fellows will welcome this appointment as a fitting recognition of Mr. Savage's devoted service to the Society as Clerk, both under the late Dr. Jackson and Lt.-Col. Gage. Mr. Savage has also some reputation for a knowledge of early botanical literature, which will be a useful asset in his new position.

The President's Address dealt with a group, the Polyanz, to the study of which he has devoted the leisure of many years. Sir Sidney described concisely the evolution, economic uses, and taxonomy of the group.

In the election of the new Council, Dr. T. F. Chipp and Mr. Gerald Loder replaced the two retiring botanical Members of the Council, Mr. A. D. Cotton and Prof. J. Percival.

After the Meeting a number of the Fellows and their friends dined together at the Criterion Restaurant.

Mr. W. J. Bean.—The retirement on May 20 is announced of Mr. W. J. Bean, Curator of the Royal Botanic Gardens, Kew. Mr. Bean entered Kew as a young gardener in 1888, and succeeded the late William Watson successively as Assistant Curator in 1900 and Curator in 1922. His special interest has been the study of hardy trees and shrubs, and his book *Trees and Shrubs Hardy in the British Isles* is a standard work. He is succeeded by Mr. T. W. Taylor, who joined the Staff of the Royal Gardens in 1902.

**Hanbury Medal.**—The Hanbury Medal of the Pharmaceutical Society "for high excellence in the prosecution or promotion of original research in the natural history and chemistry of drugs" has been awarded to Dr. Henry Hard Rybury, Professor of Materia Medica in the College of Pharmacy of the Columbia University, New York. Professor Rybury's name is familiar to botanists from his work of exploration in various parts of equatorial America, especially with a view to the discovery of new plants of medicinal value. He is the author of numerous papers on pharmacognosy; and his "Enumeration of Plants collected in Bolivia by M. Bang" contains descriptions of numerous new genera and species.

**North-Western Naturalists' Union.**—A proposal is on foot for the formation of a Union of Scientific, Natural History, and other Societies in the North-Western area of the country, and a committee, with Mr. H. Britten, of the Manchester Museum, as Chairman, and Mr. J. H. Danvers, Southport Society of Natural Science, as Acting Secretary, have issued a circular letter suggesting a tentative scheme. The aims and objects of the Union are to systematise and co-ordinate existing records of work done in the area and to stimulate and extend this for survey work, to create an exchange of lectures and lecturers with the Societies included, to co-ordinate and publish work amongst the Societies, and to assist in preserving the amenities of the district. The Union will consist of Societies regularly functioning in the area and ordinary members. An Annual General Meeting shall be held at such time and place as may be convenient, in the area covered by the Union. The publication of any reports or papers concerning the affairs or work of the Union shall be entrusted to a Publication Committee.

**Banks Correspondence.**—An interesting collection of letters and papers by Sir Joseph Banks or addressed to him was sold by Messrs. Sotheby on May 3. The greater part were bought for the Mitchell Library, Sydney, where they will find a very suitable home in view of their strong Australian interest. The letters &c. deal mainly with early work of exploration and settlement in Australia, but names familiar to botanists are included, such as a series of letters "concerning botanical matters" by George Caley, who sent home large collections from Australia and was subsequently in charge of the Botanical Gardens at St. Vincent. Lot 2, labelled "Botanical and Agricultural," includes correspondence from Governor King on the growth of New Zealand Flax in Norfolk Island, also from Governor Philip and Lt.-Governor Wm. Paterson dealing with botanical matters.
ROYAL HORTICULTURAL SOCIETY'S SPRING SHOW.—Glorious summer weather favoured the great flower-show at Chelsea, May 22-24. An unusual and attractive feature was an exhibit illustrating the flora and fauna of the deserts and redwood forests of California, shown by Mrs. Sherman Hoyt. The exhibit was originally designed by Mrs. Hoyt to interest those of her countrymen who are unable to travel, in the movements for the creation of National Parks for the preservation of the natural beauty of various types of country. Mrs. Hoyt generously offered to re-stage the exhibit at Chelsea. The most striking of the three scenes represented was the Death Valley in east central California. The remarkable "Creosote bush" Larrea glutinosa, a Cluster Cactus, Echinocactus polycephalus, and a Barrel Cactus, Ferocactus sp., were the most conspicuous objects of the sparse vegetation, a pair of coyotes, a tarantula, a scorpion, and a few birds represented the fauna. Another scene, the Desert Garden, included a considerable variety of Cacti, the tree Yucca (Y. arborescens), the Smoke Tree, Dalea pubescens, which is a cloud of rich purple when in blossom, and the Ocotillo, Fouquieria splendens, notable for its brilliant carmine flowers.

The Science exhibition included contributions from the Society's Gardens at Wisley, Rothamsted, the research station at East Malling, and the Royal Botanic Gardens of Kew and Edinburgh.

THE LATE SIR WILLIAM SCHLICH.—A bronze portrait plaque of the late Professor of Forestry at Oxford was unveiled by the Vice-Chancellor of the University in the School of Forestry on May 22. It is also proposed to set apart an area of forest to be named the Schlich Forest, which will be available for experimental work, within easy reach of Oxford.

A CORRECTION.—In this Journal for May (p. 150) in a notice of the Twentieth Botany Report in the Transactions of the Devonshire Association (1928), two plants are noted therein as "apparently new County or Vice-County records." Of these, Carex etrigosa Huds. was recorded by me from Bickington (v.c. 3) in the Eighteenth Botany Report (Trans. Dev. Ass. 1926, p. 128). Vicia gracilis Lois is a very old record for Torquay, repeated last year. For the parishes in which now they are recorded these plants are new: viz., Woodbury and Littleham respectively. But Littleham is alluded to as in "v.c. 4." The Littleham, near Exmouth, to which Major Orme's discovery refers is in v.c. 3. There is in Devon v.c. 4 also a Littleham near Bideford, with which latter place the writer of the note (C. E. S.) has probably confused the Littleham of Major Orme's Vicia gracilis.

In the Botany Reports of the Devon Association, when I was their Editor, plants new to any parish were inserted, the aim being to make a list as complete as possible of plants found in each of the Devon parishes. For one who does not possess the whole set of these Reports (1910-1929), it is, of course, almost impossible to determine whether a record is new, or has been already made therein.—C. E. LARKER.
A NEW VARIETY OF *POLYGALA SERPYLLIFOLIA*

J. A. C. Hose (Serpulacea Wehne).

By C. E. Salmon, F.L.S.

(Plate 591)

For some years past, during expeditions in the North, I had noted a conspicuous form of this *Polygala*, but it was not until the summer of 1922, when botanizing in Scotland, that the full force of this beautiful plant came home to me.

Here, on the mountains near Dalnaspidal, East Perthshire (v.c. 80), were vigorous plants bearing longish racemes of large, gloriously deep blue flowers, up to fourteen in a head, and forming fine patches of colour amongst the heather and sphagnum.

At first I thought my plants might come under Rouy and Foucaud’s var. *maius*, described in Fl. France, iii. 75 (1866), and, with this in view, my friend Mr. C. C. Lacaite kindly submitted examples in November 1923 to the monographer of the genus, Dr. Chodat. He reported that my plant was neither var. *maius* Rouy & Foucaud nor var. *pyrophila* Reichb., and advised that it should be published as a new variety, and as I am unable to identify it with any named form of *P. serpyllifolia*, I venture to describe it as such.

Var. *decora*, var. nov., a typo distat ob partium omnium magnitudinem, racemos longiores plurifloresque, flores 7 mm. longos, et sepala obtusiora nervis omnisbus marginem versus dichotomis.

*Plant* large and robust. *Stems* lax and struggling, not forming compact plants. *Leaves* large, particularly on the flowering branches, up to 20 mm. long and 6 mm. broad, widely separated above, closer below, rather blunter than in type. *Racemes* longer and with more flowers than in type, 3-5 cm. long, with 8-14 flowers. *Flores* larger than in type, about 7 mm. long, always (?) deep blue; wing sepals rather more blunter than in type with marginal veins more anastomosing.

*Distribution.*—Carnarvonshire (v.c. 49); rocks, Cwm Glas, 1890, H. T. Mennell. Perth east (v.c. 89); mountains near Dalnaspidal, 1922, C. E. S. Forfar (v.c. 90); Canlochen Glen, 1916, G. C. Druce.

When characteristic, this variety might be passed over as *P. vulgaris* or *P. dubia*, but the opposite lower leaves at once distinguish it.

Through the kindness of Dr. E. De Wildeman, I have had the opportunity of seeing the type of Dumortier’s *P. mutabilis* and also plants named “*P. serpyllacea*” by this author. His descriptions of these may be found in Bull. Soc. Bot. Belg. vii. 314 (1865), in an article entitled “Bouquet de littoral Belge,” and I have come to the conclusion that the variety now called var. *decora* is the “*P. serpyllacea*” of Dumortier (non Wehne), whilst Dumortier’s *P. mutabilis* is the common plant of Britain and Europe generally, known as *P. serpyllacea* (serpyllifolia).

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I have been unable to obtain ripe capsules and seeds of the new variety, but the almost mature examples seen appear to differ only in size from those of the type. The variety appears to frequent more marshy spots than the type, and will probably be found to occur in many places in our islands, particularly in the north.

As regards the change of name from *P. serpyllifolia* to *P. serpyllifolia*, this would appear to be inevitable. An interesting note upon this point, included in an article, "Die Polygalaceen der Rheinprovinz," by W. Fritberg (Verhandl. Naturhist. Ver. Preuss. Rheinl. u. Westf. 187, pt. 2, 241, 1911), seems worth translating: -- "Here some remarks may be made on the first appearance of the plant [serpyllifolia] in literature as they are not lacking in general interest. I am indebted to the kindness of Herr F. Wirtgen, to whom I express my most grateful thanks for these observations, and also for the varied assistance which he has given me in this work. Until now Weile and Wenderoth have been generally taken as the first authors, and the plant has been attributed to them. This is, however, not so. Indeed, considerable attention, especially that of the Rhine botanists, was earlier drawn to the plant; so that, in the more extensive herbaria of the years before 1820, there are found specimens on the labels of which the collector expresses the view that the plant was so far undescribed. Unfortunately, this was neglected through the reluctance of the collector to publish his opinion. I was all the more pleased, therefore, by Wirtgen's news that the plant had already, in 1797 (thus almost 20 years before Weile and Wenderoth), been published by a certain J. A. C. Hose in the *Annales der Botanik*, pt. 21, p. 38, as *P. serpyllifolia*. The author gives a distinctive Latin diagnosis, one and a half pages long, of our plant. As locality he gives 'erecta circa Crevel,' and as flowering time April-May, which, especially for Krefeld, is certainly better altered to May-June."

I have to thank Miss F. Strudwick for her care in preparing the excellent drawing and dissections. Specimens of the plant are being deposited at the British Museum and Kew.

**Explanation of Plate 591.**

*Polygala serpyllifolia* J. A. C. Hose, var. decora var. nov., from Duthispield. Half natural size. A. Capsule and wing sepals of same (almost mature), ×4 times. B. Capsule and wing sepals of *P. serpyllifolia*, from Banmore Common, Argyll.

**NEW SPECIES OF LEGUMINOSE FROM TROPICAL AFRICA.**

**By E. G. Baker, F.L.S.**

*Cassia* (Cathartocarpos) *Kassneri* Bak. fil., sp. nov.

Arbor? ramis cortice nigrescente tectis, denum glabris. *Folia* 5-6-juga; foliolis parviaculis, subcoriaceis, glabris, ovatis vel ovato-subrotundatis, apice rotundatis vel leviter omarginatis, basi rotundatis, 20-20 mm. longis, 15-20 mm. latis. *Flores* parviaculi, *Racemis* subcorymbosi, pedicellis longis, leviter puberulis, 7-8 mm. longis; bracteis parvis, linear-lanceolatis, 3-4 mm. longis. *Calyx* sepals oblongis apice rotundatis, adpresso cinereo-pubescentibus, 1 x 1 cm. longis. *Petalas* 15-18 mm. longa, subsemiali vel breviter unguiculata. *Stamina* 3 longiora filamentis prope basina dilatatis, anteris 4-5 mm. longis. *Ovarium* cinereo-tomentosum, lineare, multiovulatum. *Legumen* ignotum.

**Hab. **KENYA COLONY: Makindu R., Kassneri 598 (type in Herb. Mus. Brit.).

An ally of *C. abbreviata* Oliv., but the flowers and leaves are both small for this section. The filaments of the three longer stamens are dilated near the base.

*Dialium orientale* Bak. fil., sp. nov.


**Hab. **KENYA COLONY: Coast Distrikt, Webber 613 (type in Herb. Kew).

A shrub with small glabrous leaves and flowers in a divergent panic. *Buds* incano-pubescentes.

*Brachystegia Kassneri,* sp. nov.

Arbor? ramulis pubescentibus. *Folia* sape 4-juga, paribus rotundatis, rhachide pubescenta, foliolis oppositis, distibus majoribus, imbricatibus; carinis ovulinibus, superne glabris, subtus sparse pubescentibus, 8-14 mm. longis, 5-5-5 mm. lat. proximalibus 4-4-6 mm. longis, ±3 mm. lat. apice obtusis vel breviter obtuse acuminatis. *Stipulae* basi reniformes, nonnumquam ± lobata, appendiculato-lineari, ± 2 cm. longa. *Flores* in racemis laxisuis dispositi, pedunculis pedicellisque pubescentibus; bracteis pubescentibus, ±14 mm. longis, una oblonga, altera obovata. *Sepala* 5, angustas, usque ad ±5 mm. longae, margine fimbriata. *Petalas* 5, sepaliis subsemili. *Stamina* 15-16. *Ovarium* breviter stipitatum, ferrugineo-hirsutum, 7-8 ovulatum. *Legumen* (Ritzscher spec.) oblongum, molliter ferrugineo-verlotuminum, 6-8-8 x ±2-5-3 cm.

**Hab. **BELGIAN CONGO: Matumbi, Kassneri 2506 (type in Herb. Mus. Brit.). *Mukuluku, F. Ritzscher 1454 is the same.

Noticeable on account of the four pairs of large and rather remote leaflets and rather large flowers with 15-16 stamens.

*Loesenera Talboti* Bak. fil., sp. nov.

Arbor? *Folia* paripinnata, foliolis sepissimis 3-jugis, leviter falcatis, ellipticis vel elliptico-oblongis, apice acuminatis, basi rotundatis vel late cuneatis, 8-10 cm. longis, 30-35 mm. lat. utrinque o 2
more elongate, glabrous inflorescence. The petals are either absent or very minute.

I have placed this in *Hymenostegia* on account of its resemblance to *H. Bakeriana*, but in some respects it approaches the genus *Talbotiella*, having narrow bracteoles, a funnel-shaped receptacle, and no petals.

**Talbotiella Batsii** Bak. fil., sp. nov.

*Arbor vel frutex? ramulus lignosis cortice griseo-brunneo tectis. Folia paripinnata, rhachide leviter pubescente, foliolis ±12-jugis, oppositis, oblique oblongis, apice obtusi, basi obliquis, unilateraler arunculatis, subcoriaceis, utrinque glabris vel subglabris, ±15 mm. longis, 5–6 mm. latibus. Stipulae caduceae. Bracteola linearis, acuta, membranacea, ±5 mm. longa. Flores in racemos laxos, breves (2–3 cm. longos) ad basil bracteatis dispositis, rhachide villosa, pedicellis gracilibus, 6–8 mm. longis, leviter hirta. Calyx receptaculo breviter infundibuliforme, sepals ±4, ±4 mm. longa, subequalibus, latis, subglabris vel leviter puberulis. Petala 5. Stamina 10. Ovary dissecum, 5-loculare, 5-ovulatum; style gracile leviter pubescente. Legumen ignotum.

**Hab. S. Nigeria: Oban, Talbot 1459** (type in Herb. Mus. Brit.).

Differents from *L. kalantha* Harms in having a racemose-paniculate inflorescence and smaller flowers. The leaflets are also somewhat more acuminate.

**Cynometra Webberi** Bak. fil., sp. nov.

*Arbor ramulis griseis. Folia 3–4-juga, foliolis ramboidoideoblongis, apice obtusi, 20–25 mm. longis, 8–10 mm. latis, reticulatis, glabris, subcoriaceis. Flores in paniculis ±8 cm. longis dispositi; pedicellis pubescentibus 8–10 mm. longis, erecto-patentibus. Calycis tubus brevissimis, ±1 mm. longis, pubescens; sepals 4 rotundatis, conicas, 2–5 mm. longa. Petala 5, sepalis, linearis-oblonga, ±4 mm. longa. Stamina 10, filamentos longis, contortis. Ovarium applanatum ovatum, stipitatum, hirsutum, 5-ovulatum; style gracile. Legumen compressum, coriaceum glabrum, 4–4.5 cm. longum, 2–2.5 cm. latum, reticulatum, lato oblongum vel ovali-oblongum, apice acuminatum, marginatum.


Noticeable in differing the number of the numerous small flowers, the leaflets in 3–4 pairs, and the flat pod. It is allied in some respects to *C. Fischeri*, differing in having more numerous smaller leaflets and a pod without marked wing on the dorsal suture. Also allied to **C. Alexander C. H. Wright**.

**Hymenostegia Talbotii** Bak. fil., sp. nov.

*Arbor? Folia sapissime 3–4-juga, foliolis subcoriaceis (junioribus membranaceis) oblique oblongis, apice acuminatis, apice ipso obtusis, 8–15 cm. longis, 3.5–5 cm. latis. Stipula magne, linearioblonga, foliaceae, caduceae, 4–5 cm. longa. Flores in racemos dispositi; racemis basi bracteatis; pedicellis 1–2 cm. longis, glabris. Bracteae ad basil pedicellum elongatae, apice praecipue pubescentes; bracteis petaloideis, lineari-oblongae, ±2 cm. longae, ±acutae. Calyx in toto 9–10 mm. longum, tubo cylindrico vel tubinato ±5 mm. longum, dentibus 4, latis, eudactilis, valde imbricatis. Petala 5. Stamina sapissime 20. Ovary dissecum, 5-loculare, 5-ovulatum; style stigmatum capitatum, obtuso.

**Hab. S. Nigeria: Ekit District, Talbot 3141** (type in Herb. Mus. Brit.).

Closely allied to *H. Bakeriana* Hutch. & Dalz., differing chiefly in the fewer, larger leaflets with longer internodes (4–6 cm.) and the

**Species of Leguminose from Tropical Africa**

*Euryptelum Batsii* Bak. fil., sp. nov.

*Arbor sec. cl. detect. 50–75 pedalis, caulibus fasciculatis, ramulis cinereo-corticatis. Folia 1–2-juga, jucundus proximalibus foliolis suboppositis, distalibus oppositis, foliolis petiolulatis (petiolulis 4–5 mm. longis) inequilateraliter ovato-oblongis vel oblongis, subcoriaceis, utrinque glabris, apice acuminatis, basi cuneatis 7–8 cm. longis, ±40–45 mm. longis; petiolibus subapicem 10–12 mm. longo. Stipulae arunculatae. Flores ab apicem radiatae; pedicellis fuso-puberulatis; bracteis lacinulis alabastri miliolitae brevioribus. Calyce in toto 4–5 mm. longus, lobus aequi, 4, conicas, glabris. Petala 5, uno calyce majori ±5 mm. longa, 7–8 mm. lato, reliquis minium, 5 mm. longis. Stamina 10, exserta, filamentos filiformibus. Ovary hirtum, 2-ovulatum, style brevi incurvo, stigmate parvisculo. Legumen ignotum.


"Tree 50–75 ft. high with several stems in a cluster. An inferior red-wood of commerce."

Differents from *E. unijugum* Harms by the smaller 1–2-jugate leaflets and puberulous rhachis of the inflorescence, and from *E. Tassaeni* Harms by the smaller petals and more acuminate leaflets.
Cylcodiscus Battiscopiei Bak. fil., sp. nov.

Arbor elata usque ad 90–100-pedalis alta, corticie levi pallide griseo. Folia pinnis sepalsemine 2-jugis, glandulis interjungis confusi; foliolis ±5-jugis, oppositis, glandulis interjungis, obovatis vel rhomboideae-ovatissimis, basi cuneatis apice saccipite obtusa, glabras, distalibus seps inequalibus, quam proximalibus majorebus; 3.5–5 cm. longis, 2–3 cm. latius, proximalibus 1.5–2.5 cm. longis, 10–15 mm. latius. Flores parvi in spicis multilobis paniculatis dispositi. Calyx campanulatus, vix 1 mm. longus, dentibus minutissimis, sparse pubescentibus. Petala pubescentia, lineari-lanceolata, ±2.5 mm. longa. Stamina 10, antheris rotundatis, glandulis sepsibus. Ovarium hirsutum, basi disco cinetum, multi.ovulatum. Legumen valde elongatum, glabrum, coriaceum, marginatum, ±80 cm. longum, ±28 mm. latum, venosum, seminibus oblongis, alatis, applanatis, tenuebus, ±75 mm. longis, 20 mm. latius, funiculo ad extrematum affixo.

Hab. KENYA COLONY: Battiscopiei 93 (in Herb. Kew.); Webber 607.

"Tall tree; coast forests."

This species differs from C. gabunensis Harms in having smaller obtus, opposite leaflets and pine in two pairs, both pinnae and leaflets with conspicuous glands between the pairs. The pod of both species is like a very large Piptadenia pod. P. Ellioti Harms (Scott Elliot 4792) may, when fruit is available, prove to be congeneric; the foliage is similar to C. Battiscopiei.

Acacia Hermannii Bak. fil., sp. nov.

Arbuscula ±5 m. alta, ramis anfractis, corticie albidio-cinereo vel grisco-brunneo tectis. Folia elongata, curvata, pinnis numerosis 30–40-jugis, ±3 cm. longis, rhachide glabro vel sarmassime puberulo; foliolis parvis, ±20-jugis, 2–5 cm. longis, ±1.5 mm. latius acutis, oblongis, glabris. Stipules spinoso, recte, fuliginose, 2–4 cm. longe, divergentes. Flores pallide rosi in capitura dispositi, pedunculo brevi, pubescenti, 10–15 mm. longo, involucro ad medium vel infra medium longo. Calyx brevis, dentibus parvis pubescentibus, in toto ±1 cm. longus. Petala linearis-elliptica, ±3.5 mm. longa, glabra. Stamina longe exserta, ±6 mm. longa. Legumen valde elongatum, angustatum, multispermum, breviter stipitatum, 22–22 cm. longum, ±5–7 mm. latum, glabrum, extus atro-brunneo, intus stramineo.

Hab. TANGANYIKA TERRITORY: Singida District, nr. Manyangum, ±4500 ft.; B. D. Burtt 1379 (in Herb. Mus. Brit.). Native name "mikese." The following are conspecific — Kondoa, Irangi, B. D. Burtt 1463; Tabora, Holz 1495 (Herb. Berol.).

"Very thorny small tree approx. 15 ft. high; flowers pale pink; fruit long and slender. Growing in Commiphora-Grevia thicket."

This species is named in honour of Dr. H. Harms, who has kindly assisted in the determination of many East African Acacias. It is noticeable on account of the zigzag branches, the numerous pairs of short pinnae and the very elongate narrow pods. It is allied in some respects to A. Segal Del.

SPECIES OF LEGUMINOSE FROM TROPICAL AFRICA

Albizzia tanganyicensis Bak. fil., sp. nov.

Arbor alta teste cl. detect. corticie membranaceo ochnaceo. Folia pinnis 3–5-jugis; foliolis 5–10-jugis, sessilibus, maturis late oblongo-ovatis, leviter inaequalibus, basi truneatibus vel levissime subcordatis apice obtusis mucronatis, glabras, 25–35 mm. longis, 20–28 mm. latis; junioribus parvioribus, apice acutis, ±22 mm. × 10 mm. Flores numerosi, capitati, pedunculo 25–30 mm. longo. Calyx in- fistuliformis, puberulis, ±4 mm. longus, dentibus parvis triangulobus, vix 1 mm. longis. Petala paulo ulterius medium conatus, lanceolata, exsud ad apicem pubescentia, 8–9 mm. longa. Stamina numerosa, ad basin ±5 mm. conata, longa exserta. Ovarium parvum, glabrum, stylo elongato. Legumen (No. 1946) oblongum, glabrum, applanatum, marginatum, 5–12-spernum, 12–25 cm. longum, 3.5–4 cm. latum.

TANGANYIKA TERR. Kondoa Dist., Simbo Hills alt. 5000 ft. and over, B. D. Burtt 716 (in Herb. Mus. Brit.); native name "mapi" (Sandawi); Kondoa Dist., Hundwe, B. D. Burtt 1946 is conspecific.

"A tall tree in Brachystegia forest." This belongs to Section Enulabizia, and is remarkable on account of its rather large glabrous leaflets in 5–10 pairs. It is allied in some respects to A. Lebbeh Bent. (Enulabizia § Obustifolia), and differs chiefly by the broader leaflets.

THREE GENISTAS OF THE LINNEAN HERBARIUM.

By C. C. LACATTA, M.A., F.L.S.

1. Genista anglica; it is surprising to find that the plant on the only sheet where Linnaeus has written this name, No. 18 in Dr. Jackson’s order, is not that species at all, but a Portuguese specimen of G. triacanthos Brot., sent by Alstroemer with a label in his hand. "Porto, rarius eum Ulmus vulgaris." Smith long ago pencilled "&" against the G. anglica written by Linnaeus. Genista triacanthos is very plentiful in the heathy pine-woods north of Oporto.

Pinned to this sheet are two others. The middle sheet bears no writing by Linnaeus. It shows a scrap, sine loco, of what obviously is G. anglica. On the lower sheet he has written "purga L. 231 b," inquiring that he had received the specimen from Loefling from Spain under that number. Smith has annotated "Spartium scorpius? Genista purga, Sp. Pl. ed. 2, see Sp. purga, Syst. Nat. ed. 12, 2, 474." I do not understand Smith’s note, nor dare I attempt to determine so scrappy a specimen. It has no resemblance to G. anglica, and, whatever its be, should never have been pinned to either of the other two sheets.

2. Genista lusitanica; the solitary specimen, No. 27 in Dr. Jackson’s order, is not a Genista at all, but Ulex ophylas from Setubal, in Portugal. This also came from Alstroemer with his label: "Ulex ophylas, spinis ramosis, floribus terminalibus, No. 26. St. Yves in collibus cupioce."
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THREE GENISTAS OF THE LINNEAN HERBARIUM

that it is G. Boissieri (called by Boissier G. horrida), as it should be

ex loco citato, in spite of Willkomm's objection that Boissieri—as

known to him—is a plant of high mountains, for I have myself seen it

pleasantly near to Cazorla and Huelma in the province of Jaen at

altitudes very little greater than that of Granada itself. In favour of

the identification with Boissieri is the figure itself, which shows a

less rigid plant than "lusitanica," and especially, indeed conclusively,

the first words of Clusius, "pedis altitudinem naro superabat,

"lusitanica" being a much larger bush.

If this be admitted, G. Boissieri would be replaced by G. lusi-

tanica L., ex. loco "lusitanica," and G. lusitanica auch, non L.,

would presumably become G. Barnadesii Graells var. lusitanica; for

G. Barnadesii, as already pointed out by Pau, cannot really be

specifically separated from G. lusitanica auct.

Yet, unless and until Spanish botanists accept these conclusions

and confirm them, as they easily can, by careful exploration of the

hills to be crossed, in Clusius's time, on the way from Granada to

Cordoba, it may be better not to disturb the customary nomenclature.

In the case of Genista tridentata again, neither of the two

Alstroemer sheets can be a type, for the same reason as before, though

they are quite rightly so named. Linnaeus tells us that Loelling sent

him the plant from Portugal, and the name is underscored in his own

copy of Sp. Pl. 1753, proving that he already possessed a specimen,

as explained by Dr. Daydon Jackson in his Index to the Linnean

Herbarium, p. 8. What has become of the Loelling specimen that he

had at that time? Can the writing A. 160 on sheet no. 9 have been a

slip of the pen L. 160? But such a slip could not have been made

till a good many years after any specimen from Loelling was already

in the collection.

FUSIDOMUS

(PSEUDGENUS NOVUM, E NECTHIOIDES).

BY W. B. GROVE, M.A. *

PYCNDIA cyanoe-violaces, mollis, laxe cellulosa, subglobosa.
Sporula fusiformis, lunata (an amper?), acutiuscula, sepsate, 
±hyaline v. coaeangeae roseo, pedicellis ramossis hyalinis turgitis
suffulta.
The spores resemble, or are even identical with, the Fruarium
spores generally associated with Gibberella, but differ from them in
being contained in a complete all-round pyxidium like a peritheicum
in shape.

This form-genus is, strictly speaking, an unnecessary one, since it
is admittedly merely a stage in the development of Gibberella. The
object in giving it a name is to focus attention upon a state of things
still obscure, and probably by no means of common occurrence. The
facts are referred to in a few words, buried in a mass of text in
Saccardo's Syllae and hardly noticeable, in still fewer words in

* Other references discovered since this article was printed will appear in a

subsequent number.—W. B. G.
Rabenhorst's *Kryptogamen-Flora*, and hardly anywhere else. But they deserve more explicit treatment; one may find *Fusidomus* without a sign or a hint of any ascophore.

Six form-species are known or implied:

(1) *Fusidomus pulicaris*, on *Sambucus*.
This corresponds to the "macrospores (f.)" which Saccardo reports in his *Sylloge*, ii. 552, under *Gibberella pulicaris*. Spores oblong-fusiform, curved, 3-septate, constricted at the septa, hyaline, 20–25 × 6 μ.

(2) *Fusidomus Arctium*, on *Arctium*, described below. Probably belonging to *G. Sauhineti*.

(3) *Fusidomus Euonymus*, on *Euonymus*. This is the "status pyriformis" described, under *G. Euonymus*, by Fuckel (Symb. Myc. p. 157), and as a *Hendersonia* by Saccardo (Syl. ii. 556). It is again recorded, under the inappropriate name of *Stagonospora Euonymi*, by Saccardo (Syl. iii. 447), by Diedicke (Krypt. Brand. p. 555), and by Migué (Thome's *Krypt. Flor. 3*, i. 346). Spores oblong, 1–4-septate, 20–24 × 6 μ, reddish in mass.

(4) *Fusidomus ficus*, on *Ficus*. This is hinted at by Saccardo (ibid. p. 556), under *G. ficina*;—"Stylospores (f.) lanceolate, obtuse, somewhat curved, 3-septate, hyaline, 30 × 8 μ.
These words are quoted from Cooke and Harkness (Grevill. ix. 87), where they say under *Gibb. ficina*: "Ascii and sporidia not seen. Stylospores evidently different from those of *G. pulicaris*.


(6) *Fusidomus cyanogenum*, on *Brassica*. Winter says (Kr. Flora, p. 102): "Stylospores like the ascospores, 3-septate, but smaller, narrower, and more pointed."

**Fusidomus Arctium**, sp. nov.

*Hab.* In caulibus amortuis *Arctii Lappa*, Hibemton, Wores (Rhodesia), April.

The lamellate spores have the acute ends bent slightly to the inside of the curve so as to form a continuation of its outer boundary. The cells of the branches of the pedicels, just below the spores, are more or less ampulliform or oblong-turgid, and wider than the spores. This species differs from *F. pulicaris*, which I have found on thin dead stems of *Sambucus* at Walmley, near Sutton Coldfield, in having narrower spores and less epispores, scarcely crowded, pyecidium. There were no ascoporous concepacies accompanying either of these pyecidium.

Since *Gibberella Sauhineti* occurs on all sorts of herbaceous stems and upon thin stems of *Buxus* etc., it seems likely that the species here described is the same as was called *Hendersonia Arctium* by Berkeley and Broome (in Ann. Nat. Hist. 1860, 2. v. 373) as occurring on box twigs (see Cooke, *Hand. p. 435*). I have examined Berkeley's specimen of *H. Arctium* (*Stagonospora Arctus* Sacc. Syll. iii. 449) in the Kew Herbarium; there is very little of it, but some of the pyecidium agreed in having *Fusidomus* spores, measuring 20–25 × 3–4 μ, in blue-celled concepacies. Most of the pyecidium, however, belonged to *Phomopsis stictica*. It must be remembered that in Berkeley's day *Stagonospora* was not distinguished from *Hendersonia*—in fact, the genus *Hendersonia* was instituted by Berkeley in honour of his friend, Mr. J. Henderson, on what is now called *Stagonospora elegans* Sacc. & Trav. (*H. elegans* Berk.).

The explanation of these occurrences seems to be that the mycelium, which ordinarily produces the *Fusarium* spores, is here growing and producing them within a peridium that under other circumstances would have borne only asci and ascospores. The references to this event in literature have hitherto been curiously scattered or mistaken.

**ECONOMIC MYCOLOGY IN THE EMPIRE OVERSEAS.**

Dr. E. J. BUTLER, in his Presidential Address to the Mycological Society, recently published in the Society's Transactions (v. p. s. i. & ii., March 1929), took as his subject the rise and development of economic mycology in the more distant parts of the Empire.

The first detailed study of a fungal disease of a tropical plantation crop was Marshall Ward's investigation of the coffee-leaf disease of Ceylon, begun in 1890, a date which marks the beginning of economic mycology in the Empire overseas. His was the first of a number of tours made by men specially sent out to deal with a particular problem. The first step in the establishment of a Government mycological service was made by Australia when, in 1890, two whole-time appointments to permanent posts in phytopathology were made under the State Departments of Agriculture of Victoria and New South Wales. But the development of economic mycology, which is measured to-day by the number, about one hundred, of mycologists and plant-pathologists in Government service in the Dominions, Colonies, and Protectorates, has come about almost entirely since the beginning of the present century. It has resulted from the tremendous increase during that time in the demand for the agricultural produce of these countries. It is not entirely on the efforts of Government workers that the advance has been dependent. In Australia and Canada, workers in the Universities have made important contributions, while such bodies as the Ceylon Planters' Association and the Rubber Growers' Association of Malaya have played a large part in the organization of research. In the Federated Malay States, indeed, the extraordinary wave of prosperity that swept over the country as a result of the huge growth in the demand for rubber led to a fierce competition between the industry and the Government Departments.
for the services of scientific men. This competition reacted unfavourably on the Government Departments concerned, and seriously affected the organization of the mycological work. The situation has had a marked effect on the development of economic mycology in Malaya. The attention of individual workers was, as a rule, focussed on single problems, and the bulk of the work done has been the monographic study of individual diseases and their control. The lack of co-operation between the Government Department and the various workers in private employment led to much overlapping and waste of effort; the recent foundation of the Rubber Research Institute of Malaya, jointly by the Government and the planters themselves can be directly traced to this cause.

Mycological developments in India, South Africa, and the West Indies date from the establishment of Government posts in the agricultural or botanical services at the beginning of the century. In India the tea industry also early recognized the value of a scientific department, and several of the early mycological investigations were concerned with the diseases of the tea-plant. India was, incidentally, the first of the tropical dependencies to take up seriously the study of the diseases of crops grown by the people themselves, as distinct from the plantation crops grown under white supervision mainly for export.

In British tropical Africa, as might be expected, mycological research has been dependent on Government enterprise. The work in these colonies has been naturally determined mainly by the nature of the local agriculture. Though no longer a part of the Empire, Egypt deserves mention on account of the pioneering work on cotton diseases carried out by Mr. Lawrence Balis.

For various reasons, outbreaks of plant-disease in newly-developing countries are of a much more serious type than those usually encountered at home. Furthermore, the economic mycologist overseas is fortunate when he has to deal with a known parasite with the means of control already worked out. Failure to cope with an epidemic in time to prevent serious consequences is still too frequent, owing to the unsuitability of the disease or want of time for working it out. Such cases make the observer feel that no increase in the number of men engaged in the struggle against plant-disease can be too rapid, and that no field of mycology better repays cultivation than that worked by the mycological and plant pathological departments overseas.

B. J. Rendle.

SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.

The thirty-fourth Annual Congress of the Union was held at Brighton from June 5-8 under the Presidency of Sir Arthur Keith, F.R.S., who gave a very interesting address on “Southern Englishmen of the Pro-Roman and Roman Period.” The meetings were held in the Royal Pavilion. Mr. A. D. Cotton, F.L.S., Keeper of

the Kew Herbarium, succeeded Mr. C. E. Salmon as President of the Botanical Section, which met on Thursday morning.

Mr. Cotton’s address was entitled “The Importance of the Study of Systematic Botany.” He emphasized the necessity and fundamental nature of this branch of science, and alluded to the fact that the value of a training in taxonomy was not always appreciated. Taxonomy was not encouraged at the Universities, and systematic theses were not as a rule accepted for University degrees. While fully admiting the value of other branches of botany and the fact that some of these were more suited for revealing the skill and reasoning powers of the graduate student, it was unfortunate that, at the present time, when activity was so great with regard to systematic and economic botany within the Empire, as a result of lack of encouragement there was a dearth of properly trained men. The nature, scope, and importance of the various departments of systematic botany were then treated under the following headings:—

(a) historical and bibliographical,
(b) nomenclatural,
(c) monographic,
(d) geographical and floristic, and
(e) phyllogenetical.

In the case of floras of new countries or those which are very imperfectly known, it was pointed out that nothing can equal the time-honoured method of ordinary herbarium research, but in the case of well-known floras, such as those of most countries of Europe, the matter was different. Present-day work in these countries usually consisted in the search for new records, or intensive studies of limited areas, the result of which was seen in the publication of revised Floras or new Local Floras. Useful as this work is, Mr. Cotton held that an even more valuable field for research was to endeavour to acquire by observation and experiment a more precise knowledge of the status of the innumerable doubtful units in the supposedly well-known flora. To assist in the elucidation of these problems, it was suggested that the aid of ecology, biology, and genetics (including cytology) should, if necessary, be invoked. The manner in which these branches of botany could assist was outlined, and attention was drawn to the proposed Biological Flora of Britain to be published by the British Ecological Society, for which Dr. E. J. Salisbury was collecting data. Special emphasis was placed on the assistance that controlled breeding experiments would be likely to yield in showing whether those numerous forms which occur in certain genera and to which names had been given were not merely transient segregates or back crosses.

In conclusion, the value of specialization and co-operative effort among members of Field Clubs and Natural History Societies in this country was emphasized in the direction of both monographic and floristic studies. In the Colonies and abroad there was still ample opportunity for travellers to assist science by sending home well-dried collections. Such collections added to the stock of material in National Herbaria, and this would in time be used up and the records incorporated in published Floras.

A final appeal was made to students and professional botanists. The need and opportunities for sound systematic work were never
greater than they are to-day, whether it be in intensive critical work on small groups often in association with the geneticist, or in floristic and monograph work on the floras of the vast territories of the Empire or other countries of the world.

Mr. George Morgan, F.R.C.S., read a paper on "The Etiology of Spheroeblasts or Wood-nodules," the isolated nodules of very varying size that are found in the cortex of many trees, such as beech, holly, and others. Mr. Morgan maintained, contrary to the generally accepted view, that the nodules had no connection with the wood-cylinder, but were the result of the development of minute portions of the pith which had become detached from the central cylinder. They were comparable with tumours in the animal world, which resulted from an invagination of the epithelial tissue and reproduced epithelial characteristics in unusual places in the body.

Dr. Rendle reported the progress that had been made towards the collection of material for the Survey of the Flora of Sussex, and emphasized the importance of careful collecting and checking of previous records.

At the business meeting of the section Lt.-Col. A. H. Wolley-Dod was unanimously elected President for the year 1930-1.

On Thursday afternoon a party of botanical members visited Major F. Stern's garden at Highdown, near Goring. This garden is interesting as being at the foot of the chalk Downs, and a large part of it is on the site of an old chalk-pit. It contains a very large collection of choice trees and shrubs, and also herbaceous plants and alpines, the owner having specialized on Chinese and New Zealand plants. Amongst the former are many plants raised from seed sent home by well-known collectors such as R. Farrer and G. Forrest. Major Stern's method is not the usual one of putting plants in pockets of well-made soil in the chalk, but rather to fork up the chalk to a depth of 1-3 ft. as desired, place his plants in the thin layer of soil on the top, and let them root down into the pure chalk. In the case of many trees and shrubs unexpected success had been obtained, and the vigorous growth of the collection of rare plants he has got together shows what can be done, even under such unpromising conditions.

Of particular interest was a small collection of Rhododendrons from the Liuchiang Range, Yunnan. The genus, as is well known, is very intolerant of lime, but in a shady corner of the garden, where a certain amount of leaf-soil has been incorporated with the chalky loam, species from the Liuchiang Range, which consists of a form of limestone, will grow and thrive.

On Friday, June 7, a ramble to Shoreham beach was conducted by Miss A. J. Cottis and Mr. H. J. Smart, supported by Mr. A. D. Cotton, President, and Mr. C. E. Salmon, the retiring President.

It was considered advisable to concentrate attention on the plants of the sea-shore. The beach is a more or less dry shingle on the eastern side, with small patches of vegetation and many interesting plants pushing up among the stones. The whole beach was under the influence of the salt spray, and little distinction could be drawn between the plants near or far from the sea. Among the plants noted were Arenaria serpyllifolia var. sievidula Roth, Trifolium scabrum L., an abundance of Anthyllis vulneraria L. on the shingle, very stunted in growth and forming a marked contrast to the tall cliff form. Grasses of interest were Festuca rotchardii Kershaw, the shore form of Bromus helveticus L., with its short, clustered, panicle and glabrous spikelets, and the rare Glyceria Borreti Bab., which grew in some brackish water at the edge of the beach.

On the western part of the shore, which was separated from the eastern by a wide channel, there was a marked change of soil-conditions; the shingle was less in evidence, its place being taken by mud-flats with the accompanying vegetation; the dominant plant Armeria maritima Willd. was in full flower and added a pleasing colour to the scene. Among the rarer plants seen were Medicago falcata L. and Frankenia lavis L.

DURLEAI ITER ASTURIUM BOTANICUM.

By C. C.bagin. M.A., F.L.S.

[Continued from p. 154.]


L. pilis brevisimis, inarticulatis, glanduliferis tota pubescentis, caule solitario, erectissimo, multiramoso, ramosisque patulis aridum usque foliataem; surculos nonnullis brevibus ad basin fluitantum; foliis succulentis lineari-lanceolatis, 4-5-verticillatis, caulibus multo longioribus latioribus, laceratis, infernibus 5-verticillatis, relictis alternis, ramosis remotis sparsis; floribus paucis, demum breviter densaeque racemosis; pedicellis brevisimis, erectis; segmentis calycinis lineari-lanceolatis; corolla (lutea) labio superiore erecto, ovoato, emarginato, inferiore laté trilobo, palato (aurantaceo) convexo, hirsuto, calcare corollam excedente, conico-subulato, acuto; stylo indiso, apice parum dilatato; capsula asperula, valvis 6-8 dissecante; seminibus transversal ellipticis, compressis, late marginalibus, diso tuberculatis.

asturicae habeat cognoscens vir doctus et optimus, cui inlernis sui quasque suum fructus se debere gratia factur noter Durius.


multicaulis, pilis is tota superficie densissimis elongatis et septiferis, capsula ovata, non globosa, seminibus denique minus distincte marginatis, forte omnino inumarginatis, quamvis compressis, undè locus ei tribuitur in alia generis divisione. Est itaque à L. Perezi nostre distinctissima.


Voram S. Scorodonum allo loco fusi describatur. Mennisine nunc sufficiat illam a sequente alpestris diversissimam esse, ob caulem longum rosco, folia bullato-rugosa, pilos densiores et septiferos, pedicello ad apicem usque glanduloso-pubescentes, calycis segmenta pubescentia, marginis eroso-dentata et corollam (recentem) foris purpureo-fuscis, lobis 2 superioribus concordioribus, dubius intermediis utroque partim purpureo-fuscis, partim luteo-scentibus, infereor utroque luteo. In horto Luxemburgo parisiino, alpestris integro hibi mere præcoercor.


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Habitat in alpibus Europee australis occidentalis, inter Liguriam et Asturiam, in alpibus Apuatinis (Bertol.). In Cebennarum monte Asturiae (Froat). In toto Pyrenaeorum jure inter 400 et 1000 hexapodas (notra propria experientia). In Asturiae occidentalis montibus frequentus, nominatim ad rium ex lacu montis tie d'Armes in vallem Trecastro defluentem (Duvier). Florum July ineunte in Pyreneis, et Junio ineunte in horto Luxemburgo Parisino.

Vericoria Scopoli carpatica specimina mihi sunt, a Sadler et Baueroe suppettata, quibus comparatis potui non nostrum pyrenaeam et asturicam pro diversissima specie habere. Statuta enim hicet carpatica dimidio minor, caulis multo tenius; folia plus dimidio breviora, exsicata distinctissime pellucido-punctata, dentibus brevibus densiusque ciliolatis; panicula, carne, pedicelli fructiferi longi breviores; pedicelli ad sumnum usque glandulos, non apice nudi; glandulae pedicellorum plures, breviuscule stipitatae; segmenta calycina ferruginea non albo-marginita; filamenta parvis glandulis; discus hypogynus minus causas, et ovarium laxe einges, non arctisuisse amplissms; capsula denique ovato-sabrotunda, abrupte mucronata, non ovato-acuminata. Hoc tandem magni momenti est, quod Scopoli in horto Eringensi biennem! expertus est Kochius (Deutschl. Fl. iv. p. 407), quam vis stirps pyrenaeica, anno 1824 in horto Luxemburgensi sata, ad hanc usque diem (anno 1826) duravit et quam maximam perennem se declaravit. Distributio geographica etiam, quamvis consideratis solis latitudinis gradibus non multum diversa, tamen omnino alia est. Species enim nostra Europa maximae occidentalem affectat. Scorpy. verbo Scopoli, ex Cucacae per Hungariam in Carnia et Silesiam migravit, et est evidenter originis orientalis, quae sunt Xeranth. annuam, Astragalus vesicarius et alopecuroides, aliaeque occidentales versus plus progressae.

Quam ex loco natali et diagnosi emendem fere cum nostra credere, S. Herminii Hoffm., et Link Fl. Port. i. (1800) p. 206, tab. 53, ex descriptione et icone longe differt caule ramoso ramosisque longitatis longissimis subscendentibus, foliis tenuioribus profundissimis albo-marginitis, cymis paucifloris, pedicellis ad apicem usque subscendentibus, antherae sterilis forma postru alia, nemente (ex icono) cuneate et bifiida.

Asarum europaeum L. in Dorset.—Nancy Holloway, aged 13 years, of the Elementary School at Corfecombe, Dorset, has found Asarum europaeum L. on Merrilands Farm in that parish. This is the first time it has been found in Dorset. The discovery has been confirmed by the Rev. A. N. Storrs, Rector of the parish, and the Rev. F. L. Bathway, of Melbury Osmond. Its position in a secluded copse proved undoubtedly that it is growing wild. Asarum europaeum, which Watson regarded as a denizen, is recorded from copse in Wiltshire, Hereford, and other counties.

It should be pointed out that E. F. Linton's record for Dorset (Flora of Bournemouth, Appendix ii., p. 319: "1 (s.) Redlynch, still abundant in the old locality, Salter") is an error. This locality is in Wiltshire (see Preston, Flow. Pl. Wilts. 262), and not in Linton's division 1 (s.). Confusion has apparently arisen owing to the existence of a Redlynch in Somerset (see Munn, Fl. Somerset, 291).—A. J. W.

Festschrift Hans Schinz.—A very substantial volume has been issued by the Naturforschende Gesellschaft* of Zurich to celebrate the attainment of seventy years of age by Professor Hans Schinz. The frontispiece is an admirable photograph, and the contributions, twenty-eight in number, by his pupils and colleagues cover a wide range of botanical interests. Some of the papers are of local interest, such as a contribution to the biology and phytography of some panerogams of the Jura of Neuchâtel, by H. Spinner (in French); on the spring-vein-flora of Lugano, by A. Thellung (in German); the flora of the Maloja, by G. Hegi (German); the vegetation of the Monte di Cbasno, by M. Jäggl (Italian); and alterations in the Zürich flora in the last century, by O. Naegeli (German). M. Richter and E. Rübel discuss the flora and vegetation of the Libyan Desert, and J. Braune-Blanquet the vegetation of the Great Atlas, C. Schröter and C. A. Backer describe excursions in East Java, Ed. Fischer investigations on Phalloide from Surinam, and J. Briquet discusses the floral structure of the so-called monadelphus Cynaraeae. Other contributions deal with genetics, plant-physiology, ecology, and anatomy.

A discussion on the origin of carcinoma by mutation is contributed by Hans R. Schinz. There is also a classified list of Prof. Schinz's published works by the late A. Thellung, completed by the editor, Ernst Furrer—these extend from 1885 to 1925; and a list of the dissertations prepared under his supervision. Useful maps and good photographic illustrations are included in many of the communications.

Ceratodon chloropus Brid. in Britain.—In March last I had the pleasure of finding this moss, a new record for Britain, but unfortunately without fruit, at Walton, Clevedon, Somerset. It grows thinly scattered upon a small area of loose, light soil about outliers of limestone rock on a rather steep slope of an open hillside, and is associated with Trichostomum crispulum and Encalypta vulgaris. Nothing would be easier than to overlook this moss as found at Clevedon, as it bears a superficial resemblance to several common species, e.g., Barbula fallax, which one would expect to find on the kind of ground referred to. It is only when viewed with a lens that its hardness and rigidity show it to be so very distinct. The species is recorded for France.—C. H. Bainsdard.

Veronica serpyllifolia L. var. nov. obscura.—In the autumn of 1928 a Veronica was found in abundance on freshly turned soil at Freshwater, Isle of Wight. The plant differs so strikingly from ordinary V. serpyllifolia that it has been kept under constant observation in culture at Reigate and Freshwater until the present time (May 1929). During the dry summer of 1928 the growth was less luxuriant, but after the rain the plants grew vigorously and assumed their characteristic size.

We have been unable to find any named specimens with which our plant agrees. Indeed, the only specimen at all resembling it is one in Herb. Mus. Brit. from Austria. Its relationship to V. serpyllifolia seems to be beyond question, and we regard it as a variety—though a very well-marked one—of that species. It differs markedly from the common humifuse state of serpyllifolia.

Veronica serpyllifolia L. var. obscura var. nov.—Herba prostrata minus longissimus profuse radicans, foliis late ovatis pagine oposciis. Stem branching freely without pronounced upright main axis; branches prostrate, long, up to 24 cm. or more, rooting profusely at the nodes, densely covered with short hairs. Leaves matt, slightly rough, laminae broadly ovate 1.5-1.0 to 1.8 cm., mostly with petiole 0.5 to 0.7 mm. long; those of the lower part of the inflorescence-axils sessile; margin of leaf shallowly crenate or crenate serrate. Inflorescence up to 15 cm. long, curved, at the ends of branches ascending from widely divergitae or prostrate bases. Flowers very numerous; flowers and fruits similar to those of ordinary serpyllifolia.—E. Drabbel; C. E. Salmon.

Reviews.


These two volumes contain practically all Bateson's contributions to purely scientific journals, together with portions from two of his earlier books, the Introduction to the Materials for the Study of Variation (1894) and Mendel's Principles of Heredity—a Defence (1902). In the former Bateson broke away from "the common methods of morphological argument and interpretation," and declared...
that the first duty of the naturalist is to collect and codify the facts of Variation; this eminently suggestive chapter, which occupies nearly one hundred pages of Vol. I., merits careful perusal by every thoughtful biologist. The latter is aptly described by the Editor as the earliest reasoned statement of Mendel's work in English, and marks the beginning of Bateson's genetical work, for which it supplied the reason and the stimulus.

Volume I. contains the papers concerned chiefly with problems of Variation, Volume II. those dealing mainly with Heredity. The lengthy series of Reports to the Evolution Committee of the Royal Society, 1902–7, are included only in the form of the summaries. The arrangement of the papers is generally chronological—without doubt the fairest method of presentation, as it enables the reader to follow the development of the theme in the mind of the author.

From the point of view of the botanist the important item in the first volume is the Introduction to the "Materials," to which we have already referred. The great majority of the papers deal with the description and discussion of cases of variation in different groups of the animal kingdom—fishes, insects, mollusca, and others. There is, however, the paper "On the Variations in Floral Symmetry of certain Plants having irregular Corollas," in which his sister Anna Bateson co-operated, published by the Linnean Society in 1891. From the study of the numerous variations in the flowers of Veronica Bac-bauuistii, Streptocarpus, Gladiolus, and others the authors were led seriously to discount the value of comparative morphology as a guide to the origin of existing forms, and to insist on the evidence that perfect forms may occur as sudden variations. A short communication with Miss D. Fertl (1900) indicated that the variation in the corolla of P. Bac-bauuistii was not inherited. There are also three communications to Nature (1896) of a more controversial character, presenting Bateson's arguments as to the origin of the cultivated Cineraria, arising from his attack on a suggestion by Thistel Dyer that they had originated from the Canary Island species, C. ernesta, "by the gradual accumulation of small variations." Sporling after hybridisation was the origin suggested by Bateson.

There is a larger proportion of botanical interest in the volume dealing with the matters of heredity, Bateson's active study of which originated in the rediscovering of Mendel's observations of 1865. These occupy the period between 1901 and 1926, and many of them were in collaboration with pupils or colleagues at Cambridge or the John Innes Institution who drew their inspiration from his own work—Miss E. R. Saunders, the late R. P. Gregorie, and Miss Caroline Pellow. The nature and origin of Plant-Chimens form the subject of several communications. The controversial attitude is represented by communications to Nature on Dr. Kammer's testimony to the inheritance of acquired characters, Bateson strongly discredited the instance of Algytes, in which horny pads on the "hands" were claimed to have been produced in response to a change to an aquatic environment and to have been transmitted to offspring. The last paper, "Segregation," appeared in the Journal of

*The Vegetation of New Zealand.* By Dr. L. Cockayne, F.R.S. 2nd edition. 560 pp. xxvi, 456, 8 maps and 108 figs. on 87 plates. Engelmann, Leipzig, 1928. Price (unbound) 42 M.

The first edition of Dr. Cockaynes's book, of which a review appeared in *Nature* in 1923 (p. 204), was delayed in publication. The manuscript was sent to Berlin in 1914, and although the book was not published until 1921, the author had not the opportunity of bringing the text as a whole up to date. In the interval Dr. Cockayne had not only extended his own knowledge of the plant-life of New Zealand, but could also draw upon the results of the work of other botanists, no doubt largely inspired by his own work. Hence the second edition is "practically a new book, by far the larger part having been rewritten and the remainder thoroughly revised." The text occupies 426 pages as compared with 385 pages in the first edition, and the number of illustrations is also increased. Moreover, the original edition appeared at a time of national stress, which is reflected in the inferior quality of the paper and the poor reproduction of the figures as text-blocks. The new edition is a striking contrast in its clear print and shining white paper, and the plates, photographic reproductions mostly from the author's originals, form a separate picture gallery at the end of the volume.

Perusal of the exhaustive and very helpful Table of Contents indicates that the arrangement of the text-matter is practically the same as that adopted in 1921, though indications of up-to-date-ness are evident, "biology" in edit. 1 becoming "autecology" in edit. 2, while "growth-forms" and "plant-formations" become "life-forms" and "plant-communities." The Bibliography has also been brought up to date and considerably increased.

Dr. Cockayne subdivides his matter into five parts. The first, introductory, includes chapters on the history of botanical investigation from the voyages of Captain Cook to the end of 1927, and on the leading physiological features of the region and the climate.
Part II., which occupies the greater part of the book, deals with the vegetation of primitive and semi-primitive New Zealand in four sections—the sea-coast, the lowlands and lower hills, the high mountains, and the outlying islands (the Kermadec, Chatham, and subantarctic islands). Part III. describes the effect of settlement upon the plant-covering—about 514 exotic species have become more or less firmly established, by far the greater part of which are European. Part IV. deals with the distribution and composition of the flora—the botanical subdivisions of the region and the various elements of which the flora is compounded. The author concludes that the flora has two very distinct floristic and ecological elements. The more primitive consists of a combination of the palaeozelandic and subantarctic elements of the flora, now difficult to disentangle. A common property is the power to tolerate cold. The second element, also largely endemic, consists of descendants of an ancient paleotropic stock, the members of which have not generally become fitted to the present average climate, but are for the most part confined to the lowlands. The true Australian element does not play a conspicuous part in the vegetation. In Part V. these conclusions are developed in a brief "history of the flora."

It is a pleasure to be able to review Dr. Cockayne's admirable contribution to plant-geography in its new and more attractive form.

—A. B. R.

BOOK-NOTES, NEWS, ETC.

Imperial Botanical Conference, 1930.—At a meeting of the Executive Committee of the Imperial Botanical Conference (1924), held in London on the 18th of January last, it was decided to arrange a short Imperial Botanical Conference to be held immediately before the International Botanical Congress in 1930.

The Imperial Botanical Conference, which it is intended should last only one day, will meet in London on Friday the 16th August, 1930, at the Imperial College of Science and Technology, South Kensington, S.W. 7.

The agenda before the Conference will be purely of a business nature. The proposal to hold a further Imperial Botanical Conference in 1935, on lines similar to that held in 1924, will be discussed; and, if necessary, the appropriate organisation for convening the Conference will be arranged. Reports of the Committees which have dealt with the Resolutions of the 1924 Conference will be received.

Any other business which it is desired to lay before the Conference should be communicated in due course to the Hon. Secretary, Professor W. Brown, Imperial College of Science and Technology, South Kensington, S.W. 7.

Mr. Anthony Giff has kindly consented to receive matter for the Journal and to see through the press the numbers for August and September during my absence in South Africa, where I hope to attend the meetings of the British Association at Cape Town and Johannesburg. Communications should be sent as usual to the British Museum (Nat. Hist.), Cromwell Road, London, S.W. 7.—A. B. Rendle.
ARTHUR BENNETT
(1843–1929).

(With Portrait.)

Arthur Bennett was born at Croydon on June 19th, 1843, and there at Mr. Twentyman's Academy, at Fairfield House, he received his education. On leaving school, he at once went into his father's business, that of builder and house decorator, to which he eventually succeded, and carried on with greater or less success until his death on May 2nd, 1929.

To this Journal he was a most prolific contributor, from his first note in 1874, where he reports an unsuccessful hunt for *Junardia* in 1874 in its recorded station, till the May number of this year, when his additions to Topographical Botany appeared; in this latter work he had the assistance of Messrs. C. E. Salmon and J. R. Matthews. In these fifty-three years he only missed a single year without making some contribution, and no fewer than 243 notes, papers, and reviews have appeared in its pages. They cover a wide range of subjects. The topography of the Eastern Counties was a first love, and he did much to elucidate the Flora of East Anglia with conspicuous success, for not only were numerous new county records made, but he was fortunate enough to add *Najas marina L.* (N. major All.) from Hickling Broad on July 21, 1888 (Journ. Bot. 1888, 246, 353). (Independently Bolton King and myself found it early in August in the same year.)

Previously Bennett (1880, 219) reported as new to Britain *Chara stelligera*, a plant now known as *Nimphaea octopus* J. G. Groves, from Filby Broad, gathered on September 23rd, 1880. He also added to England, from Burwell Fen, Cambridgeshire, *Potamogeton lanceolatus Sm.*, only certainly known previously from Anglesey. It is now admitted to be of hybrid origin, but whether the Anglesey, Cambridgeshire, and Co. Clare plants have the same parentage is a matter of discussion. There seems to be no reason to doubt the accuracy of Hagstrom's suggestion that *P. coloratus* is one of the parents of the Glen Cahir plant, since that species grows with it, there and at Burwell Fen. In 1882 (Journ. Bot. 80) he recorded the Irish *Chara tomentosa* from Potter Heigham, but it was an imperfect sterile specimen which has never been found, so it is wisely ignored by Groves and Bullock Webster in the *British Charophyta* (p. 24). His success with the aquatics doubtless induced him to specialize on the Potamogetons, to which he devoted himself and on which he became our best British expert. His only competitor was Alfred Fryer, but they were of different schools of thought, and there was no jealous rivalry. Fryer excelled in his vivid descriptions of the life-history, and of their behaviour as living entities, but he had not the faculty nor the inclination for critical literary research. Their respective merits will be well seen in the *Pond-weeds of the British Isles*, hereafter to be referred to. Bennett's extraordinary faculty in making notes led to an enormous accumulation of them.
and this is especially noticeable in his reviews, of which he wrote many for this Journal, especially of Scandinavian and Icelandic works, an area which was his special favourite. The object-matter was sometimes obscured by too many citations; and his style was not always lucid. His work on the pond-weeds was remarkable. When one hears complaints, as any member of an educational body cannot fail to hear, of the want of space or the insufficiency of work-room which it is urged are hindrances to success, one can the more appreciate how Bennett in his intervals from business with his sparse library could do such remarkably good work in such narrow circumstances and could arrive at such a critical eminence on such a difficult subject. Bennett had something else besides this critical gift, for he could stimulate others in the study of nature, and he had a very large circle of correspondents; he acted as an unpaid referee to scores of botanists scattered over Britain—as he once told me, he liked to put some interesting sentence into each of his letters. From time to time he was to some extent rewarded by having sent to him interesting plants, such as the pond-weed which J. G. Griffith, of Bangor, forwarded from Llyn yr Afon, and which he named P. Griffithii (Journ. Bot. 1883, 65). In this, its only British station, myself twice and A. Wilson more recently have searched in vain for P. alpinus or P. prolunga, of which two species Haggstrom and Gnebner think it a hybrid, i.e., the × nereiger, of Haggstrom. Only P. oblongus has so far been observed. Griffith has sent Nitella tenuissima from Anglesey (Journ. Bot. 1882, 241). From Caithness J. Grant and W. F. Miller sent him many plants, including × Carex Granti (Journ. Bot. 1887, 239), Calamagrostis stricta (1882, iii.), and Carex salina. Beckwith sent from Salop a Carex, which Bennett named C. laviyata var. gracilis (1889, 314); Maevicar Carex Buxbaumii from Arisaig (1895, 282). A Carex from Harris sent by Darnick was later identified as C. spiculata, but the identification is by no means settled, since one of its assumed parents is unknown from the Hebrides, and I could see nothing of it or its assumed offspring when I visited the spot in 1928. Potamogeton alpinus var. lacustris Mars., was sent by A. Sturrock from the Lunan Burn (where he and I gathered it); P. Zizii by Charles Bailey from the Lake District (Journ. Bot. 1882, 370); Carex elongata (1885, 253) and Rhynchospora fansa (1887, 373) by J. McAndrew from Kirkudbright; Calamagrostis stricta var. Hookeri by F. Robinson from Norfolk (1915, 236); P. alpinus × lacunos by Mr. Green from Binecon; Dorset (1916, 306); Zosteria nana by Mr. Scoble from Cleethorpe (1884, 301). These were the effects of casting one's bread upon the waters. But the drudgery he underwent and the thousands of specimens of common things which he had to examine few can realize.

His own specialised work on the pond-weeds is reflected in the pages of this Journal, for, in addition to those mentioned, he established many foreign species—we may add that the authorities at the Kew and British Museum Herbaria entrusted him to work up much of their rich material. Among the results of this work are P. cheesmanii (Journ. Bot. 1888, 65), New Zealand; P. mexicanus (1887, 190); P. oligocarpus (1890, 297); P. javanicus (1891, 121, 154); P. Dalavayi, China; P. triarumatus with F. Mueller (1892, 227); P. Archenzii, S. America (1893, 294); P. strictifolius, Canada; P. Morongii, Japan; P. similis, Australia; P. pseudo-rutulus (1892, 303); P. distinctus, Japan; P. subculatus; P. MacRaeanus, America; P. elliottii, Mauritius, etc. (1904, 169); P. Fryeri and P. Franchetti, Japan (1907, 371); P. ausseleensis, Australia; P. semicoloratus, Soutra; P. dissimilis, Argentina (1910, 149).

Valuable notes on British pond-weeds, in which are described many new varieties and hybrids, will be found in the pages of the Journal, notably 1891, 75; 1900, 125; 1909, 192; 1908, 160; 1915, 288; 1918, 10; 1922, 55; 1925, 149; 1926, 21, 1927, 113; and 1928, 102.

The genus Carex was also a favourite with him, the discovery of many new hybrids and varieties is due to his acuteness. He was not always so fortunate with these, since his C. elymioides (Journ. Bot. 1896, 117) is not the plant of Fries, nor is his C. trinervis (1884, 125) the plant of Degland, nor his C. ligerice (1897, 244) the plant of Gay. He, however, detected in Balfour's herbarium (1886, 143) the hybrid helvolus, which Balfour had called alpica. The Wensleydale C. caespitosa (Journ. Bot. 1897, 259) is not the plant of Fries.

It may not be invidious, and it may save confusion, if it is stated that Calamagrostis stricta (Journ. Bot. 1885, 253) is not the plant of Hartman. It is mostly my C. scoticus; and the P. rutulus (1900, 65, 247) of Salmon's Sussex specimens and the Staffordshire plants are not rutulus of Wolfgang. His Surrey Scirpus navas in Echiocharis accinataria, his Utricularia brevii (1912, 316) is U. minor, and his earlier and perhaps his later Atriplex calthacea are not the plants of Fries. Neither is Orobanche cruenta correctly identified.

Bennett's comital notes on the counties of Norfolk and Suffolk, Iolo of Man, etc., are valuable. His "Supplement to Watson's Topographical Botany," issued as a Supplement to this Journal (1905), was a voluminous addition to our knowledge of plant-distribution in Britain. Unfortunately, his citations were not consistent, nor always correct, and were sometimes duplicated and occasionally misleading—for instance, some hundreds were attributed to Newbould for counties he had never been in, e.g., Wigton and West Rous, which were due to my own work. But it and its more recent supplement are of great service.

To the Scottish Naturalist, the Annals of Scottish Natural History, and the short-lived Scottish Botanical Review, he was a prolific contributor, especially on Scottish comital Botany—the vicerealties of Caithness, Sutherland, and the Western Isles being his special favourites. He at one time kept the plants from the Ehudes separate from the rest of his herbarium.

Fryer's Pota...
affair, and it was only my strong personal efforts that led him to go on with it. Dr. A. H. Evans undertook the editorship of parts 10–12 (pp. 57–76). Then Bennett described the eight grass-leaved species, from no. 30 downwards, pp. 77–91, and it must be said that he did not do himself justice. One felt that he might have made the description more vivid, the comital distribution more detailed, and the synonymy more complete—for instance, *P. rustics*, here at last correctly identified and described, is only cited for Anglesey, and Orkney with a query; the locality Llyn Coron should have been inserted. It has since been found in Orkney and Shetland. His *P. vaginatus* is not the plant of Tureczaninow, but a hybrid of *H. megalocarpa* and *P. sectinatus*, and is the *× P. suecica* of Hagström. But it was a great advantage that the partly completed work of Fryer should have had one so competent as Bennett to write the concluding portion; one only regrets that he did not give us more details from his store of knowledge.

My own personal acquaintance with him began in 1876, when I gave him the locality for *Seneio paalouus* in Norfolk, where a non-botanical friend of mine (Mr. C. Jacks of Northampton) had pointed it out to me. From that time onwards to this last month we had been in close correspondence, as the large pile of letters before me testifies. We did not always see eye to eye, especially in nomenclatural matters, since he would not have rejected the old Linnaean names for others more precisely correct—for instance, he never could be induced to give up *P. heterophyllus* for the Linnaean *alpinus*. It is curious that one of his last communications should be on the plant I had called *× P. Palomieri* from Odisha, which my friend Miss Palmer and I gathered in the canal there. When fresh it has a distinct *prelongus* look, but we became convinced it was a well-marked variety of *alpinus*, and he suggested that I should name it var. Palomieri.

At one time he had some financial trouble, and it was a pleasure to send him from our members of the British Exchange Club a substantial sum, the more pleasing as it was so freely given, with very kindly feelings expressed by the donors. For many years he had been our valued “Expert,” and as an Exchange Club we shall sadly miss him. He was one of our four corresponding members.

When I first knew him he was thin and energetic, with an intellectual face. He was perhaps a little dogmatic, and somewhat captious under criticism, but he really relished hunting up a difficult subject to aid a correspondent, and freely gave to others from his great store of knowledge. It was a great shock to me when I called to see him to find that a few hours before he had passed away from heart failure, after an attack of influenza. The Linnean Society made him an A.L.S. in 1910 (he had been a Fellow of the Society from 1881–1909), and Fryer named *×Potamogeton Bennettii*, a rare hybrid pond-plant, in his honour. Professor Graebner availed himself of his assistance in compiling his account of the pond-plants for the *Synopsis der Mittel-Europäisch. Flora*. He was responsible for the list of *Potamogeton* in two or three editions of the *London*
THREE NEW MICHELIAS FROM INDO-CHINA.

By J. E. Dandy, M.A., F.L.S.

The three new species described below are all natives of French Indo-China, and are additions to a group of species which already contains one Indo-Chinese representative in *Michelia Balassa* (Aug. DC.) Dandy (known from Tongking and Hainan), together with two Chinese members in *M. Levelliana* Dandy and *M. Martini* (Lévêillé) Dandy. This group is characterized by having the perianth dicyclic (normally comprising 6 tepals in two whors of 3, but occasionally consisting of only 4 tepals in two whors of 2), the stigmas completely free from the petiole, and the connective distinctly—but sometimes very shortly—produced beyond the anther-loculi. The Indo-Chinese species of the group may be distinguished by means of the following key:

1. Branchlets and petioles at first brown-tomentose; lamina of the leaves more or less densely brown-pubescent beneath, especially on the midrib and prominent lateral nerves; *gymnema brown-tomentose* .................................................. *M. Balassa*.

2. Branchlets and petioles glabrous or at first puberulous; lamina of the leaves glabrous or at first appressed-puberulous towards the midrib and along the margins; *gymnema appressed-tomentellous or puberulous at least on the stipe.*

   - Ovules about 11-12 in each carpel; lamina with lateral nerves prominent beneath; carpals about 12-18. *Ovules 4-8 in each carpel; lamina with lateral nerves inconspicuous or not very prominent beneath; carpels numerous.*
   - *Gymnema appressed-tomentellous; ovules 6-8* .................................. *M. chapensis*.
   - *Gymnema minutely puberulous on the stipe and towards the base of the carpels; ovules 4* .................................. *M. masticata*.
   - *M. constricta*.

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**Michelia masticata** Dandy, sp. nov.

*Arb. 10-18 m. alta; indumentum griseum, appressum; ramuli glabri.*

*Foliiorum lamina elliptica vel oblongo-ovata vel obovato-elliptica vel obovato-oblonga, basi obtusa vel cuneata, apice breviter acuminata vel rotundata, usque ad 20 cm. longa et 9-5 cm. lata, plus minusve coriacea, supra glabra vel primo ad costam marginemque puberula, subutus glabra vel primo secus marginem puberula in sicec laxi reticulata, nervis lateralisibus utrinsecus c. 10-16 subitus prominentibus; petioliis ceciatrisatis, usque ad 2 cm. longum, glaber vel juvenilis ad canaliuli margins puberulus; stipula a petiolo libere, extus tomentose vel tomentellae.*

*Albastrum primo in bracteis spatheidiose 3-4 extus tomentosis side duce cliudici inclusum; pedunculis floris tomentosis, fructifer crassus c. 1-2 cm. longus.*

*Perrinianthus vicicicicum, 3-merum, tepalis 6 subtootobili glabri.*

*Gymnema masticata; carpella c. 12-18, libera; ovula c. 11-12.*

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**Michelia chapensis** Dandy, sp. nov.

*Arb. 20 m. alta; indumentum fulvum vel griseum, appressum; ramuli glabri vel juveniles puberuli.*

*Foliiorum lamina ovata vel obovato-elliptica, basi cuneata vel late cuneata, apice acuminata vel subacuminata, usque ad c. 15 cm. longa et 6-5 cm. lata, coriacea vel tenuiter coriacea, utrinque glabra, subutus in siccus laxe sed vix conspicue reticulata, nervis lateralisibus utrinsecus c. 10-15, subitus vix prominentibus; petioliis ceciatrisatis, gracilis, usque ad 2 cm. longus, glaber vel juvenilis basin versus minute puberulus; stipula a petiolo libere, extus saltum juvenis tomentelle vel puberula.*

*Flora in foliorum superiorem axillas dispositi; albastrum primo in bracteis spatheidiosi 3-4 extus tomentellus vel puberuli deincepse decidus inclusum; pedunculis mediocrier crassus, c. 0-6-0-8 cm. longus, tomentellus sed interum basis versus glabrescens. Perrinianthus vicicicicum, 3-merum, tepalis 6 subtorboili glabri vel extus tenui basi puberuli, 3 exterioribus oblanegeoblongis c. 3-5 cm. longis.*

*Samaica c. 14-22 mm. longa; connectivum ultra anthere loculos in appendicem brevem acutum productum.*

*Gymnema tomentellum, stipite excalo anguste cylindricum; carpella numerosissima, libera; ovula 6-8.*

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**Michelia constricta** Dandy, sp. nov.

*Ramuli glabri.*

*Foliiorum lamina elliptica vel oblongo-elliptica, basi obtusa vel cuneata, apice plus minusve acuminata, usque ad c. 11 cm. longa et 5-5 cm. lata, chartacea, utrinque glabra in siccus laxe reticulata, nervis lateralisibus utrinsecus c. 12-14 inconspicue; petioliis ceciatrisatis, gracilis, usque ad c. 2 cm. longum, glaber vel juvenilis basin versus puberulis; stipula a petiolo libere, glaber vel extus minute appresso-rubo-pubescentes.*

*Albastrum ellipsioidicum, primo in bracteis spatheidiose 3 deinceps decidu inclusum; bracteae glabrae vel extus minute appresso-rubo-pubescentes, 2 extiores basi manifeste constrictae; pedunculis modice gracilis, c. 1 cm. longus, glaber vel rufo-pubescentes.*

*Perrinianthus vicicicicum, 3-merum, tepalis 6 substribili glabri.*

*Staminum connectivum ultra antherae loculos in appendicem brevem acutum productum.*

*Gymnema in stipite et ad carpellorum basin minute bruneo-pubescentium; carpella numerosa, libera; ovula 4.*

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*Hab. Annam: prov. Quang-tri, in montibus Dong-cho, alt. 500-
NEW BRITISH SPECIES OF EUPHRASIA.

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

At the General Meeting of the Linnean Society on the 2nd May, 1920, a paper, "A Revision of the British Euphrasias," was read in title. A revised arrangement of the British forms, and of the groups under which they fall, is proposed in this paper, but as some time must necessarily elapse before its publication, it is thought that it will be found convenient for abridged diagnoses of the new species which it includes (six in number) to be printed in the Journal of Botany. They are as follows:

**Euphrasia rotundifolia**, sp. nov. *E. latifolia* auct. angl. (ex parte) non aliorum.

This plant has been collected at Melvich by Marshall and others in mixture with the following species.

**Euphrasia Marshallii**, sp. nov. *E. latifolia* auct. angl. (ex parte) non aliorum.

Most of the British material hitherto identified with *E. latifolia* Pursh belongs here.

**Euphrasia canebria**, sp. nov.

This diminutive plant has not hitherto been distinguished.

**Euphrasia Pseudo-Kernerii**, sp. nov. *E. Kernerii* auct. angl. non Wettstein.


This is the British plant identified with *E. Kernerii* Wettst. of Central Europe.

**Euphrasia rivularis**, sp. nov.

This elegant little plant appears to have been hitherto overlooked.

**Euphrasia anglica**, sp. nov. *E. Rostkoviana* auct. angl. (pro maj. parte), non Hayne nec Wettstein.

This is the widely distributed glandular English Eyebright that has been named *E. Rostkoviana* Hayne.

ALABAstra DIVERSa.—PART XXXVI.*

By S. Moore.

(Continued from Journ. Bot. 1926, p. 48.)

1. **SOME NEW OR RARE AFRICAN ACANTHACEAE.**

MONACHOCILAMYs.

This is the generic name given by J. G. Baker (Journ. Linn. Soc. (Bot.) xx. 217, pl. 20 (1888)) to a Madagascar plant with affinities with Mendecia and Thunbergia, the subsequent discovery of its drupaceous and not capsular fruit pointing to its closer relation to the former.

Its chief characters are: flowers in axillary fascicles, each flower within two large bracteoles; calyx a shallow almost entire cup; subregular corolla with lobes contorted in aestivation; 4 stamens.

* Types in the British Museum Herbarium.
with two cells opening each by a terminal pore and a one-celled ovary with two collateral ovules.

Ten years afterwards Gilg (Engl. Bot. Jahrb. xvii. 111) published descriptions of two tropical African species, for the reception of which he proposed the genus *Afromendania*, which Lindau (Engl. & Prantl, Nat. Pflanzenfam. iv. t. 3) differentiates from *Monochoclamys* mainly on its one-celled ovary, the Madagascar plant (M. flagellaris Bal.), according to him having, at least in its earliest stage, a two-celled ovary with two ovules in each cell. This is a mistake, for the ovary in question at all stages is one-celled with two ovules, as stated by Baker. But the figure in Journ. Linn. Soc. shows this to be incorrect: the true structure is as shown by Lindau (l. c. 290, f. 115 c) for his *Afromendania Gilgiana*, where the one-celled ovary is seen to contain a couple of collateral ovules.

Baker does not mention, neither does his figure give any indication of, a staminode. Lindau, in characterising his group Mendonioideae, in which he includes the two genera in question (l. c. 289), says the flowers of both are without a staminode; but on p. 291 he credits *Monochoclamys* with one ("Staminod vorhanden"), while nothing is said about a staminode for the other. In Hook. i. c. Pl. 2426 and 2427 two species of *Afromendania* (A. Lindaviana Gilg and A. phytochonoides Gilg) are figured, the flower in each case being represented with a staminode. Moreover, a careful examination of all *Afromendania* material available at the Museum has revealed the presence of this organ and the same is the case with *M. flagellaris* * and M. Boivini Bals., though the staminode must be carefully looked for in the former of these two. *M. Boivini*, it may be added, is represented at the Museum by Hildebrandt, 8278, from Nos. Bé, which answers Baillon's incomplete description in Bull. Soc. Linn. Paris, ii. 926, having acute (not rotundate) leaves, flowers solitary (not fascicled), larger bracteoles than the other, each with two very prominent gibbosities, and the flowers markedly larger in all respects.

The fruit of both genera is now known to be drupaceous, and seeing that every other character of generic importance, including the pollen, is similar in both, there is no reason for retaining *Afromendania* as distinct.

The species may be arranged as follows:

**§Monochoclamys**: bracteoles glabrous.

Flowers solitary in the leaf-axils

1. M. Boivini Bals.

Leaves membranaceous, rotundate at apex.

2. M. flagellaris Bal.

Leaves coriaceous, acuminate

3. M. Lindaviana, comb. nov.

4. M. floribunda, comb. nov.

(A. floribunda Burkill.)

**§Dartchoclamys**: bracteoles hairy.

Flowers solitary in the leaf-axils

5. M. Cowani, comb. nov.

(A. Cowani S. Moore.)*

* It is mentioned by Radkofer in Bremen Abhandl. viii. 467.

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**Thunbergia** (S. Lu-Thunbergia) Javiti, sp. nov. *Herbecea, caule decumbente gracili scabriusculo; foliis (summis solummodo visis) parvulis brevijulioletatis ovatis obtusis basi rotundatis 6-nervibus embriusculis margine scabriusculis ciliolatis; pedunculis solitariis foliis longioribus scabriusculis; bracteolis oblongo-ovatis obtusis basi 6-nervibus subprominenter reticulato-nervosis membranaceis pressetim in nervibus scabriusculo-puberulis; colysis dentibus circa 12 lineariae elongolatibus pubescentibus; corollis verisimilem luteo tubo ex bracteola eminente juxta basis subito dilatato inde infundibulari-cylindrico lobis tubo brevisuberoso ovatis retilibus; antherarum connexivo obtusdoblo loculis cristato-barbatis loco uno incerto-calcarato; ovario (uti stylus) glabro; stigmatibus labio antico subreflexo formis labio postico obtovato.


Leaves only at most 2 cm. × 12 mm., and usually still smaller; petals 2–3 mm. long. Peduncles up to nearly 3 mm. long, slender. Bracteoles 18–7 mm. Teeth of hairy calyx 2–5 mm. long. Corolla-tube 2–5 mm. wide at the base, quickly enlarged and 8 mm. wide at the throat; lobes 12 mm. long. Filaments stout; longer pair 7 mm., shorter pair 5–6 mm. long. Anthers barely 4 mm. long. Style 5 mm. long, lower lip of stigma 2 mm., upper lip 1–25 mm. across.

A very distinct species apparently not closely related to any other. The very small leaves are peculiar. The colour of the flowers would seem to be pale yellow, but may perhaps be white.

**Thunbergia** (S. Lu-Thunbergia) trinervis, sp. nov. *Herbecea, folio glabro, caule erecto circa 8 dm. alt. infere simplici tetragonio pluriserrato pallide viridi ramos umbellatos emittente; foliis sessilibus linearibus acutis marginibus angustissimae cartilagineis perspicue trinervibus; floribus medio-brevioribus in axillis solitariis vel binis pedunculis bracteolis semper aquantibus ins commonibus; bracteolis ovatis obtusis acutis sparse albo-lepidoideis trinervibus; corollis calycis brevisuberoso denticulato; antherarum connexivo incerto-calcarato loculis abaxialibus perspicue abaxialibus; ovario (uti stylus) glabro; stigmatibus labio antico subreflexo formis labio postico obtovato.

Hab. Belgian Congo, Elisabethville; F. A. Rogers, 10,864.
Leaves mostly 7–9 cm long, 4–5 mm wide, bright green when dry. Peduncles 2–2.5 cm long, glabrous. Bracteoles 2.5–1.5 cm long. Disk very prominent. Calyx 1.25 mm long. Corolla-tube yellow, with conspicuous nectar, 3.7 cm long; at the bottom 8 mm broad, suddenly contracted to 3 mm in the upper part 14 mm broad; lobes purple, 1 cm long. Anthers of the anterior stamen about 3 mm long on thick filaments 12 mm long. Styles glabrous, 18 mm long. Stigma slightly pilose outside, the mouth 5 mm across.

Allied to several species, such as *stellarioides*, *graminifolia*, *stomphylla*, &c. Besides floral peculiarities, the plant is at once recognisable by the long and narrow very conspicuously 3-nerved leaves.

Var. angustifolia a typo discranniis ob ramos oppositopubentes foliaque angustiora (5–6 cm × 2–2.5 mm.) pariter vestiti. Hab. Belgian Congo, Kambwe Mine; Buru–Dayy, 18,029.

*Staurogyne congoensis*, sp. nov. Herba ascendentem ramosam, ramis quadrangularibus subdistantibus foliosis glanduloso-pubescentibus; foliis petiolaribus oblongo-ovatis obtusis vel obtusissimis basi cuneatis flave membranaceis utrinque scabriusculis costisque pubescentibus; floribus in spicis axillaris vel terminalibus foliis subaequilongis glandulosis digastis; bracteis anguste oblongis obtusis uti bracteata paullu angustiores calycis segmenta glanduloso-hispidulis; calycis segmentis linearibus acuminatis excluso segmento postico longiore lineari-oblongo obtuso; corollae calyce paullu brevioris tubo exuto minute glanduloso hispidulis, staminibus subinclusis filamentis sursum puberulis; capsula calyce breviori ovoideo-oblonga obtusa glabra.

Hab. Portuguese Congo, Lufu, Maiombo in a forest- cleared situation at M'bulu hill, R. N'Zanza, Gossweiler, 7860.

Obviously a somewhat straggling plant with longish internodes.

Leaves mostly 6–8 × 3–4.5 cm, drying grey-green; petioles glandulose pubescent, ±1.5 cm long. Spikes about 6 × 1.2 cm, drying dark brown. Bracts 5 × 2 mm; bracteoles 7–9 × 1.5 mm; hind calyx-segment about 1 cm long and nearly 2 mm broad; other segments 5–7 mm long. Corolla white; tube somewhat wrinkled outside, enlarged in the upper half, nearly 5 mm long; lobes about 2 mm long. Pollen normal. Capsule pale brown, 3 mm long, with many minute seeds.

Till a few years back this genus was not supposed to occur in Africa. In 1906, however, Hallier (Bull. Herb. Boiss. 1903, 201) referred to *Staurogyne* the Camerons plant considered by Engler to belong to Scrophulariaceae, and described by him as *Zenkereina kameruensis*. Although Clarke is said (Fl. Trop. Afr. iv. sec. 2, 262) to have considered this as belonging to an undescribed genus of Acanthaceae near *Hemigraphis*, there seems to be no reason to doubt the correctness of Hallier's view, for, besides the structural details,

the pollen, on which Clarke seems to have founded his opinion, while not in any way resembling that of *Hemigraphis*, agrees with that of *Neurogyne*. Worthy of notice is the fact that, whereas *S. kameresius* has crowded spikes with broadish bracts and bracteoles, this, with its laxer and narrower spikes, has the narrow bracts and bracteoles characteristic of Indian and Malayan species.

*Hyrophila subquadrangularis* Lindau in Engl. Bot. Jahrb. xxiv. 314 was removed by Clarke (Fl. Trop. Afr. v. 79) to *Dyschoriste* as *D. subquadrangularis* Clarke. Lindau founded the species on Buchwald's 94 in the British Museum, communicated from Berlin, and examination shows it to be almost certainly one of the forms of *D. depressa* Nees.

Another of Lindau's species, viz. *Hygrophaella gymbalensis* (Engl. Bot. Jahrb. i. vii. 20) is a *Dyschoriste* as understood in this country, and becomes *D. kyimbaldensis*, comb. nov. On the other hand, *Hygrophaella sessilifolia* Lindau and *H. affinis* Lindau in Baum Kun- Zamb. Exped. 375 and 376 have all the characters of *Dicperma* Clarke and become respectively *D. sessilifolium*, comb. nov., and *D. affine*, comb. nov.

*Mellera parvifolia* Lindau in Engl. Bot. Jahrb. xxiv. 314 was not seen by Clarke. He says of it (Fl. Trop. Afr. v. 62): "Lindau says capsule unknown and does not mention the ovules, but says he has no doubt about the genus of this plant. The corolla appears small for *Mellera*." He would have had more grounds for doubting the genus to which the plant belongs had he given due weight to Lindau's statement (l.c.) that the calyx-segments are united up to the middle, a condition never met with in *Mellera*, and that the ovary is only 2 mm long. Among Mr. Migeod's Tanganyika Territory plants there is a specimen (no. 261 b) with small flowers, calyx as of *M. parvifolia*, corolla except for its size extraordinarily like that of a *Mellera* to the point of having the strong deflexed hairs on the lower lip of that genus, and ovary with only one ovule in each of its cells, this answer being so small that there is no room for more. This answers Lindau's description of *M. parvifolia* thoroughly, and leaves no room for doubt that the plant is a *Disperma*. A second Migeod specimen (no. 263) has leaves much larger than those of the other, but is identical with it in all other respects. These leaves are about the same size as those of *Disperma dentatum* Clarke, which there seems no reason to doubt is conspecific with *M. parvifolia*. There being already a *Disperma parvifolium* Clarke founded on the earlier *Hygrophaella parvifolia* Lindau, Lindau's trivial must yield to that of Clarke.

*Crocosandra angolensis*, sp. nov. *Fruticulus parvus; caulibus abbreviatis sursum foliosis ex rhizomate torulo copioso radicigeno catostratis; foliis paucis approximatis sessilibus oblongo-ovatis obtusis vel obtusissimis basi gradatim attenuatis flave membranaceis pag.
utrape sebaeens; spieis terminalibus foliis subequilongis inter folia sessilibus vel subsessilibus cylindriskis; bracteis acuta imbricatis oblongo-obovatis apice breviter spinulo-acuminatis margine disdido abaxiali spinulo-dentatis dorsi prominenter 5-nervosis membranaceis subtiliter pubescentibus viridibus; bracteolis lanceolatissimis acuminatis quam calyx longioribus pubescentibus; calycis segmento postico 2-nervi ovato apice bidenticulato ciliolatoque segmentis reliquis paulo angustioribus apice acutis; corolla alba tubo bracteis excedente vel subsumate sumpse pubescente stamina prope apicem gerente; ovario oblongo sumpse attenuato glabro.

*Hab.* Angola, in shady situations in mixed woods between the rivulet Cuanza and R. Cuive; Goosweiler, 2897.

Plant when in flower only 10 cm. high. Stem bearing the marks of fallen leaves almost to its base. Leaves up to 8 x 3 cm., but often smaller, e.g., 5 x 2 cm. or even less. Spikes up to 7 cm. long and 1-5 to nearly 2 cm. wide. Bracts up to 2.5 x 1-2 cm. Bracteoles 14 mm., calyx-segments 6-7 mm. long. Corolla-tube 2-2.5 cm. long; slightly narrowed in the upper half; limb 12 mm. long. Anthers obvate or slightly apiculate, puberulous, 1.5 mm. long. Ovary 3-5 mm. long.

Differing from *C. Greenstockii* S. Moore in the sessile spikes with narrower less prominently toothed bracts, the hinder segment of the calyx not ending in 2 spinulose teeth and the other segments not spinulose-acuminated and the white, not red, corollas. Apparently the western representative of *C. Greenstockii*.

Mr. Goosweiler notes this as "a striking plant on account of the brilliant large white flowers."

*Croccandra crocea*, sp. nov. *Herba perennis hispithamae; caulc erecto subsimpli distanter folioso tereti minute pubescente; foliis in petiolum gradatim angustatis membranaceis in nervis puberulis paginaque sup. pilis brevibus appressis subparsim obisitis; spieis aciculatis cylindris pedunculis minute pubescentibus foliis sepe excedentibus fulmis; bracteis late oblongis apice sepsimse breviter spinuloso-dentatis dente intermedio lateralis majori membranaceis dorsi glanduloso-pubescentibus margine ciliolato ciliatis; bracteolae bracteae circa aquilungis linearibus pubescentibus; calycis segmento postico binervi oblongo-ovato apice bifidato segmentis ceteris lanceolatissimis acuminitis obtusis ciliatis; corolla crocea ex bracteis eminentibus tubo pubescenti quam limbus longiore; ovario oblongo apice pubescente exemplum glabro.

*Hab.* Angola, in the shade of trees near Sanga, R. Cuve, Amboim; Goosweiler, 4468.

Leaves from 6 to nearly 10 cm. long and 2-3 cm. broad (uppermost much smaller) running down into the 2-6 cm. long petiole. Peduncles 10-12 cm. long (of the uppermost spike only 4 cm.). Spikes up to 5 x 1-3 cm. Bracts 14 x 4 mm.; bracteoles 13-14 mm. long. Hinder segment of calyx 10 mm. long, its narrowly triangular teeth 2-5 mm. long; front segments 10-5 mm. lateral 8-5 mm. long. Corolla-tube 22 mm., limb 15 mm. long. Ovary 8 mm. long.

**ALABASTRA DIVERSA**

Apparently nearest *C. nilotica* Oliv., but, besides the long-stalked leaves, the more slender spikes with narrower usually 3-dentate bracts, the short teeth of the posticus calyx-segment and the saffron corolla yield further points of difference.

*(To be continued.)*

**MARINE ALGÆ OF THE COAST OF WALES.**

By T. KENNETH REES, M.Sc.

(University College of Swansea.)

From time to time during the last two hundred and fifty years there have been, either resident in Wales or visiting its shores, a number of Naturalists and Botanists who have paid attention to its marine flora. This list of marine alge is compiled from their published records, with some additions of my own (see Journ. Linnsean Society (Bot.) lxxvi. 293-4, 1926).

It is hoped that it will prove useful in three directions. In the first place exact localities are given, where possible, in place of mere county records. It should, therefore, not be difficult to check the records of the past, the accuracy of which, owing to frequent changes in algalogical nomenclature during the past 100 years, must be called into question. In the second place, in view of specialisation in recent times, the list may be helpful to algologists as showing the occurrence and distribution of species along the coast of Wales. Thirdly, it is hoped that this list may form a basis upon which, by periodic revision and correction by competent algologists, a complete classified list may be drawn up.

This list follows the classification adopted by Batters in his *Catalogue of the British Marine Algae*, 1902, and contains 108 additional records, 81 of which (chiefly in the Phaeophyceae) are from my own observation, made whilst studying the ecology of the group; these include six new Welsh records.

The following abbreviations are used for the more well-known collectors, details of whose visits to Wales were given in the paper mentioned above:


**CYANOPHYCÉE.**

*Gloeocapsa crepidium* Thur. Puffin Island (H. G.); Rhyl, Point of Ayr (B.).

*Dermocarpa Schouboe* Born. Puffin Island (H. G.).

Pleurocapsa amethystea Rosenv. Puffin Island (B.).

Hyella cepsita Born. & Flah. f. nitida Batt. Coast of Wales (B.).

Spirulina major Kütz. Point of Ayr (B.).

S. subsalsa Oersted. Dolgellau (R.); Menai Bridge (H. G.).

Phormidium fragile Gom. Point of Ayr (B.).

P. tenue Gom. Point of Ayr (B.).

P. poppyraceum Gom. Bangor (D.); Anglesey (H. G.); Anglesey
Point of Ayr (B.).


f. limicola Gom. Point of Ayr (B.).

f. natans Gom. Point of Ayr (B.).

f. symplocoides Gom. Point of Ayr (B.).

f. aeruginosa Gom. Point of Ayr (B.).

f. spectabilis Gom. Point of Ayr (B.).

L. majuscula Harv. Menai Bridge (R.); Puffin Island (H. G.).

L. semiplena J. Ag. Puffin Island (H. G.); Point of Ayr (B.).


Symplaca hydroides Kütz. Puffin Island (H. G.); Puffin Island
(B.).

S. atlantica Gom. Ferryside (Nordstedt).

Microcoleus chthonoplastes Thur. Wales (R.); Cadnant (Holmes);
Dolgellau, Point of Ayr (B.); Menai Bridge (G.).

Colothrix confluens Ag. Anglesey (Dav.); Anglesey, Puffin
Island (H. G.).

C. scopulum Ag. Puffin Island (H. G.); Penmon, Menai Bridge
(G.).

C. pulvinata Ag. Puffin Island (H. G.); Cadnant, Beaumaris (G.).

C. aeruginosa Thur. Llanfan-loch (D.).


Rivularia Biosphita Menegh. Cadnant, Menai Bridge (G.);
Point of Ayr (B.).

R. atro Roth. Anglesey (Dav.); Anglesey (H. G.); Llangwyfan
Griffith's-Crossing (G.).

R. nitida Ag. Barmouth (R.); Cadnant, Menai Bridge (G.).

Anabaena variabilis Kütz. Dolgellau (R.).

A. torulosa Lagerh. Menai Bridge, Barmouth, Dolgellau (R.);
Anglesey (H. G.); Point of Ayr (B.).

Nodularia Harrygona Thur. Point of Ayr (B.); Anglesey (H. G.).

N. spumigena Mert. f. litorea Born. & Flah. Dolgellau (R.);
Barmouth (Salwey).
C. linum Kütz. Anglesey (D.); Puffin Island (H. G.); Cemlyn
Bay, Valley (G.).
C. crassa Kütz. Anglesey (Dav.).
C. conrae Kütz. Anglesey (D. & Br.); Laugharne, Ishmael's Ferry,
Carmarthenshire coast (Young); Puffin Island (H. G.); Llangyfan,
Griffith's Crossing, Gorad Goch (G.).
C. Melanogonium Kütz. Bracelet Bay, Mumbles (Gutch); Puffin
Island (H. G.); Holyhead, Menai Straits (G.); Aberystwyth
(N.U.T.).
Rhizoclonium riparium Harv. Puffin Island (H. G.); Penmon,
Gorad Goch, Beaumaris (G.).
B. implicate Kütz. Mumbles (Gutch).
Cladophora pacifica Kütz. Anglesey (Dav.); Aberffraw (R.);
Caswell Bay (Gutch); Puffin Island (H. G.); Llangyfan
(G.); Aberystwyth (N.U.T.).
C. Hutchinsiae Harv. Griffith's Crossing, Llangyfan (G.); Anglesey
(G.).
-f. distans Kütz. Swansea (Dill.); Anglesey (Dav.); Aberffraw
(R.).
C. rupestris Kütz. Anglesey (D.); Anglesey (Dav.); Mumbles
(Gutch); Aberystwyth (M.); Puffin Island (H. G.); Anglesey
and Carmarvonshire (G.).
C. utriculosa Kütz. Swansea (Dill.); Anglesey (Dav.); Anglesey,
Puffin Island (H. G.); Aberffraw, Menai Straits, S.W. Anglesey
(G.).
C. sericea Kütz. Swansea (Dill.).
C. flexuosus Harv. Anglesey, Puffin Island (H. G.); Llanfairis-
gaer (G.).
C. albida Kütz. Puffin Island (H. G.); Aberystwyth (N.U.T.).
C. conrae Kütz. Aberystwyth (M.); Puffin Island (H. G.); Aberffraw,
Rhosneigr (G.).
C. frigida Kütz. Harlech (Evans); Anglesey (Dav.); Anglesey,
Puffin Island (H. G.).
C. uncialis Kütz. Aberystwyth (R.); Puffin Island (H. G.).
C. lancea Kütz. Anglesey (Dav.); Anglesey (D.); Mumbles (Gutch);
Anglesey, Puffin Island (H. G.); Port Dinorwic, Gorad Goch
(G.).
Bryopsis hypnoides Lamour. Puffin Island (H. G.); Aberystwyth
(N.U.T.).
B. plumosa Ag. Swansea (Dill.); Mumbles, Bracelet Bay (Gutch);
Anglesey, Puffin Island (H. G.); Anglesey and Carmarvon-
shire (G.).

MARINE ALGAE OF THE COAST OF WALES

Lunaria Thurvetii Woron. Holyhead (R.); Holyhead (G.).
L. litorea Bang & Ag. Barmouth Ferry (Nordstadt); Ferryside,
Carm. (B.). The latter record is doubtful, for I can find
no trace of a visit paid to South Wales by Batters; it is,
however, included in his list of 1962.
Oedogonium tomentosum Stackh. Benger (D.); Port Eynon (Rees);
recorded by Dillwyn as appearing amongst "rejectamenta"
left on the beach as the tide recedes.

(Obe continued.)

OBITUARIES.

GIACOMO BRESADOLA

(1847-1929)

The eminent mycologist G. Bresadola died at Trento on June 9th
last. Born at Ortegr on February 14th, 1847, he began training for
engineering at the age of 12, but after four years he broke away
from this in chagrin at being only second in his class examination and
took up study for the church, soon afterwards entering the episcopal
seminary at Trento. He reached high ecclesiastical office, being
Administrator of the Metropolitan capital from 1887 to 1910.

The Abbé Bresadola was a true naturalist, and beginning with
the study of flowering-plants was soon persuaded to turn his atten-
tion to cryptograms. According to his own story when on one of his
natural history excursions about Magræa, where he was priest from
1878 to 1883, he met some Capuchin monks gathering fungi for the
kitchen. They welcomed him when he wished to join them on
learning that they were interested in fungi, apart from their edible
qualities. Soon he outstripped his teachers, for their identifications
were somewhat casual and did not agree with the descriptions given
in the mycological works which he acquired. Presumably one of
these was Quelet's Flore Micologique, for he became a correspondent
of that famous French mycologist. After three years of active study
he began the publication of his Fungi Tridentini, which appeared in
fourteen fascicules from 1881 to 1900. This, which contains 217 plates
and Latin text, is one of the classics of mycology. He also wrote a
popular illustrated work Il Funghi mangerecci e velenosi (1899),
which had a good sale and reached a second edition in 1906. From
1890 he studied exotic fungi, beginning with a collection from the
Cameroons and put out a steady stream of papers until his death.

Bresadola's reputation was built up on careful work. It is,
perhaps, not going too far to say that he and Patouillard had the
greatest influence on the study of the larger fungi in post-Friesian
days, revolutionising our ideas by their grasp of the essentials of
microscopic details. It is astonishing to realise that Bresadola's work
was accomplished away from facilities, but he was helped by the loan
of specimens from many of the principal European herbaria. He
was thus enabled to gain a clear idea of many old species, and his
work was such that although he described about a thousand new species he sank about a thousand others, and in doing so managed to clear up many difficulties of determination. His main service to mycology has been with the larger species, but he had a sound knowledge of microfungi. In 1925 I had the great pleasure of visiting Brasada in the hills above Trento, where he had gone for the summer. Our time together was unfortunately short, but I was very much attracted by his personality, and when I left was as much an admirer of him as a man as I already was of him as a mycologist. The table in his small bed-sitting room was covered with fungi he had just gathered; these were mostly common species of the neighbourhood which it pleased him to examine again.

On the approach of his 80th birthday Italian botanists, desiring to pay tribute to the man and his work, arranged for the publication of his original drawings, which number about a thousand. The *Iconographia Mycologica*, of which nine fascicles of fifty plates have already appeared, will be completed in his memory.—J. Ramsbottom.

**Very Rev. David Paul**

(1843–1929).

The Very Rev. Dr. David Paul, whose death occurred on July 12, was a man of great distinction both in the ecclesiastical and the botanical world. He was born in Aberdeenshire in 1843, and had nearly attained the ripe age of 84 years. After a distinguished University career, he was ordained in 1869 to a church in Roxburghshire, subsequently being called to the Robertson Memorial Parish, Edinburgh. He was appointed Principal Clerk of the General Assembly of the Church of Scotland 1912–26 and Moderator in 1916. He received the degrees of L.L.D. (Aberdeen) 1894 and D.D. (Edinburgh) 1915. He took a great interest in botany, and served for some years as Foreign Secretary of the Botanical Society of Edinburgh and as President in 1898–1901; he was also President of the Scottish Alpine Botanical Club, 1923. He joined the Linnean Society in 1926. His chief interest lay in the study of fungi, and he served as President of the British Mycological Society in 1918 and of the Cryptogamic Society of Scotland in 1922. His botanical papers were mostly contributed to the Berwickshire Naturalists' Club and to the Botanical Society of Edinburgh. His presidential address to the Mycological Society (Trans. Mycol. Soc. vi. 1920) deals with the “Earlier Study of Fungi in Britain,” and not only shows his practical knowledge of the Hymenomycetes, but also reveals the power and charm of his highly cultured and scholastic mind.

**Short Notes**

**Common Names of British Plant Diseases.**—The last issue of the *Transactions of the British Mycological Society*, xiv. pts. i. & ii. pp. 140–77, contains a list which has been compiled by the Plant Pathology Sub-Committee of the Society with a view to standardizing the popular nomenclature of the various diseases that affect cultivated plants in the British Isles. The list is arranged in two parallel columns under the name of the host; on the left the common name recommended for the disease, on the right the scientific name of the parasite. As many of the diseases are also prevalent in foreign countries, the common names applied to them in certain of those countries have been indicated. The host-plants are arranged in groups—Cereals, Pasture and Forage Crops &c. An index of hosts facilitates reference.

**Range of Effective Spore-Dispersion.**—For the past nine years I have had a number of plants of *Sempervivum* growing on the roof of a shed in a garden at Richmond, Surrey. Amongst these are three clumps of *S. tectorum* and one of *S. fimbriatum*. In a couple of pots on the shed during the same period there have been plants of these species heavily infected with the rust *Endophyllum Sempervivum*, which each spring has produced millions of spores. The plants have not been interfered with in any way except that occasionally a hose has been turned on to the shed. This year two rustettes of *S. tectorum* in one of the clumps have shown infection on all their leaves. The infection must have occurred last year, and it thus took eight years for the fungus to spread about two feet to the nearest uninfected host; the top of the pot is an inch or two above the level of the infected rosettes. (The distance between the infected and healthy *S. fimbriatum* is about a foot.) When the great distances over which rust-spores are known to travel are considered, the above facts seem worthy of record without attempting to give any explanation of the surprising failure attending such a terrific bombardment of spores.—J. Ramsbottom.

**Rubus glaberous Rog. & Marsh.**—This form was one which I distributed last Christmas to the Botanical Exchange Club. In a note which accompanied the specimens, I said that Dr. Druce, in the last edition of the *List of British Plants*, identifies *R. glaberous* with *R. monachus* G. Jensen, but I did not know his authority for doing so. Since then I have discovered in my herbarium a sheet of *R. monachus*, sent to Rogers from the original (only known) locality in Slesvig by Friderichen; but this occurred too late (as Dr. Druce told me in conversation) for the Report. It is necessary, therefore, to point out that *R. monachus* G. Jensen and *R. glaberous* Rog. & Marsh, are two distinct forms. The former is much more like *R. fucus* Weih & Ness, and, indeed, was compared by Gelet with Rogers's *sitarus*, though not identical with it. *R. glaberous* is, as Rogers pointed out, a species belonging to the roacea group. It is a great pity that the false identification of *monachus* and *glaberous* has got into print.—H. J. Riddelsdell.
have been a land of refuge for numerous species, and the very high proportion of endemics is no doubt connected with this, since there is no strong evidence of post-glacial climatic changes.

Chapter IV. (77-98), "Duration and Life-forms," contains tables (number of species in each family) based on Raunkier's and the author's extended classifications. The "spectra" of various districts are compared and the categories are analysed.

Chapter V. (99-103), "Flowering Periods," is based on very meagre data. Cultivation at Kew indicates that species grown there come into flower a few weeks later, but remain in flower longer than at home.

Chapter VI. (104-109), "Habitat Classification," contains similar tables for sixteen types of habitat. Analysis shows that 2127 species inhabit stony and dry places, 1691 grassy places, 1140 dry rocks and walls, 1051 bushwood, and only 844 the woods and forests which have now been much destroyed by man.

Chapter VII. (111-117), "Altitudinal Zonation," contains tables for seven subdivisions. "In Greece there are ... many small groups of two or three ... closely allied species, of which one at least is endemic to a limited area within the district. Very frequently the species composing such a group occur at different altitudes, and the evidence is clear that the altitude, by modifying the complex of environmental factors, has been one cause of their origin as distinct species—the modified environments would select favourable variations."

Chapter VIII. (118-172), "Plant Communities," contains a general account (in the practical absence of modern detailed ecological studies) of the distribution and general composition of the various communities. The differences between the types of brushwood (Phragmites, Macchia, Pseudomacchia, and Shilbyak) are well tabulated. The photographic illustrations are good.

Chapter IX. (173-187), "Plant Succession," is a short account of the relations between the climax communities of the area, which are considered to be probably older as such than any others in Europe.

Chapter X. (188-239), "The Influence of Man," deals primarily with the gradual destruction of the former vast forests, from the time of the Venetian ship-builders. Once destroyed, grazing prevents rejuvenation, and the humus and soil are often soon blown away. There is some evidence that even the bare Karst lands could be re-afforested. An account of the weeds and ruderal plants is added, and Chapter XI. deals with the cultivated crops.

Chapter XII. (247-305) summarises (with tables) many of the preceding data. For each family we are given the genera and number of species, the number of species of each duration, life-form, habitat, altitude, etc.

Chapter XIII. (306-309), "Plant-dispersal and Animal Migration."

Chapter XIV. (310-552), "Floristic and Vegetational Distribution," tables and a short floristic account of each district, with an attempt to make natural subdivisions of the area.

Chapter XV. (563-426) is an account of the distribution of the
Balkan species outside the area. Many species (listed) are absent from Italy and Sicily, although occurring farther west, and there are many pairs of species (Spanish and Balkan) which "very probably represent examples either of homogeneity or, at least, of fractionisation of some common ancestral type. They must, however, be considered as examples of pseudovicariance." (If this cannot be expressed in ordinary language a glossary should be given. There exists the abuse as well as the use of technical language.) Details are given of connexions with the floras of Italy, Asia Minor, Central Europe, the Alps, Carpathians, Southern Russia, and others; and there is a list of Swiss alpine species absent from the Peninsula.

Chapter XVI. (427-472) deals with the Endemic and Relict species, including a discussion of the "Age and Area" hypothesis. There are 1754 endemic, of which 901 occur in one only of the districts. The last chapter, "General Conclusions," contains a sketch of the author's views on the history and development of the flora of the area.

Altogether it is a valuable if, for the most part, not a very readable book. The paper and print are of the usual high standard of the University Presses, while it is a pleasure to use a book so bound that it will lie flat at any page. The index of 3 4 pages is meagre, but it might be difficult to draw a line if more were included.--A. J. WILMOTT.


In the Journal for 1928 (p. 308) we welcomed the first issue of this completion of Solereder's text-book on the Systematic Anatomy of the Flowering Plants. The first of the seven parts to be published was Heft iii., dealing with the Palms, Cynanchaceae, and Aroids. The present portion, Heft iv., contains the account of the order Farinose, comprising the families Flagellariaceae, Restionaceae, Centrolepidaceae, Mayacaceae, Xyridaceae, Ericaceae, Thurniaceae (restricted to an examination of Thurnia sphaerocephala Hook.), Rapateaceae, Bromeliaceae, Commelinaceae, Pontederiaceae, and Phylldraeaceae. Thus, though the order is a pre-eminent herbaceous one, the families represent widely differing developments of that habit, and interesting cases of adaptation to very various environments, ranging between the extremes of xerophily on the one hand to the aquatic on the other. They also include a number of less generally known but very interesting groups of Monocotyledons, including monotypic families such as Mayacaceae and Thurniaceae. We are glad to welcome a second instalment of this useful work, and, as we remarked on the occasion of our former notice, shall look forward to its completion.

BOOK-NOTES, NEWS, ETC.

We hear with regret of the death of Prof. R. J. Harvey-Gibson on 3rd June, and hope to give some account of his work in a later number.

A MEMBER OF THE FUCACEAE FROM THE DOVEY SALT-MARSHES.

BY MISS P. M. SKEENE.

In this Journal for 1928 (p. 152) I communicated a note on the occurrence of Fucus vesiculosus, ecal muscosoids (Cotton) on the Dovey salt-marshes. Further investigation at subsequent visits to the salt-marshes has revealed characters in the plant which must be taken as separating it from the ecal muscosoids of Fucus vesiculosus and indicating it to be a form of Pelvetia.

On the salt-marshes at Mochras (Carnarvon) there occur ecal muscosoids (Cotton), caespitosus (Baker), and volubilis (Turner) (Baker) of Fucus vesiculosus, an account of which is being prepared for publication. Of these, Fucus vesiculosus, ecal muscosoids forms a close type as an undergrowth in the Juncus maritimus association. The plant which was described in the 1928 note forms part of a similar association on the Dovey salt-marshes. The Dovey and Mochras plants correspond closely, not only in their habitat on the salt-marsh, but also in their appearance, the former, however, being smaller in size. The plants are generally cylindrical in both localities, but in wetter regions of these some larger plants are found having a different appearance. At Mochras these larger plants are flattened, they bear occasional hair-pits along the margin of the thallus, and resemble in habit the caespitosus occurring in another region of these salt-marshes. On the Dovey salt-marshes hair-pits do not occur on any of the specimens, and on the larger plants there is a suggestion of a channel (fig. C), indicating that the plant is not a form of Fucus but of Pelvetia canaliculata. The majority of the plants do not show the channel, which, even in the largest specimens, is not very distinct.

The figure shows the range of size and habit of the plants occurring on the Dovey salt-marshes. The typically profuse dichotomous branching is seen in the plant shown in fig. A. The majority of the plants show only this mode of branching, but on some individuals adventitious branches may arise, as in fig. B. A and B are two of the small cylindrical plants of most frequent occurrence. C is one of the occasional larger plants found generally in wetter regions of the Juncus maritimus zone of the Dovey salt-marshes. These larger specimens are more sparsely branched than the smaller plants. The thallus is somewhat flattened, and along the broader parts an indistinct channel can be observed.

Two salt-marsh forms of Pelvetia canaliculata have been described by Baker, both of them occurring at Blakeney, Norfolk. Pelvetia canaliculata, ecal libera (Baker) grows embedded and unattached, attaining the same size as it does on stones, while ecal coralloides (Baker) is embedded in the soil, and its appearance is also similar to that of a normal attached Pelvetia. Both forms occur with Salicornia europaea.
Baker's diagnosis of *Pelvetia canaliculata*, ecad *coralloides* is as follows:

"Plant embedded in mud, from 1–4 cms. in length, producing adventitious buds from the lower parts of thallus. Frond channelled, branching sparse, thallus somewhat curled. Receptacles unknown."

The length of the smaller form, i.e. *coralloides*, corresponds to that attained by the Dovay plant, but the narrow cylindrical thallus of the latter, which only on exceptionally large plants shows any sign of a channel, bears little resemblance to the channelled thallus of *ecad coralloides*. From its close similarity in form and habitat to *ecad musoides* of *Puccinia vesiculosa*, it is proposed that the plant occurring on the Dovay salt-marsh be named *Pelvetia canaliculata*, ecad *musoides*.

**Diagnosis.** Habit turfy. Plants profusely branched, very minute and densely crowded together. Branching dichotomous with occasional adventitious branches. 0.5–1 cm., rarely 3 cm. in length. Thallus cylindrical, or with an indistinct channeling on larger plants; 2–1 mm. in width. Receptacles unknown.

**Hab.** The upper levels of the Dovay salt-marshes (Cardiganshire).

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**GLYCERIA DISTANS AND G. RETROFLEXA IN BRITAIN.**

**BY C. E. SALMON, F.L.S.**

Last year Dr. Harry Smith, Professor at Uppsala, was good enough to examine a number of critical British plants and to give his determinations thereon. Amongst them were examples of forms of *Glyceria distans*, looking rather distinct, and I was delighted to find, upon the return of the parcel, that I had both *Puccinia distans* Parl. and *P. retroflexa* O. R. Holmbr. (for Scandinavian botanists use the name *Puccinia* for this group) from England.

Dr. Otto R. Holmberg, in his *Skandinavinska Flora* (Hafte 2, pp. 216–219, 1926), fully treats of the two species and gives references as follows:


are more patent and deflexed, and the more tapering spikelets. Undoubtedly *P. distans* is a more slender and graceful species.

In my own herbarium I find the following:—


It is probable that *retroflexa* will prove to be our commoner species, but it will be very interesting to have the distribution of both plants fully worked out in our islands.

The text-figure is after Lindman’s *Svensk Fanerogam flora*.

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**UMBELLIFERÆ FROM NEPAL.**

BY C. NORMAN.

Thanks to the kindness of Prof. W. Wright Smith, of the Royal Botanic Garden, Edinburgh, I have had the opportunity of working out the Umbellifera of a collection of plants recently made in Nepal by Mr. Lall Dhuoj. As it is a region from which collections rarely reach this country, it is hoped that the following enumeration may be of interest. All the specimens are incorporated in the Herbarium of the Royal Botanic Garden, Edinburgh.

**Bupleurum falcatum** Linn. Khading, 8000 ft., 172.

**Pimpinella acellifolium** (Wall.) C. B. Clarke. Nousing Pati, 15,000 ft., 173; Tir, 5–8000 ft., 252.

I have used C. B. Clarke’s name for this plant, but its true position is uncertain. Some of the specimens at Kew seem to suggest *Thapsia* rather than *Pimpinella*.

**Selenium tenuifolium** Wall. Barpak, 10–14,000 ft., 25; Sheolga, 13, 14,000 ft., 38.

VAR. FICICEOLIUM C. B. Clarke. Sheolga, 13–14,000 ft., 37.

**Cortis nepalesis** Norman, sp. nov. Herba humilis perennis pubescens (denum glabrescens), radice fusiforme. Folia glabra, omnia radicula tenuior bi-pinnatifida (sup. Dauco revocantia), ambitu sepius anguste oblonga circa 6-jugata, segmentis minimis oblongis vel ovatis profunde incisis, petiolo elongato basi solum, vel abbreviato omnino, vagante. Umbelle sessile, vel brevissime vel plus minusve longe pedunculata circa 10–15 miliatis; radic profunde valde inaequilongi, post anthesin validi; involucri phylla folius minoribus exacte conforma; umbellulis multi-pedicellatis, pedicellis sub-aequilongis, involucellophorum phylla foliacea.
The plant is highly aromatic (also a character of *Archangelica*), but is quite unlike any other Himalayan Umbellifera that I have seen.

**Herculeum Brunonis** (DC.) Benth. (No locality), 77.

**H. candicans** Wall. Mailong Pati, 11–12,500 ft., 47.

**H. Wallachii** DC. (No locality), 29; 116.

**H. nepalense** Don. Michet, 160; Tapeshet, 167 (no altitudes given).

**Herculeum Lallii** Norman, sp. nov.

Herbs perennis alta partibus omnibus pubescentes, caule striato parce ramoso. Folia basilaria pinna-ta 3-jugata ambitus anguste oblonga longissime petiolata; petiolo quam lamina duplo longiore. Foliola lateralia (ima breviter petiolulata cetera sessilia) ovata acuta sepius isca incisa vel levior lobata, basi rotundata vel cordata margine irregulariter crenato-serratia crenatur breviter apiculatis; terminalis quam lateralia paulo majora obtusa vel acuta basi nonnumquam cuneata; folia caulina conformia, summa vaginaria non petiolo. Umbelle circa 10-radiata, radiis demum valde inséquolongis; involucro phylla paucis (deciduis?) linearis; involucrorum linearis incompsicul. Petala interna angustia oblonga apice incurvius, exteriora radiantia profunde lateaque obcordata lobulo minimum innotuet, basi paullum attenuata haud unguiculata. Calycis dentes brevissimi triangulares acuti. Fructus (vix maturus) oblongus, marginis angustus alatus; vitae dorsales haud clavatae ad basin fructus descendentes, marginantibus gyneme, commissurales 4 cuneiformes, externae subclavatae ad basin fructus non descendentes. Stypodium varium; styli tenues longiusculi. Carpophorum bipartitum.

**Hab.** Booshki, 13-14,500 ft., 30.

**Leaf-blade** up to 17 cm.; **petiole** ± 3 cm.; **leaflets** up to 6 × 4 cm.; **rays** (mature) 4–8 cm.; **pedicels** 3–6 mm.; **fruit** 7 × 4 mm.

This seems to be quite a distinct species and unlike any other Himalayan *Herculeum*. Perhaps nearest to *H. Brunonis* on account of the pinnate leaves, but showing no trace of the remarkable bracts of that plant.

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**SOUTH AFRICAN MEETING OF THE BRITISH ASSOCIATION**

(South Atlantic, July 16, 1929).

A good number of the botanists, including the President and Recorder of the Section, are travelling on the 'Llandovery Castle,' which left Tilbury on June 27. Tenerife was reached on July 2, a warm sunny day with sea and sky full of colour. A few hours ashore gave time for a motor-drive from the port, Santa Cruz, through La Laguna, the old capital of the island, up to the Mercedes Forest, about 3000 ft. above sea-level. A fine Eucalyptus avenue

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**Pleuroserpentum Angelicodes** (Klotzsch) Benth. Barpak, 10–14,000 ft., 36.

**P. dentatum** (Wall.) Benth. (No locality), 27; Pach Pokhui, 13–15,500 ft., 88; Shebal Joong, 18,500 ft., 109.

**P. apiculatus** C. B. Clarke. Barpak, 10–14,000 ft., 24; Michet (no altitude), 165.

**Nasa** 28, 34, 35 are all the same species of *Pleuroserpentum*, apparently an undescribed one; but the material hardly warrants a description, especially as the genus now comprises many species.

**Archangelica cyclocarpa** Norman, sp. nov.

Herba aromatica ut videtur grandis, primum dense fulvo-pubescentem demum glabrescentem. Folia basilaria et caulina inferiora ignota, caulina superiora tamento-pinnatisecta, segmentis lanceolatis longe acuminiatis basi cumatis nonnumquam lobatis, margine serratis, terminali quam lateralia paulo majore et rachide decurrente; petiolo omnino in vaginam tumidaem et amplissimam expanso. Umbelle maxime radii numerosissimae, ipsa in centro dispositis quam exteriores multo brevioribus; involucro phylla nulla; umbellulae multi-pedicellatae, pedicellis congestis tenuissimis; involucrorum phylla linearis pedicellis plus minusque aequales. Flores sepe polygamia in sieco albesci. Fructus (vix maturus) ambitus subrotundus basi cordonus pro genere parvus; exocarpium subero-incrassatum; jaga dorosalia prominentia parum elevata, lateralia in alas latiusculas tenues expanse. Vittam semini adhærentes, commissurales minute ( {?}) per exocarpium incrassatum insine. Stypodium prominens; styli elongati reflexi; semen valde compressum complanatum. Carpophorum ad basin bipartitum.

Hab. Barpak, 10–12,000 ft., 28.

**Leaf-segments** 5–5–8 × 1.5–3 cm.; **outer rays** up to 12 cm.; **inner rays** 4–7 cm.; **pedicels** up to 1.5 cm.; **fruit** 5 × 4 mm.

I have referred this plant to *Archangelica* rather than to *Angelica* on account of the very noticeable thickening of the outer wall of the fruit. In the true Angelicas I believe this character is never observed.
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is passed en route, and the hill-tops are cultivated with banana, maize, and other crops; prickly-pear in flower and young fruit, grown for the cochineal, is very much in evidence. Flowering trees and shrubs make brilliant splashes of colour—the Cape Coral (Erythrina caffra), Plumeria, Oleander, and among climbers, Bougainvillea and Ipomoea. Higher, the road winds with sharp curves through woodland with dense undergrowth, and glimpses of the sea cliffs, the slopes of which are dotted with the light green Euphorbia Erica, among which are small trees of Pinus canariensis and shrubs a fine specimen of the Dragon-tree (Dracaena Draco) in the grounds of an old monastic institution.

Our next halt is Ascension, at which we gaze from the ship for three hours, not being allowed to land. The island is the remains of an originally much larger volcanic formation. Part only of the great crater is left, and subsequent eruptions have formed numerous secondary cones of various shapes and sizes, but all apparently devoid of vegetation. On the older slopes an Acacia shrub is growing, and on the higher ridges in the interior scattered trees—probably Eucalyptus. This forms a sanatorium for the employees of the Eastern Telegraph Company, who, with the workers of a guano company, constitute the inhabitants.

On July 1752, when Chaplain in the Swedish Navy, visited the island in the Species Plantarum, in 1753. Two commemorate the island in their names—a grass, Aristida ascensionis, and Hedyotis ascensionis; these, with two widespread species of Cyperus, two grasses, Sporochnus and Polydendron, and about a dozen ferns, constitute the flora of the island.

Our short run brings us to St. Helena, where we are lucky to have an evening and a morning on shore. St. Helena, when discovered by the Portuguese in 1501, was described as clothed with a luxuriant vegetation to the edge of the cliffs. But the introduction of goats caused terrible destruction to the trees, which were also recklessly felled for fuel by the earlier settlers. The extinction of goats helped the well-meant effort of Governor Beaton, of the Hon. East India Company (which used the island as a depot on or out of the road to India), who introduced numerous species for use remains except on the higher ridges, where solitary specimens or small groups of a remarkable tree-composite (Commidendron) still persist. But unless steps are taken to preserve them, these, too, seem fated to disappear. Several fine specimens were seen partially smothered by exotics now only as manufactured articles, but a few specimens of the redwood (M. erythroxyloc) still remain. The destruction of the

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original flora is the more to be regretted as it was remarkably interesting, containing a large proportion of endemic genera not nearly related to any now existing. Sir Joseph Hooker, in his address to the British Association on Insular Floras in 1866, refers to it as a flora of great antiquity, strikingly different from any known at the present day. It included, besides the species of Melichah abovenamed, several peculiar genera of the tree-composites characteristic of insular floras and the higher regions of the African mountain-peaks. A list of the then unknown species is given by J. C. Millis in his St. Helena: A... description of the island, including its Geology, Fauna, Flora, and Meteorology, published in 1875. But many have probably disappeared since that time. The collections made in the several parts of the island visited by the botanists on the present trip consisted mainly of introduced species. I saw one good group and a number of isolated specimens of a fine arboreal palm, Commidendron robustum, reaching about 15 feet in height, on the ridge near Diana's Peak, the highest point of the island (2000 feet). The investigation of these very broken ridges and valleys would doubtless reveal other native and endemic species which still hold out in these less accessible areas; but nearly everything which meets the eye in the parts of the island visited were introductions. A light green plant, conspicuous from the sea dotting the slopes of the ravine in which the town, Jamestown, is situated, proved to be Boueoeza gigantea, said to have been introduced as a textile plant; it was in full flower, the large branching panicle reaching 12 to 15 feet in height. Among these were a bright orange-red-flowered Aloe, patches of a Cactus (Cereus triangelus), and, of course, prickly-pear. The South African Mesembryanthemum edule spread over large areas by the two roads passing up into the interior, on either side of the ravine, and a bright yellow Australian Helichrysum (H. brachyclayum) was also conspicuous. Several species of Eucalyptus and Acacia were frequent, and the commonest tree at mid-altitudes was Pinus Pinaster. Fine specimens of Norfolk Island Pine (Arteria excelsa) were also frequent. These, with a few Cypress, stood sentinel round Napoleon's tomb, which lies in a little glen about half a mile from the house, Longwood, which he occupied from 1815 until his death in 1820. The Plantations, a large estate in which is the Governor's residence, contains a great variety of trees, including some fine specimens of the Cape Yew, Podocarpus elongata. The Governor's house was under repair, the original woodwork, floors, roof, doors, &c., having being destroyed by white ants. The plantations have also been neglected, but the recent appointment of Mr. Bruns-Lich, after a long period of neglect, to the gardeners of the island gives hope of improvement. Mr. Bruns-Lich, who acted as our guide through the plantations, is laying out a small experimental garden. The staple industry of the island is cultivation of the New Zealand Flax (Phormium tenax), and visitors can buy articles of lace of local manufacture. But the importance of the island greatly diminished since the rainy days of the H. E. I. Co., and since the opening of the Suez Canal its isolation has increased.—A. B. R.
f. vermicularis Griff. Puffin Island (H.G.); Aberystwyth, Borth (Rees).
*A. bulbosa Lamour. Porthdinllyn, Tonfanau (Rees).
*S. tenuissimum Haut. Langwyfan (P.).
*S. fasciculatum Thur. Langwyfan (P.); Aberystwyth (N.U.T.); on Castanea virens, Aberystwyth, Borth (Rees).
E. tomentosoides Parlow. Towyn-y-capel, Menai Straits (P.); Bangor, Anglesey (B.); Aberystwyth (Rees).
E. selatina Kütz. Towyn-y-capel (P.); Puffin Island (B.); Trearddur Bay (Rees).
E. holmesii Batt. Beaumaris (Holmes); Anglesey (G.); Beaumaris (P.).
E. confervoides Le Jol. Menai Straits (P.); Aberystwyth (N.U.T.); Borth (Rees).
E. silicicola Kütz. Aberystwyth (M.); Puffin Island (H.G.); Aberystwyth (N.U.T.); Menai Straits (G.).
E. fasciculatus Harv. Puffin Island (H.G.); Aberystwyth (Rees).
E. tomentosus Lyngb. Anglesey (Dav.); Puffin Island (H.G.); Porth S. Porth Dafarch (G.); Menai Straits (P.); Aberystwyth (N.U.T.).
E. Hincksia Harv. Towyn-y-capel (P.); Porth Ceiriad, St. Davids (Rees).
E. granulosa Ag. Puffin Island (H.G.); Bangor (P.); Aberystwyth (Rees).
Pylaiella litoralis Kjellm. Anglesey (Dav.); Anglesey (Dav.); Swansea (Dill.); Puffin Island (H.G.); Bangor (P.); Aberystwyth (N.U.T.); Porth Trecastell, Porth Dafarch, Menai Straits, Dulas Bay (G.).
Isthmoplea spherophora Kjellm. Milford Haven, Menai Bridge (R.); Puffin Island (H.G.).
Myriotrichia clavaformis Harv. Langwyfan (P.); Aberystwyth (N.U.T.); Borth (Rees).
M. filiformis Harv. Langwyfan (P.); Aberystwyth (N.U.T.).
Arthrocladia villosa Duby. Swansea, Mumbles (Dill.); Anglesey (Dav.); Mumbles (Gutch); Anglesey (H.G.); Bangor (P.).
Elachista stellaris Aresch. Wales (B.).
E. fucicola Friis. Anglesey (Dav.); Mumbles (Gutch); Anglesey, Puffin Island (H.G.); Bangor (P.); Aberystwyth (N.U.T.); Porth S. Porth Dafarch, Menai Straits, etc. (G.).
E. floccida Aresch. Anglesey (Dav.); Wales (R.); Aberystwyth (N.U.T.); Pemmon (H.G.); Swansea (Dill.).
E. soutulata Duby. Tony-y-capel (P.); Trearddur Bay (Rees.).
Leptosiphon fasciulatum Rkh. Bangor (P.); Aberystwyth (Rees).
Spheciosiphon radicans Harv. Puffin Island (H. G.); Beaumaris (G.);
Bangor (P.); Aberystwyth (Rees).
*S. olivacea Pringsh. Aberystwyth (Rees).
S. cirrhosa Ag. f. pennata Hauck. Mumbles (Dill.); Anglesey
(Dav.); Bracelet Bay (Gutch); Puffin Island (H. G.);
Mena Bridge (P.); Aberystwyth (N. U. T.).

f. fusca Holm. & Batt. Newton Nottage (Young); Worms Head
(Dill.); Anglesey (Dav.); Anglesey, Puffin Island (H. G.);
Llanddwn, Llanddwyn (G.); Aberystwyth (Rees).

S. cupulata Lyngb. Bangor (B.).
S. plumosa Holmes. Barmouth, Beaumaris, Carnarvon (R.);
Carnarvon (Holmes); Menai Straits, Port Dinorwie, Menai
Bridge (G.); Menai Straits (P.); Aberystwyth (N. U. T.);
Bangor (B.).

Cladophora pluma Kütz. Menai Bridge (Holmes); Anglesey,
Puffin Island (H. G.); Penmon (G.).

Cladophora spongiosa Ag. Swansea (Dill.); Anglesey (Dav.);
Aberystwyth (M.); Anglesey, Puffin Island (H. G.); S.W.
Anglesey, Aberfraw, Carnarvon (G.); Menai Straits (B.);
Aberystwyth (N. U. T.); Monks Cave, Borth (Rees).

C. verticillata Ag. Anglesey (Dav.); Gower (Dill.). Anglesey,
Puffin Island (H. G.); Aberfraw, Porth Dafarch, etc. (G.);
Llanddwn (P.); Aberystwyth (N. U. T.); Portdinlleyn (B.);
Borth (Rees).

Halosiphon flexica Kütz. Holyhead (R.); Bracelet Bay (Gutch);
Anglesey (H. G.).

Stypocaulon scoparium Kütz. Puffin Island (Dav.); Anglesey (Dav.);
Mumbles, Bracelet Bay (Gutch); Aberystwyth (M.); Anglesey,
Puffin Island (H. G.); Menai Straits (P.); Aberystwyth
(N. U. T.); Llanddwn, Penmon, Ty’n Llwydd (G.).

Myrionema strangulans Grev. f. typica Batt. Puffin Island (H. G.);
Bangor, Towyn-y-capel (P.); Aberystwyth (Rees).


Chilodonella reptans Sauv. Puffin Island (B.).

*Ascochytis sphaerophora Sauv. Aberystwyth, Borth, Port Eynon
(Rees).

Ralfsia verrucosa Aresch. Puffin Island (H. G.); Llanfairis
gaer (P.); Aberystwyth (N. U. T.).

Lithothamnion fuscus Aresch. Llanfairisgaer (P.).


Chordaria flagelliformis Ag. Anglesey (Dav.); Aberystwyth (M.);
Puffin Island (H. G.); Towyn-y-capel (P.); Aberystwyth
(N. U. T.); Aberfraw, Penman, Llanddwn (G.).

Mesogloia vermiculata Le Jol. Puffin Island (H. G.); Towyn-y-


Catapnaea virescens Thur. Aberystwyth, Bangor, Carnarvon (R.);
Towyn-y-capel, Bangor, Llangwyfan (P.); Aberystwyth
(N. U. T.); Llangwyfan (B.).

C. Zostera Thur. Towyn-y-capel (P.); Portdinlleyn (Rees).

Petrosporaangium Berkeleyi Nág Towyn-y-capel (P.).

Leathus durus Le Jol. Puffin Island (H. G.); Aberystwyth
(N. U. T.); Mumbles, Bracelet Bay (Gutch). Aberystwyth
(M.); "Common" (G.); Borth, Gower (Rees).

Sporochroa pedunculata Ag. Anglesey (Dav.); Aberystwyth (M.);
Anglesey, Puffin Island (H. G.); Swillies (G.); Bangor (P.).

Chorda filum Stackh. Anglesey (Dav.); Swansea (Gutch.); Aber-
ystwyth (M.); Menai Straits (G.); Bangor, Towyn-y-capel
(P.); Aberystwyth (N. U. T.); Puffin Island (H. G.); Ton-
fanau (Rees).

Laminaria saccharina Lamour. Anglesey (Dav.); Aberystwyth
(M.); Puffin Island (H. G.); "Common" (G.); Bangor,
Llanfairis (P.); Aberystwyth (N. U. T.); Gower, Milford
Haven (Rees).

f. Phytophila Le Jol. Anglesey (Lhwyd); Anglesey (Dav.);
Aberystwyth (M.); Puffin Island (H. G.); Holyhead (G.);
Tenby (Stackhouse).

L. digitata Lamour. Anglesey (Ray); Anglesey (Lhwyd);
Carnarvon (Dav.); Aberystwyth (M.); Anglesey,
Puffin Island (H. G.); Swillies (P.); Aberystwyth (N. U. T.);
Borth, Gower (Rees).

L. Cloutani Em. Anglesey, Puffin Island (H. G.); "Common"
(G.); Towyn-y-capel (P.); Milford Haven, Gower, Aberyst-
yth (Rees).

Saccorhiza polyschides Batt. Llanfeathyll (Br.); Beaumaris (D.);
Holyhead (Dav.); Llanfeathyll (Green); Aberystwyth (M.);
Llangwyfan, Porth Dafarch (G.); Towyn-y-capel (P.);
Portdinlleyn (Rees).

Alaria esculenta Grev. Holyhead (Lhwyd); Anglesey (Dav.);
Anglesey (H. G.); Holyhead (G.); Towyn-y-capel (P);
St. Davids, Portdinlleyn, Trawddwr Bay (Rees).


Aglaophenia reptans Crn. Swillies (P.).

Fucus ceranoides L. Menai Bridge (Br. & Green); Anglesey
(Dav.); Mumbles (Gutch); Aberystwyth (M.); Anglesey
(H. G.); Griffith’s Crossing, Holyhead, etc. (G.); Llangwyfan
(P.); Three Cliffs Bay, Gower (Rees).

F. spiralis L. f. platycarpus Thur. Anglesey (Lhwyd); Anglesey
(H. G.); Anglesey (P.); Carnarvon (G.); Point of Ayr, Puffin Island (B.); Aberystwyth, Gower (Rees).

F. vesiculosus L. Anglesey (Dav.); Mumbles (Gutch); Aberystwyth (M.); "Common" (H. G., G., & P.); Aberystwyth (N.U.T.); Borth, Gower (Rees).

F. serratus L. Anglesey (Dav.); Mumbles (Gutch); Aberystwyth (M.); "Common" (H. G., G., & P.); Gower (Rees).

Ascophyllum nodosum La Jol. Anglesey (Green); Llanrhuddlad (D.); Anglesey (Dav.); Aberystwyth (M.); Aberystwyth (N.U.T.); "Common" (H. G., G., & P.); Gower (Rees).

Pelvetia canaliculata Dene. & Thur. Anglesey (Dav.); Aberystwyth (M.); Anglesey, Puffin Island (H. G.); "Common" (G. & P.); Gower (Rees).

*Diffraria tuberculata* Stackh. St. Davids, Whitesands Bay (Rees).

Himanthalia lorea Lyngb. Anglesey (Jones); Anglesey (Green); Anglesey (Davies); Mumbles (Gutch); Aberystwyth (M.); Anglesey (H. G.); Bardsey (G.); Towyney-capel (P.); Trearddur Bay (Rees).

Halidrys siliquosa Lyngb. Anglesey (Dav.); Mumbles (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H. G.); Gorad Goch etc. (G.); "Common" (P.); Aberystwyth (N.U.T.); Gower (Rees).

Cystoseira ericoides Ag. Anglesey (Dav.); Llangwyfan, Gorad Goch (G.); Llanfaeloig (P.); Port Eynon (Rees).

C. granulata Ag. Aberffraw (R.); Pwllheli (G.).

C. diacrus Ag. Anglesey (D.).

*C. fibrosa* Ag. Nefyn (Rees).

Dictyota dichotoma Lamour. Llanfaethly (Br.); Swansea (Dill.); Anglesey (Dav.); Aberystwyth (M.); Anglesey, Puffin Island (H. G.); Gorad Goch, Pennon, etc. (G.); Swillies (P.); Aberystwyth (N.U.T.); Swansea (Gutch); Gower (Rees).

f. impresa J. Ag. Puffin Island (H. G.); Beaumaris, Port Dinorwic, Porth Sun, etc. (G.); Crichieth (Lloyd Williams); Worms Head (Rees).

Tuonia atomaria J. Ag. Worms Head (Dill.); Bracelet Bay (R.); Bracelet Bay (Gutch); Aberystwyth (M.); Anglesey (H. G.); Holyhead, Llanddwn (Lloyd Williams); Tenby (Salwey).

Dictyopteris membranacea Batt. Aberystwyth (M.).

Padina pavonia Gaill. Anglesey (Ray); Anglesey (Dav.).

* N.B.—Plants marked with an asterisk are new records for the coast of Wales.

(To be continued.)

Ob. Radice sua perenni, et pilis omnibus apressīs, nullissimē hamatis, valēd affinis M. palustrī et carepitose. Differt tamen à priore, quae aliquando stolōnifera (et pilis quandoque gaudet omnibus apressīs) caudē teretes, non sulcatō; calycē non quīnquefrūtī, sed fērē quīnquepartīto, et stylo brevissimō, non calycēm subsequantē. A carepitose etiam satīs differt radiēs repentēs, collē stolōnifera, calycēe ultra medium fīssō, lobōs angustiorīs, acutissimīs, non obtusangulīs. Nullam aliam novī descripsum speciem nostrae aequīparandam. Videātur itaque haec pro nova sumi posse et debere.


Habitat in Asturiae inferioris monte Sierra del Peral, inter Gradum et Canadum, 27 Jun. florīs (Durieu), et in Hiberniae occidentī acerrimās, insulae Cuxamarenenses, non longō a pago Roundstone undī speciem milii est, nuper ab Hookero missum. Miro casu in extremis frēsēs oceanīcēs finībus, duobus locīs codicēmque anno detectō, hueque prorsus incognītī! Eam locōs intermediīs querent et fortē inventī botanophili extremī occidentǐs.

ERICA MACRATI Hook. (deleto nomine E. Hookeri Gay).

E. humilis, erecta; ramulis pedicellisque pubescentibus et hispidissimis; foliis 3-4, planisculis, ovato-lanceolatis, dorso pruinoso-canis, bracteolis calycinicēque segmentis utrinque glabris, minūs, apice longē pilifēri; marginē longē-paucifēlia; pilis ciliisque omnēs apice clavati; floribus umbellatis; bracteolis superā medium pedicellōm terrīs, duobus superius calycēe approximatis, oppositīs; corolla (violetaco-purpurea) segmentis calycinis triēlo longiore, ellipsoidea, ore contracto; antherēs intēri et unicūtā, non fīssīs, calycēe longē pilifēri, corolla longa, uniseriāe; corolla corollae, basi apice teretē, stylo longē exsertō, planum (in viva fortē plus minus excrescatur), non convexum hemisphēricum. Alīs etiam notae cum E. Maccki communes habet E. citarii, nempe foliis carinās, foliis calycēeque segmenta dorso pruinosa-canis, et ovarium glabrum. At foliis in E. citarii ternae, non quaternae; pili et cilia apices incrassata, non acutae; floros (oppositī vel ternati, rari alterīs) ramosi, non umbellati; pedicellī plus dūmō breviores, 2-3-frondosatī; corolla cylindracea, calycēe plus quadripātō longiō, ore hiante, non eliptīs, calycēe pilifēri, corollae, basi longissēs, corolla longa, non longissēs corollae, basi apice teretē, stylo longē exsertō, planum (in viva fortē plus minus excrescatur), non convexum hemisphēricum. Mulōrōs infīlior E. Tetralīzium cum nostrā convenit foliīrum in verticillīs numero, floribus umbellatiis, pedicellīs tribracteolatis, corolla, antherēs, stylo et stigmaticē, differt velō foliis angustiis, lineari-lanceolatis, facie et seē ad nervum dorsale (qui totum canaliculēm occupat), cum petiīlo pubescentibus, non glabrumis planiscēlīs.
ovato-lanceolatus dorsque ad latara nervi medi pruinoso-canis; pedicellis dimidio bruvioribus bracteolisque tomatis loenisibus, non inter longus quibus vestiuent pilos glabris; foliorum ciliis 6–8, non 4–5; umbellis 6–12, non 10–25-floris; pedicellorum bracteola inferioris basi non atteutata; segmentis calycinis dorso lanatis, non pruinoso-canis; corolla rosea, non violacea-purpurea; ovario denique toto villose, non glaberrimo.

Utrum genuinum sit species E. Mackai, an E. ciliaris et Tetrailsis hybrida progenies, ego non dicam. Questionis solutione, me judice, in fructum quaerenda. Si fructus abortivus, exist mihi hybrida; si perfectis seminibus festus, species. Videant Hiberni, videat imprimitis cl. Mackay qui et nostram stirpem primus in medium protrulit, et plantis hibernicae aenırımé studere dicitur.

(To be continued.)

PROPOSED AMENDMENTS TO THE INTERNATIONAL RULES OF NOMENCLATURE.

By J. C. Arthur
(Purdue University, Lafayette, Indiana).

1. Art. 19. Amend to read:—

Botanical nomenclature begins for all groups of plants (recent and fossil) at 1753 (Linnaeus, Species Plantarum, ed. 1).

It is agreed to associate genera, the names of which appear in Linnaeus's Species Plantarum, ed. 1, with the descriptions given to them in the Genera Plantarum, ed. 5 (1754).

In the considerable number of replies to the circular letter distributed to many botanists early in March, and printed in Mycologica, vol. xxi, pp. 172–174, there was almost universal agreement to this proposal. The replies came from leading writers in systematic botany, mycology, algology, bacteriology, paleobotany, hyperology, and other divisions of the subject.

2. Art. 49 bis. Amend by eliminating the words:—"starting from Fries, Systema, or Persoon, Synopsis"; for the words "teleutospore or its equivalent" substitute the words: "urolespore or teleutospore (sporangiate)."

Also replace the first example by the following:—The names Æcidium Pers., Roestelia Reb., Æcidium Unger, and Peridormium Cher. designate different states of the gametophyte in the group Æcinales. The generic name Æcidium Pers. (in Gmel. Systemat. Nat. ii. (1791)), belonging to a gametophytic state, cannot replace Gymnosporangium Hedw. f. (DC. Fl. Fr. ii. (1805)), based upon the sporophyte.

The amendment to this article, as previously suggested, met with decided opposition. As now worded, it has the effect to restore the original intention of the "Rule" as adopted at Brussels. It eliminates the acutispore, and thereby dispenses with many recent combinations, to which much objection has been made. It retains the Uredospore, for otherwise many familiar names would be rejected, such as Coleosporium Ipomaeæ Barr., Uromyces Fabæ de Bary, U. appendiculatus Fries, Puccinia glumarum Erikk. & Henn., P. Porri Wint., and other generally accepted names. It also conserves such names as Puccinia graminis, P. sessilis, P. coronata, P. Purpur, P. limosa, etc.

3. Add the following genera to the list of Nomina Conservanda:—

Uromyces (Link) Unger, 1839 (in place of Nigredo Ross., 1806); Cercospora (Link), S. F. Gray, 1821, or Pucciniola March, 1829; Puccinia Pers., 1794 (in place of Puccinia [Micheli] Adans., 1763, or Puccinia Wild., 1787); Gymnosporangium Hedw. f., 1805 (in place of Puccinia [Micheli] Adans., 1763); Melampsora Cast., 1843 (in place of Uredo Pers., 1794).

NOTES FROM THE BRITISH MUSEUM HERBARIUM.

Oxypetalum Kingi S. Moore, sp. nov. (Asclepiadaceæ). Fructulis circa 10 cm. alt.; caulibus pluribus inferne lignosis superne subvolubilibus utri foliis floresque minute farinaceo-fuscis; foliis brevivelopetalatis lineari-lanceolatis mucronatis basi rotundatis nequaquam subhastatis marginibus revolutis; pedunculis exsacularibus 1–3-floris; pedicellis pedunculos seu facile exciduntibus; bracteis lineari-lanceolatis acutis; calycis segmentis ovatis acutiusculatis corollae tubo longioribus; corolla lobis oblongis emarginatis tubo fere ter longioribus; corona phyllis corollae tubo propo apicem insertis inter se brevissime connatis oblongis breviter bifiolis corollae lobos plus quam semequantibus inutus nodis; polliniorum caudiculis abbreviatis dentisque minuuto instructis; stylo stam in rostrum sit longum bifidum producere.

Hab. Mendoza Province, Cordillera del Tigré, 2200 m. alt.; Lient.-Col. King, 347.

Main stem stout, about 5 mm., older branches 2–3 mm. thick; young stems 1 mm. thick or a little over; internodes ± 1 cm. long. Leaves 12–18 × 2–3 mm., drying light green, midrib very prominent beneath; petioles stout, 1.5–2 mm. long. Peduncles sometimes only 1–1.5 mm. long, sometimes 1 cm. or even more. Pedicels slender, usually 5–10 mm. long. Bracts about 3 mm. long. Calyx-segments eglandular within, 3–5 mm. long. Corolla apparently white or pale yellow; tube 2.5 mm., lobes 6 mm. long. Coronal leaves 4 mm. and fleshy stigma 4 mm. long.

According to the description in Bol. Acad. Nac. Ci. Argent. iv. 54, this differs from O. Echeverutii Hicon. in its longer leaves not acutulate at base, the much longer calyx-segments, corolla with longer differently-shaped lobes, longer coronal leaves, and stigma nearly three times the size.—S. MOORE.

Meconopsis (? Robusta) regia Taylor, sp. nov. Herbæ elata verisimiliter biennis, partibus plurimis pilis mollibus barbellatis plus minusve dense vestitis. Radix caudiformis. Caulis foliorum ramosus,
altitudinis saltem 60 cm. attigens. Folio radicalis usque ad 40 cm. longa et 9 cm. lata, lamina angustae elliptica, ad basim apicemque angulatam attenuata, margine serrata dentibus ab indumento dense aliquid obscuratis, firme chartacea, basi in petiolum latum decurrentia, utrinque preservata in costa nervisque dense sericeo-tomentosa, caulina superiora radiabilis multo minora, ramos graciles floriferis subdenticis, lamina textura tenuior, minus dense hirsuta, basi subamplexicaule. Flores numerosi, 5–7–5 mm. diametro, ramis axillaris crassibus gracilibus usque ad 17–5 cm. longis in fructu lignoso-incrassatis suffultis, inferioribus plerumque 2–floris, superioribus plerumque simplicibus; bracteae foliorum superioriorum similis sed minores; alabastra ovoido-globosa. Sepala ovata, extus dense tomentosa. Petala plerumque 4, margine integra, lutea. Stamina numerosissima. Ovarium globosum vel ovoidum, in flore aperto 6–12 mm. longum, dense hirsutum, placenta lamelliformis in loculum profunde intrusa; stylus crassus, 5–10 mm. longus; lobi stigmati sinuosi, non decurrentes. Capsula oblongo-ellipsoides, stylo persistente excluso 1–5–8 cm. longa, valvis 7–12. Semina ovoida, circ. 1 mm. longa et 0–5 mm. lata, testa dense papillosa.


This handsome new species was first sent to this country in 1928, and the further arrival this year of ample flowering and fruiting specimens makes it possible to publish a complete description. Its introduction is due to Col. Sir Clive Wigram and Mr. T. Hay, Superintendent of Central Parks, London, to whom I am indebted for access to the excellent material on which this description is based. Since seeds accompanying the specimens have germinated readily, it is hoped that this fine plant will soon be established in our gardens. The affinity of the species is clearly with Meconopsis superba King ex Prain. In their ovarian characters the two species are practically identical, and they further resemble each other in the serration of the leaves and sericeous indumentum. Meconopsis regia has, however, yellow flowers borne on an openly-branched indorsecence.—G. TAYLOR.

NEW VARIETY OF CINELIOTUS AQUATICUS (Jacq.) Br. Eur.

BY W. R. SHERWIN, A.L.S.

WHILE examining a series of mosses collected in Albania by A. Bakhace, several plants of Cinelidotus aquaticus were noted, one of which, in particular, was so different in general appearance that only by microscopical examination could its affinities to C. aquaticus be determined.

The straight non-secund leaves give this plant a very distinct appearance in the field, though the microscopical details (especially in the absence of fruit) do not show sufficient variation from the species to warrant more than varietal status. I propose, therefore,

OBITUARIES.

H. C. Robinson.

HERBERT CHRISTOPHER Robinson, born Nov. 4, 1874, who died May 30, 1929, was better known as a zoologist than a botanist. For some years he was Director of the Federated Malay States Museums. During the many expeditions he made in the Malay Peninsula between 1906 and his retirement in 1926 he not infrequently obtained valuable collections of plants, notably in the expedition to Gunong Tahan in 1906. Here he was accompanied by Mr. L. Wray, who, however, had to return from illness before this mountain, which had long delayed all explorers, had been conquered by Robinson, who was the first man ever to reach it. His collections were described by me in the Journal of the Linnean Society, xxxviii. 301. I travelled with him and Mr. C. B. Kloss to the same mountain six years later, and also on several other collecting expeditions organized by him. His name is associated with many Malayean plants, e.g. Paphiopedilum Robinsonii Ridl., Eugenia Robinsoniana Ridl., and Rhododendron Robinsonii Ridl.—H. N. RIDLEY.
Robert John Harvey-Gibson, who died on June 3, was born in 1860 and educated at the Universities of Aberdeen, Edinburgh, and Strasburg. He organized the Hartley Botanical Laboratory at Liverpool, and held the Professorship of Botany from 1894 to 1921. His earlier published work was in invertebrate zoology, later (after 1887) on various aspects of botanical science. It included several reports on the marine algae of the Liverpool Marine Biology Committee’s district, a preliminary list of the marine algae of the Oban district (1882), and, with Margery Knight, reports on the Marine Biology of the Sudanese Red Sea; also notes on the anatomy and reproductive organs of various seaweeds. His most important piece of work was on the anatomy of the genus Selaginella, published in the Annals of Botany (viii., x., xi., xvi.). His translation of Ludwig Jost’s Lectures on Plant Physiology (1867) did not reach the standard of other translations of botanical works issued by the Oxford Press. He also wrote the Outlines of the History of Botany (1910). Harvey-Gibson was a good draughtsman, and the illustrations for his anatomical papers were by his own hand. He was awarded the C.B.E. in 1919, and was D.L. and J.P. for the County Palatine of Lancaster. - A. B. R.

SHORT NOTE.

DEVONSHIRE RECORDS.—Miss C. Ethelinda Larter writes to point out that the record of “Lamium alliaceum” from Devon, cited in Journ. Bot. 1899, p. 150, as from Trans. Devon. Assoc. ix. 81-92 (1898), must be expanded; because Miss Young’s living plant, when examined by Mr. A. W. Trethewy, was found to be L. maculatum L., and, when sought for again later, had entirely disappeared. As regards the finding of the alien, Cynoglossum echinatum L., in S. Devon by Mrs. Carter, there is an earlier record in Mr. W. P. Hiern’s MS. Census of Devon Plants, 1923, for districts 6 and 7. Miss Larter also strongly questions the authority for the finding of Meriania maritima Gray.

REVIEWS.

NEW EDITIONS OF TEXT-BOOKS.


BOTANICAL TEXT-BOOKS 263
manner has been amplified along the broad lines of recent research."

"Sphaerotherca has been added as a type and a considerable number of new diagrams have been incorporated."

The book contains a vast amount of information which is arranged in numbered paragraphs in each section, and is admittedly designed to enable students to prepare for certain examinations. The extent to which it is likely to produce botanists or to engender a love for the science is another matter. An omission which seems a serious one is that of any reference to botanical works from which the student might obtain further information on, or a fuller explanation of, any point in which he was interested. And, unless we are mistaken, he may read, mark, and learn . . . the contents of the volume without becoming familiar with the name of a single botanist to whose work the growth and development of the science is due.


It is well known that temperature has a marked effect on the rate of growth, producing in general an increased rate, but at higher temperatures a reduced one. This fall in the rate used to be ascribed to an injurious factor which was supposed to make its appearance at such temperatures. The modern view is that the temperature coefficient for growth shows a continuous change from infinity at low temperatures to zero at high temperatures. Such a change cannot be explained by the sudden introduction of a retarding factor.

Most of the earlier observations on the temperature relations of growth were necessarily incomplete, since they were made over a very restricted portion of the growth-period of the organ concerned. The work of Vogt and Sieber on the coleoptile of oat showed that temperature not only affected the rate of growth, but determined the period during which growth lasted and also the length of the coleoptile finally attained. The object of the author of this memoir was to study further the effect of temperature on the course of the growth-curve and its effect on the size attained when growth ceases at the end of the Sachs "grand period."

The author amplifies the investigations of Vogt and Sieber by numerous experiments on the growth of roots and shoots of various plants. He characterizes the growth-curve of an organ by: (i.) the growth-rate, which he calculates from the equation for Robertson's autocatalytic growth-curve, (ii.) the period during which growth lasts, and (iii.) the final length of the organ. He shows that the shape of the curve is affected by other factors, such as light, soil-moisture, etc. He finds that the greatest rate of growth is shown at an intermediate temperature, and this applies also to the length of the growth period and the length of organ attained. The final length attained, however, reaches its maximum at a lower temperature than the growth-rate and length of growth-period. - V. H. B.
I was privileged to join a select party of the Forestry section for several days in the beautiful George and Knysna district, on the coast east of the Cape Province. This contrasts with the more arid vegetation of the Cape Province in the wealth of forest which clothes the numerous broad deep valleys running towards the coast. Mr. C. Legat, Chief Conservator of Forests of the Union, was in charge of the party, and we were met and conducted by the local Forestry officers. Visits were paid to various areas of indigenous forest where the botanists became acquainted with a bewildering variety of trees, the subject of study by the local foresters with a view to their conservation. Of special interest were some magnificent specimens of the giant Podocarp (Podocarpus elongata).

The great mixture of species in the native forests that remain and their slow growth renders difficult an adequate supply of timber. To meet the demand many thousands of acres have been planted by the Forestry Department with species of Pines, chiefly Pinus insignis and P. Pinaster; P. palustris, P. canariensis, and P. caribae were also grown.

The scenery in this district is remarkably varied and beautiful, the densely wooded valleys contrasting with the comparatively bare high-lying veld and the rugged upper levels of the mountain-ranges.

The business of the Association was opened at Cape Town by a speech of welcome from the Governor-General, the Earl of Athlone, followed by the installation, as President, of Sir Thomas Holland, K.C.S.I. The first meeting was a joint one of the British and South African Associations for the Advancement of Science. The President of the latter, Mr. Jan H. Hofmeyr, read his address, "Africa and Science," a review of the progress in science in South Africa since the visit of the British Association in 1905, and an account of his expedition of the part which South Africa might play in the development of science in the Southern Hemisphere in the future. Sir Thomas Holland's address, "The International Relationship of Minerals" was given later at Johannesburg, where the second week of meetings was held.

The sectional meetings at Cape Town were held in the new University buildings at Rondebosch, some miles from the city, on the other side of Table Mountain. The position is remarkably beautiful, on the slope of the mountain overlooking the Cape Flats which stretch towards the Hottentot-Holland Range in the far distance. The buildings are unpretentious and scarcely worthy of the site. Just above is the fine Rhodes Memorial, commanding an even more extensive view, and below is Groote Schuur, the old Dutch homestead which Rhodes owned and occupied and which is now the official residence of the Premier of the Union.

Several papers of local interest were read before the Botanical Section. Prof. R. S. Adamson gave a concise account of the vegetation of the Cape Peninsula which contains 3000 species of flowering plants, including many endemics. The greater portion is xerophytic bushland characterized by absence of social and herbaceous plants. This includes a very large number of species with no special dominant.

In the full stage of development Silver-tree and other small trees occur on the softer granite rocks, while on the harder granite are large shrubby Proteas; but these communities are very limited in area; the general vegetation comprises a shrubby greatly mixed growth. The patchwork distribution noticeable is due to burning. After a fire geophytes appear, often a remarkable development of Monocotyledons such as Watsonia, Bobartia, and others. On sandy soils communities of Restiaceae follow the fires, and give way in time to xerophytic bush. The prevalent candelabra form of bush is due to the destruction of the lower branches by fire.

Forests are now confined to the most sheltered spots. The trees support woody climbing plants and epiphytes, including many ferns; the undergrowth is not very abundant. Bryophytes and lichens are common. The destruction of the forests is due partly to fire and partly to felling by the early settlers. Regeneration may occur in burnt portions of the forest.

Prof. R. H. Compton described some features of botanical interest in the National Botanic Garden preparatory to the visit by the members; and Mrs. M. R. Levyns discussed the problem of the Rhenoster bush—Elytropappus rhinocerotis,—a shrubby composite with heath-like leaves and small flower-heads which spreads after a veld fire.

A discussion was held on the origin and evolution of the South African Flora. Dr. Marloth referred to various views as to the limitation of the Cape flora proper. Prof. J. W. Bews, speaking for Natal and Zululand, stated that all the various elements of the South African flora are well represented. The hypophyllous bush of the coast-belt is more or less an outlier of the tropical flora. The trees composing it are relatively primitive types, and this view is confirmed by the fact that the wood of one of the commonest, Eugenia (Syzygium) cordata, has been described from the Cretaceous beds of the coast. They are also relatively inefficient and unspecialised physiologically; they carry out their various functional activities at a relatively slow and uniform rate throughout the year. Numerous lianes, a smaller number of epiphytes, and a few forest-herbs are more advanced in response to the effects of the living environment. All have close tropical affinities.

The temperate South African flora in Natal is best represented on the mountain ranges, but isolated species have penetrated through the tropical and sub-tropical elements. On the whole, evidence points to this southern temperate flora being more ancient, in many respects, than the northern. The South African temperate flora connects with that of the Mediterranean region, and that in turn with the North temperate flora of Europe and Asia.

Response to a dry (winter) resting season has been responsible for the maximum amount of differentiation in the sub-tropical flora of the whole eastern side of South Africa, as well as the central, northern, and north-western regions. Natal is peculiarly well situated for studying all the steps in the process. In the dry river valleys conditions are found approaching very closely to central Karroo...
conditions, and the flora is similar. This xerophytic flora is from every standpoint the most highly evolved in South Africa. Probably in future the most fruitful line of research will be in the study of the details of its physiological behaviour.

Prof. R. H. Compton dealt with the Karoo, which is bounded north and east by a “northern” or Central African flora, south and west by a “southern” or circum-antarctic flora. The flora is highly derivative, a miscellaneous assortment of northern and southern types selected through adaptability to aridity and grazing. Both factors act by destroying subaerial growths, and the flora accordingly shows wide area of storage, unpalatability, and regeneration.

Characteristic southern families (Proteaceae, Ericaceae, &c.), typically “hard-wooded” shrubs lacking regenerative powers, though in close contact with the Karoo, do not enter it. Some families, mainly southern in South Africa, can, however, penetrate the Karoo by reason of tendencies to geophily and succulence (Crassulaceae, Geraniaceae, Iridaceae).

The woody flora is largely derived from families with a wide northern and southern distribution (Compositae, Leguminosae, Solanaceae, Sterculiaceae, Acanthaceae, Rubiaceae, &c.). Most species are both distasteful to animals and drought-resistant through chemical means, the few edible species having great regenerative powers. The opportunistic ephemerals belong to widely distributed genera; other herbaceous elements (Gramineae) being outliers of northern or southern provenance.

Geophily, exemplifying storage and grazing survival, is most conspicuous in bulbous monocotyledons, and Liliaceae and Amaryllidaceae are well represented; but many dicotyledonous genera have also taken advantage of geophilous tendencies to colonise Karoo areas. Succulents, combining storage with distastefulness, are the most distinctive Karoo elements. Stem-succulent Euphorbiaceae and Asclepiadaceae are mainly northern, leaf-succulent Aizoaceae and Cactaceae have strong southern affinities, other groups being more general geographically. Karoo stream-beds contain arboreal extensions of northern tree-vegetation.

Dr. I. B. Pole Evans, discussing the country north of the Orange River, as far as latitude 22°W, and west of the Drakensberg escarpment, referred to six types of vegetation—desert, semi-desert, desert-grassland transition, stepppe, savannah, and temperate rain-forests. The South-eastern part of this area lies within the tropics, tropical African forms are to be found over the whole; in fact, the outstanding point about the area as a whole is the very marked invasion of the South African flora by the tropical African flora.

The flora of this area shows affinities also with the floras of tropical America, tropical Asia, and Madagascar.

Prof. Marie-Victorin spoke on some evidences of evolution in the flora of Western America, which extension of area has taken place especially across the tropics. Several theories can be made to explain the facts, but it is suggested that a modified theory of continental movement involves as little hypothesis as any other.
Miss E. S. Saunders gave an account of her work on the morphology of the carpel, and Prof. F. E. Lloyd described the mechanism of the trap in *Utricularia*.

Prof. J. H. Priestley (on the Movement of Water and Solutes in the Tree) claimed that a study of the seasonal activity of the cambium in the tree throws quite a new light upon the processes by which water is moved, in the early part of the growing season, from the trunk into the young shoots, and upon the manner in which organic solutes are transferred downwards in the tree towards the close of the growing season.

Dr. Winifred E. Brenchley, in describing the influence of traces of various elements upon plant-growth, stated that the importance of traces of the rarer elements found in plants is gradually becoming apparent, as it is demonstrated that in certain cases they have a definite physiological function in relation to metabolism. Many elements are known to improve growth if presented in sufficiently small amounts, but it is now evident that minute traces of boron, manganese, zinc, &c., are as essential to the development of some plants as the major nutrients, phosphorus, potash, and nitrogen. There is some evidence to indicate that the discrepant results obtained by various investigators may be due, partly at least, to environmental conditions such as variations in light intensity.

The exact physiological function of these essential traces of elements has not yet been fully determined.

During the meeting Dr. L. Pole Evans exhibited a beautiful series of colour photographic views of South African vegetation prepared by himself and Mrs. Pole Evans.—A. B. R.

(To be continued.)

**ALABASTRA DIVERSA.—Part XXXVI.**

By S. Moore.

(Concluded from p. 231.)

**Crossandra Gossweileri,** sp. nov. *Suffrutex erectus* circa metralis caulisibus erectis sursum simplicibus ligurese fistulosis juncta apiem solutum foliis albis ciliatis foliorum demortuorum signatis primo fulvo-pubescentibus deinque glabris; foliis paucis obovatis vel ovato-oblongis obtusis acuminatis basi in petiolum brevem angustatis membranaceis glabris costis utrinque 10 purpureis extematis glabris; **spicis** brevipedunculatis foliis multo brevioribus late cylindricis; bracteis ovatis vel ovato-oblongis obtusis subpapillosus costa unica brunnea peregrina dorso minute brunneo-punctatis; bracteolis parvis ovatis debillibus spinoceo-acuminatis; *calycis* segmentis bracteolae similibus nisi paullo longioribus angustioribusque obovatis 5-nervibus; *corolla* alba tubo glabro bracteis superane; ovario oblongo glabro.

**ALABASTRA DIVERSA.**

_Hab._ Portuguese Congo, Pôtigami forest, Maiombe, in shady situations along rivulets on the R. N'Zanza; _Gossweiler, 7728._

Stem somewhat anfractuous, in the specimen leafless or with only 2 or 4 leaves. Leaves up to 15×7-5 cm. the smallest 12×4-5 cm.; petioles of the largest leaves 3 cm., of the smallest only 0.6 mm. long, puberulous. Spikes 3-5×3-5×2-9 cm.; on peduncles of 1 cm. or less. Bracts 15-20×6-10 mm. Bracteoles only 3-5 mm. long. Calyx-segments 4-5 mm. long. Corolla-tube 33×1-6 mm.; limb 10 mm. long. Anthers linear, with a slightly curved cucullate appendix, barbeolate at base, elsewhere puberulous, 3 mm. long. Ovary 3 mm. long.

Affinity with _C. guineensis_ Nees and its allies; known from them on sight by the wide spikes.

It is usual for the calyx of _Crossandra_ to have a posticus calyx traversed by 2 nerves and ending in 2 teeth. Several exceptions to this are known; in these cases the segment is similar to the others and like them is entire. The plant under notice makes the eighth exception to the rule, the others being _C. Boivini_ and _longipes_ (Madagascar), _Warneckii_ (E. Tropical Africa), _pinularia_ (S. Central Africa), and _Buntingii, elatior_, and _Tabotii_ (W. Africa).

**Justicia (§ *Rostellaria*) Woodia.** sp. nov. *Herba dumosa* circa semipedalis; *ramis* tenuibus tetragononis sursum foliolosis appresso pubescentibus; *foliis* subobovatis lanceolatis apiis basi brevissimis obtusis in nervis strigosis pilosis utrinque lenticulis; *bracteis* in spicam subulatis foliis paullo breviorum digestis; *spicis* floratibus oblongo-obovatis obtusis tenuissimi unilaterales bracteae brevissimae consanguineaeque et breviorum longe ciliatis; *calycis* segmentis 5 inter se subequebus linearibus acuminatis ciliatis; *corolla* tubo calycei circa acuquadunco labio antico late ovato lobis rotundatis valde aspectabilis labio postico antico paullo breviori quadrato lobis ovatis; *antherarum* loculo inf. breviter obtuseque calcarato; *ovarii* loculis 2-ovulatis; *capsula* oblonga-ovoides acuta basi breviter stipitata squamis pubescentes; *seminibus* tuberculatis.

_Hab._ North Rhodesia, Matabuka; _Mrs. Wood, 23._

Branches straight, barely 2 mm. across. Leaves 8-10×1-5-3 mm., drying dark green; petioles hairy, 3 mm. long. Spike densely flowered, rather less so below and probably farther up when fully grown, 7×2 cm. Floral leaves green, about 1 cm. long. Bract and bracteoles 5-7 mm. long. Calyx-segments 4 mm. long. Corolla blue-grey with yellow throat; lower lip 7 mm. wide, the lobes 1-5×2 mm.; upper lip 4×3 mm. Capsule pale, 5-6 mm. long, apparently 4-seeded. Seeds rounded, covered with large brown tubercles, nearly 2 mm. across.

Affinity with _J. flava_ Vahl and allies; different in flower and capsule.

**Siphonoglossa Migeodii,** sp. nov. *Herbaea, 4 ped. alt., ramis tetragononis gracilibus appresso pubescentibus in nodis strigulis dein glabrescentibus; foliis subobovatis linear-lanceolatis obtusiusculis basi
robundatis in costis paginae utriculique (et alibi sparsum) pilis strigillo-
ossis applicatis instructis; floribus albis in spicis pedunculatis, 
terminalium quam folia breviorum dispositis; folii floribupus linear-
lineolata acutis uti bractea linearis strigillo-pubescentibus; bract-
eolitis angustae linearibus puberulis bracteae brevioribus; calycis se-
mentis 5 inter se subequeabilibus; corolla tubo angusto sursum levissime 
ampleti labio antico late obovato segmentis ovatis rotundatis labio 
postico antico breviori oblongo-ovato breviter bifido; antherarum 
loriculorum verrucosae calcariato; capsula oblonga strum angustata 
pubescente; seminibus 4 tuberculato-rugosis.

Hab. Tanganyika Territory, Tendaguru; F. W. H. Migeed, 137, 
478.

Leaves 8–15 cm. long, in the lower part 9–20 mm. wide, drying 
dark green but paler below; cystoliths on the upper face numerous 
and easily seen. Spike up to 8 ½ cm. long and 7 mm. broad on a 
peduncle somewhat shorter; hairy axis slightly exposed at the base 
of the spike. Floral leaves, bracts and bracteoles green, the first 
±10 mm. long, bracts about 7 mm. and bracteoles 6 mm. Calyx-
segments 4 mm. long. Corolla-tube glandular-puberulous, 13 mm. 
long, in the dry state not above 2 mm. wide; lower lip 8 mm., upper lip 
5 mm. long. Capsule 1 cm. long, including the nearly 3 mm. long 
style. Seeds round, black when ripe, about 1 mm. across.

This is the third tropical African species of the genus, its other 
Old World representatives being endemic in South Africa. In habit 
the present plant resembles S. royiella Clarke, but in other respects 
it is quite different. The genus differs from Justicia only in the 
long slender tube of the corolla; it is the Autojusticia of Lindau.

Diciplerta cubangensis, sp. nov. Herba perennis; caulibus 
ascendentibus a basi ramosos et rhizomate brevi copioso radiciforou 
orundis subsparsum foliis puberulis; folis parvulis bracteolatis 
varia vel oblongo-oblongis basi apicisque obtusis utriculique glabris 
cystolithigerisque; sropheis 2-fornis (lare secundum subeusepto) in spicem 
angustatam terminalvel axilarem digestis; folii floribupiuss lirae 
viatias subulatis puberulis; bracteis exterioribus oblongis obtusis 
pubescentibus quam interiores linear-lanceolata longioribus; calycis 
segmentis bracteis interioribus similius nisi minoribus; corolla 
exitus puberulis tubo sursum leviter ampiato bracteis ext. circa 
equilongo limbo tubum sequantae; staminibus breviter exsertis; ovario 
uti strus glabro.

Hab. Rather rare in moist situations near R. Cubango at Forte 
Prinseza Amelia, Angola; Gosseweiler, 1998.

Plant about a span high. Leaves ±1 cm. long, 4–5 mm. broad; 
petioles 1½ mm. long. Spikes up to 2×1 cm., but usually shorter. 
Floral leaves 1½–2 mm. long. Outer bracts 6–7 mm., interior 5 mm. 
long. Calyx-segments 3 mm. long. Corolla barely 10 mm. long. 
Ovary 1 mm., style 9 mm. long.

Close to the South African D. minor Clarke. The leaves are 
smaller and relatively broader, the bracts are obscure, and the flowers 
smaller.

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PSIADESIA HENDERSONI, sp. nov. Frutex ramosus, crebro folioso, 
leviter resinaceus; rami subteretibus striatis scabriusculo-puberulis; 
foliis sessilibus oblongis mucronatis basi leviter amplexicaulis 
axis versus paucidenticulatis alibi saxiis integris margine revolitis 
subcordatiis utriculique (pretiosum vero pag. sup.) scabriis; capitis 
mediocribus multifoliosculosis corollam brevem ramulos coronamentum 
efficientibus; involucra campanulati minute pubescentes phyllis 3–4-
seriatis oblongis acutis cuneatis calcaratis; capsula oblonga strum angustata 
pubescente; seminibus 4 tuberculato-rugosis.

Hab. British Central Africa, Nyika Plateau; Miss M. S. Hen-
derson.

Leaves mostly 1½–2½ (barely 3) cm. long, 3–5 mm. broad, paler 
below and prominently reticulate. Corollas about 2½–3½ cm., the 
branches slender and minutely pubescent; ultimate peduncles at most 
5 mm. long. Expanded heads 5×8 mm. Outer involucral leaves 
3 mm., inner 4 mm. long. Lamina of ligule 2 mm. long; hermaphro-
dite corolla 4 mm. Achenes 1½–2½, setae of pappus 3½–4½ mm. long.

A very distinct species with its oblong leaves; conspecific with 
it is a plant in the Kew Herbarium collected by Thomson on “Higher 
Plateau north of Lake Nyassa.”

Spheneanthus Taylori var. emodi in Trans. Linn. Soc. (Bot.) xxxvii, 330, 
was described by Robyns when preparing his monograph of the genus 
published in Kew Bull. 1024, 177–196. At that time Robyns had not 
seen a specimen of S. gomphrenoides O. Hoffm., founded on Fischer 
335, but one has since been sent to Kew from Berlin, and this shows 
that S. Taylorii must be cited as a synonym for the other. At the 
Museum is another specimen of this collected by Swynnerton (no. 577) 
at Makara in Tanganyika Territory.

ONDETIA Benth. in Hook. Fl. Pl. 1112 (1872) and Eremothanum 
O. Hoffm. in Engl. Bot. Jahrb. x. 278, tab. ix. b (1888), South-
West African genera, have many points of external resemblance. 
Thus the involucres in other of broad scales in many rows, spiny 
(Eremothanum) or spinulose (Ondetia) is strikingly similar on a 
first view. The heads of each are heterogamous with female outer 
and hermaphrodite inner florets; each has tailed anthers and nearly 
the same style-arms; also a hairy ovary crowned by a pappus of stiff 
seta, short in Bentham’s genus but long in Hoffmann’s. The only 
important difference between the two is found in the presence of 
palaeon on the receptacle of the former and their absence from that 
of the other. Bentham puts his genus in Inuloidae subtribe Buph-
thalmen, of which the chief characteristic is a paleseous receptacle; 
Hoffmann in Senecionidem subtribe Liabeae. But the Liabeae 
except for Gongrothamus, perhaps better included in Vernonies, are 
New World plants and entirely different in habit from Eremothanum. 
On the other hand, there is nothing to exclude the latter from 
Inuloidae, though it cannot be admitted among the Buphthalme.
It is submitted that the proper place for *Eremothamnus* is among the Eu-niulaceae next to *Homochete*.

*Gynura minata* Welw., *Apont.* 586, is an Angolan plant. A Tanganyika Territory variety was described by O. Hoffmann more than thirty years ago. A specimen of this species recently brought by Mr. F. W. H. Migoed (no. 481) from Bamenda in Cameroun would seem to be intermediate between type and variety. This marks a considerable extension in the range of the species.

*Dicoma sessilifolia* Hart. var. Migoedii var. nov., a typo aborrens foliis papyraceis neeron capitula minoribus.

Hab. Tanganyika Territory, Tendaguru; F. W. H. Migoed, 225. Lower leaves obovate-oblong, acute to very obuse; midrib very broad; drying grey-green above, silvery tomentose below, up to 10×4.5 cm. Capitula numerous, sessile along the branches, 15×10 mm.

The genus *Lopholena* DC.

This was proposed in 1837 by A. P. De Candolle (*Prod. vi.* 835) for a South African plant of D'Orge's finding (*L. dregeana*) which has been collected of recent years by others in Natal. Its chief characteristic, and the one giving rise to the name, is a plate-like outgrowth running down the back of each involucral leaf and lying in a plane at right angles to that of the leaf. Other points are the involucres of five broad leaves, the capitula with tubular hermaphroditic florets and the long linear flattish style-arms hairy on the back, and thus differing from most of *Ternonia*, *Senecio*, and *Othonna*. But before this notice was given some of the species have been confused. The genus remained monotypic until Bentham, notwithstanding the absence of a dorsal plate from its involucral leaves, with rare sagacity described (Hook. f. *Pl.* 1113, 1872), as *L. platyphylla*, a Natal plant differing from *L. dregeana*, besides the point just mentioned, in having a 7-leaved involucral leaf.

To these two species I added in 1894 (*Bull. Herb. Bois. sér.* 2, iv. 1021) five more, all but one of them removed from *Othonna*, *Senecio*, or *Othonnopsis*. But before this notice was given some of the species have been confused. The genus remained monotypic until Bentham, notwithstanding the absence of a dorsal plate from its involucral leaves, with rare sagacity described (Hook. f. *Pl.* 1113, 1872), as *L. platyphylla*, a Natal plant differing from *L. dregeana*, besides the point just mentioned, in having a 7-leaved involucral leaf.

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The species just mentioned (*L. phyllodes*, comb. nov.) has a broad tomentose band running down the back of each involucral leaf, and tranverse sections of a leaf showed it to be composed of three parts, a thin basal cellular foundation (the "base"), a thicker portion ("pad") with vascular bundles, and superimposed on the latter a broad hairy "crest" also vascular (*fig. 3, b, p, c*). This structure is similar to that of *L. dregeana* (*fig. 1*), except that the cushion-like crest replaces the flat plate of the other. *L. platyphylla* resembles the

Former of these two except for its glabrous crest (*fig. 2*). The other species are without a crest, but with base and pad as before (*fig. 4*). This difference in the involucres is made use of in the accompanying clavis.

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§.PLATYPHYLLA. Appendix to involucral leaf a erect lamina

1. L. dregeana.

§.PLATYPHYLLA. Involucral appendage cushion-like.

Cushion glabrous

2. L. platyphylla.

Cushion villous-tomentose

3. L. phyllodes, comb. nov.

(*Ternonia phyllodes* Hiern.)

§.ALOPEA. No involucral appendage.

Leaves distichous.

4. L. disticha.

Leaves few or solitary, 1 cm. diam.

5. L. segmentata.

(*Senecio segmentatus* Oliv.)

Leaves scattered.

Leaves few together or solitary.

6. L. ussangrensis, comb. nov.

(*Senecio ussangrensis* O. Hoffm.)

Leaves oblong-lanceolate, up to 2.5 cm. long.

7. L. randii.

Leaves oblong-lanceolate, up to 5 cm. long.

8. L. bainesti, comb. nov.

(*Othonna bainestii* Oliv. & Hiern.)

Leaves linear or linear-oblongate, up to 4 cm. long.

9. L. dolichopappa.

(*Senecio dolichopappus* O. Hoffm.)

Leaves linear, up to 10 cm. long.

10. L. cneorifolia.

(*Doria cneorifolia* DC. *Othonnopsis* Benth.)

Leaves in panicles.

11. L. bicallosa.

Specimens of all these except *L. ussangrensis* are in the British Museum Herbarium.

The following variety is here added to the genus:

*Lopholena randii* S. Moore var. *brachycephala*, var. nov., a typo aborrens involucris brevioribus (vix 1 cm. long.) disciformis paucioribus (13).
Hab. Rhodesia, Makoni, on exposed summit of mountain; *F. Eyles*, 741, in Herb. Mus. Brit.
A low shrub, 2–3 ft. Leaves subblishy; florets pink-tinted.
The genus extends from Natal through the Transvaal and Rhodesia to the southern part of Tanganyika Territory; there are also three Western species (S.W. Africa to Angola), and one in the western part of the Cape Province.

MARINE ALGAE OF THE COAST OF WALES.
By T. KENNETH REES, M.Sc.
(University College of Swansea).
(Concluded from p. 254.)

RHODOPHYCEAE.


*Erythrotrichia carnea* J. Ag. Loughor (Young).

*Bangia fusco-purpurea* Lyngb. Mumbles (Dill.); Dunraven Castle (Young); Anglesey (Dav.); Anglesey, Puffin Island (H. G.); Gornal Goch (G.); Aberystwyth (N.U.T.).

*Porphyra lineata* Grrev. Anglesey (D.); Anglesey (Dav.); Puffin Island (H. G.); Aberystwyth (N.U.T.).

*P. umbilicata* Kütz. *f. laciniata* J. Ag. Appears in Gutch's list without locality. Anglesey (Dav.); St. David's (Evans); Menai Straits, Penmon etc. (G.); Newport, Pemb. (Cotton).

*Aerocystis virgatum* J. Ag. Afon Alaw (Br.); Puffin Island (H. G.).


A. Daviesii Nág. Anglesey (Dav.); Anglesey, Puffin Island (H. G.); Holyhead (G.).

*Nemalion* sp. Cotton records an association of which this is the dominant at Dinas Bay (Pemb.).

*Helmithora diversicata* J. Ag. Anglesey (D.); Aberffraw (R.).

*Scinaria fucellata* Bivona. Menai Bridge (Dav.); Aberystwyth (M.); recorded by Gutch, but not locally specified.


G. cornuum Lamour. Worms Head (Dill.); Worms Head, Bracelet Bay (Gutch); Puffin Island (H. G.); Aberffraw, Llanddwyyn etc. (G.).

G. latifolium Born. Ynys-y-moch (Br.); Penmon (G.).

*Chondrus crispus* Stackh. Anglesey (Dav.); Bracelet Bay (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H. G.); “Common” (G.); Aberystwyth (N.U.T.).

C. crispus f. stelligerus Turn. Conway (Br.).


*G. stellata* Batt. Anglesey (Dav.); Bracelet Bay (Gutch); Anglesey, Puffin Island (H. G.); Carnarvon, Port Dinorwic, Aberffraw (G.).

*Phyllophora ephippium* Batt. Anglesey (D.); Mumbles, Worms Head (Gutch); Puffin Island (H. G.); Penmon, Swillies, S.W. Anglesey, etc. (G.).

P. Brodiyi J. Ag. Llanddwyyn (Dav.); Penmon (Holmes); Swillies, Penmon, Aberffraw, Carnarvon (G.).


P. membranifolia J. Ag. Menai Bridge (Br. & Green); Anglesey (Dav.); Anglesey, Puffin Island (H. G.); Menai Straits, Llanfaelog (G.); Aberystwyth (N.U.T.).

*Gymnogongrus Griffithia* Martius. Aberystwyth (M.); Griffith's Crossing, Beaumaris (G.).

*G. norvegicus* J. Ag. Swansea, Mumbles (Dill.); Aberystwyth (M.); Rhyll (H. G.); Penmon (G.).

*Ahnfeltia plicata* Fries. Llanfaethlwyd (Br. & Green); Anglesey (D.); Aberystwyth (Brown); Anglesey (Dav.); Bracelet Bay (Gutch); Puffin Island (H. G.); Llangyfawr etc. (G.); Aberystwyth (N.U.T.).

*Actinocyclus setubalensis* Rosenv. Anglesey (B.).

*Cobaclela insularis* Schm. Wales (B.).

*Callophyllis laciniata* Kütz. Anglesey (Dav.); Anglesey, Puffin Island (H. G.); Penmon, S.W. Anglesey (G.).

*Callymenia microphylla* J. Ag. Bangor (B.).

*Gyrostomium purpureum* Batt. Carnarvonshire (Br.); Ynysfadog-goch (D.); Anglesey (Eoulkes); Anglesey (Dav.); Anglesey, Puffin Island (H. G.); Bangor, Aberffraw (G.); Aberystwyth (N.U.T.).

*Catenella regens* Batt. Puffin Island (D.); Anglesey (Dav.); Tenby (Stackhouse); Puffin Island (H. G.); Menai Bridge, Carnarvon (G.).


*Rhodophyllum bifida* Kütz. Anglesey (Dav.); Puffin Island (H. G.); Holyhead (G.).

*Sphaerococcus coronopifolius* Grrev. Llanfaethlwyd (D.); Aberystwyth (M.).

*Gracilaria confervoides* Grrev. Anglesey (Dav.); Bracelet Bay (Gutch); Aberystwyth (M.); Wales (H. G.); Llangyfawr, Menai Straits, etc. (G.); Aberystwyth (N.U.T.).

f. procerrima Turn. Holyhead (B.).

*Calliblepharis ciliata* Kütz. Anglesey (Dav.); Mumbles (Gutch); Anglesey, Puffin Island (H. G.); Penmon, Carnarvon, Port Dinorwic (G.).
C. lanceolata Batt. Llanfaethly (Br.); Bangor, Abergegyn (G.).
Rhodymenia Palmetta Grev. Bracelet Bay (Gutch); Anglesey, Puffin Island (H.G.); Menai Straits (G.).
R. palmata Grev. Ynys-y-Moch (D.); Anglesey (Dav.); Mumbles (Gutch); Aberystwyth (M.); Puffin Island (H.G.); Swillies, Menai Straits etc. (G.); Aberystwyth (N.U.T.).
L. sarniensis Grev. Anglesey (Dav.).
L. soliflora J. Ag. Aberystwyth (M.).
Cordylocidalia erecta J. Ag. Beaumaris, Penmon (G.).
Lomentaria articulata Lyngb. Anglesey (Dav.); Bracelet Bay (Gutch); Aberystwyth (N.U.T.); Puffin Island (H.G.); Swillies (G.).

L. clavellosa Guill. Ynys-y-Moch (Br.); Anglesey (Dav.); Aberystwyth (M.); Griffith's Crossing to Port Dinorwic, Penmon (G.).
Champia parvula Harr. Friars to Penmon (G.).
Chylocladia katiiformis Hook. Swansea (Dill.); Anglesey (Dav.); Aberystwyth (M.); Anglesey (H.G.); Carnarvon to Port Dinorwic, Aberffraw (G.).
C. ovatus Batt. Anglesey (Jones); Anglesey (Br.); Caswell, Worms Head (Gutch); Worms Head (Dill.); Aberystwyth (M.); Llangyfam, Aberffraw (G.).

Plocamium coccinum Lyngb. Anglesey (Jones); Anglesey (Dav.); Mumbles, Langland Bay (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H.G.); Menai Straits etc. (G.).

f. uncinitum Ag. S.W. Anglesey, Penmon (G.).
N. nitophyllum punctatum Grev. Llanfaethly (Br.); Swansea (Dill.).
N. Gneimini Grev. Bracelet Bay (R.); Mumbles, Bracelet Bay (Gutch.).

N. ramorum Batt. Ynys-y-Moch (Br. & D.); Trefadoc (Dav.); Bracelet Bay (Gutch); Aberystwyth (M.); Puffin Island (H.G.); Llangyfam, Gorad Goch, Menai Bridge, etc. (G.).
Phycodrys rubens Batt. Swillies (Br.); Worms Head (Dill.); Anglesey (Dav.); Mumbles (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H.G.); Swillies, Penmon etc. (G.).

Delesseria sanguinea Lamour. Anglesey (Dav.); Bracelet Bay (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H.G.); Aberffraw, Rhosneig, Holyhead, Gorad Goch, Menai Straits (G.).
D. alata Lamour. Anglesey (Jones); Anglesey (Br. & Green); Anglesey (Dav.); Aberystwyth (M.); Anglesey, Puffin Island (H.G.); Gorad Goch, Aberffraw, Penmon (G.).

D. hypoglossum Lamour. Bangor (Br.); Worms Head (Dill.); Anglesey (Dav.); Bracelet Bay (Gutch); Puffin Island (H.G.); Langyfam, Griffith's Crossing, Penmon etc. (G.).

Bostrychia scorioides Mont. Anglesey (Dav.); Dolgellau, Menai Bridge, Barnmouth (R.); Anglesey, Puffin Island (H.G.); Menai Bridge, Holyhead (G.); Point of Ayr (B.); Llanmadoc Salt Marsh (Rees).
Rhodomela subfuscus Ag. Llanfaethly, Ynysfaedogoch (Br.); Anglesey (Dav.); Bracelet Bay (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H.G.); Carnarvon, Aberffraw, Penmon (G.).
R. lycopodioides Ag. Puffin Island (H.G.); Holyhead, Aberffraw (G.).


Laurencia obtusa Lamour. Worms Head (Dill.); Menai Straits, Pwllheli (G.).
L. cespitosa Lamour. Llanfaethly (Br.); Puffin Island (H.G.); Aberystwyth (N.U.T.); Llangyfam, Carnarvon, Pwllheli (G.).
L. pinnatifida Lamour. Llanfaethly (D.); Anglesey (Dav.); Puffin Island (H.G.); Llangyfam, Gorad Goch (G.).
Chondria tenuissima Ag. Anglesey (Dav.).
C. daephylla Ag. Mumbles (Dill.); Penmon, Gallow Point (G.).

Polyphoria macrocarpa Harv. Puffin Island (H.G.).
P. fibrata Harv. Puffin Island (H.G.); Bangor (G.).
P. urococata Grev. Puffin Island (H.G.); Garth Ferry, Menai Bridge, Pwllheli (G.); Aberystwyth (N.U.T.).

f. patens J. Ag. Bracelet Bay (Gutch); Puffin Island (H.G.); Holyhead (G.); Aberystwyth (N.U.T.).
f. formosa J. Ag. Puffin Island (H.G.); Carnarvon to Griffith's Crossing, Tubular Bridge (G.).
f. comosa J. Ag. Swansea (Dill.); Anglesey (Dav.).
P. elongella Harv. Anglesey, Puffin Island (H.G.); Bangor (G.).
P. elongata Grev. Ynys-y-Moch (Br.); Anglesey (Dav.); Bracelet Bay (Gutch); Aberystwyth (M.); Puffin Island (H.G.); Aberystwyth (N.U.T.).
P. violacea Grev. Anglesey (Dav.); Carnarvon (R.); Friars to Penmon, Carnarvon to Port Dinorwic (G.); Aberystwyth (N.U.T.).
P. variegata Zan. Puffin Island (H.G.); Beaumaris (G.).
P. fastigiata Grev. Anglesey (Dav.); Anglesey (D.); Bracelet Bay (Gutch); Menai Straits (G.); Anglesey (H.G.); Aberystwyth (Rees).
P. nigra Batt. Gower (Dill.); Carnarvon to Port Dinorwic, Beaumaris (G.).
P. nigrescens Grev. Ynys-y-Moch (Br.); Anglesey (D.); Anglesey (Dav.); Bracelet Bay (Gutch); Anglesey, Puffin Island (H.G.); Aberystwyth (N.U.T.); “Common” (G.).
C. tetragonum Ag. Caswell, Langland, Swansea (Dill.); Caswell, Langland (Gutch); Puffin Island (H. G.);
C. tetrix Ag. Mumbles, Gower (Dill.); Mumbles, Bracelet Bay (Gutch); Llangwyfan (G.).
C. corystosum Lyngb. Puffin Island (H. G.); Trecastel, Beaumaris, Holyhead (G.).
C. granulatum Lyngb. Holyhead (R.); Puffin Island (H. G.).
Seirospora Griffithiana Harv. Beaumaris (G.).
Compsothamnion thyoides Schm. Bracelet Bay (R.); Bracelet Bay (Gutch).
C. gracillimum Schm. Milford Haven (R.); Beaumaris (H. G.).
Plumaria elegans Schm. Llanfaethly (Br. & Green); Anglesey, Puffin Island (H. G.); Menai Straits etc. (G.); Aberystwyth (N.U.T.).
Ptilota plumosa Ag. "Abundant" (Dill.); Anglesey (Dav.); Holyhead (R.); Holyhead, Puffin Island (H. G.); Holyhead (G.).
Antithamnion eruciatum Näg. Milford Haven (R.); Beaumaris (G.).

C. Plumatia Thur. Caswell Bay (Dill.); Bracelet Bay (Gutch); Aberystwyth (M.); Beaumaris (G.).
C. f. ovipum J. Ag. Beaumaris (G.).
Syphridia filamentosas Harv. Holyhead, Aberffraw (R.); Holyhead (H. G.); Beaumaris, Llangwyfan, etc. (G.).
Ceraminium tenuissimum J. Ag. Anglesey, Puffin Island (H. G.); Griffith's Crossing, Carnarvon (G.).
C. strictum Harv. Garth Ferry, Bangor (G.); Aberystwyth (N.U.T.).

C. diaphanum Roth. Anglesey (D.); Anglesey (Dav.); Aberystwyth (M.); Worms Head (Gutch); Puffin Island (H. G.); Aberystwyth (N.U.T.).
C. Deslongchampsii Chauv. Anglesey (D.); Swansea (R.); Puffin Island (H. G.); Menai Straits (G.); Llandudno (B.).
C. circinatum J. Ag. Ynys-y-Moch (Br.); Anglesey (D.); Puffin Island (H. G.); Beaumaris (G.).
C. tenue J. Ag. Anglesey (D.).
C. rubrum Ag. Ynys-y-Moch (Br.); Anglesey (D.); Anglesey (Foules); Anglesey (Dav.); Swansea (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H. G.); "Common" (G.); Aberystwyth (N.U.T.).
C. citratum Duc. Anglesey (Dav.); Worms Head (Gutch); Puffin Island (H. G.); Aberystwyth (N.U.T.).

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C. acanthonotum Carn. Puffin Island (H. G.); Aberffraw (N. U. T.); Aberystwyth (N. U. T.).

Gloiosiphonia capillaris Carn. Llangwyfan (Dav.); Anglesey (H. G.); Treffaco (G.).

Grateloupia filicina Ag. Aberystwyth (R.); Aberystwyth (M.); Menai Straits (G.).

Dumontia incrassata Lamour. Ynys-y-Moch (Br.); Swansea (Dill.); Bracelet Bay, Mumbles (Gutch); Anglesey, Puffin Island (H. G.); Aberystwyth (N. U. T.); Aberffraw, Carnarvon to Port Dinorwic (G.).

Dilsea edulis Stackh. Wales (Llwyd); Anglesey (Br.); Anglesey (Dav.); Abergaele, Denbighshire (J. W. Griffith); Mumbles (Gutch); Aberystwyth (M.); Anglesey, Puffin Island (H. G.); Swillies, Porth Dafarch (G.).

Halarachnia liguilatum Kütz. Anglesey (Dav.); Aberffraw (R.); Anglesey (H. G.).

Furcellaria Jutigla Lamour. Anglesey (Dav.); Worms Head, Swansea (Gutch); Aberystwyth (M.); Llangwyfan, etc.; Menai Straits (G.); Aberystwyth (N. U. T.).

Polysiphon rotundus Grev. Carnarvon (D.); Anglesey (Dav.); Mumbles, Bracelet Bay (Gutch); Aberystwyth (M.); Anglesey (H. G.); Penmon, North Dafarch (G.); Aberystwyth (N. U. T.).

Petricelis cruenta J. Ag. Puffin Island (H. G.); Llanfairwgwr, Aberffraw (G.).


f. rosea Kütz. Port Dinorwic, Carnarvon (G.); Puffin Island (H. G.); Aberystwyth (N. U. T.).

Schnitzia endophylla Born. & Batt. Puffin Island (H. G.); Bangor, Anglesey (B.).

Melobesia farinosa Lam. Puffin Island (H. G.).


Lithothamnion ichonoides Fosl. Llangwyfan (Holmes); Aberystwyth (N. U. T.).

L. Lenormandi Fosl. Puffin Island (H. G.); Llangwyfan (G.).

L. oretiforme Fosl. Llangwyfan (G.).

Phymatolithon polymorphum Fosl. Llangwyfan (G.).

Corallina officinalis L. Bangor (Br.); Anglesey (D.); Carnarvon (R.); Aberystwyth (M.); Anglesey, Puffin Island (H. G.); Aberystwyth (N. U. T.); Gereid Goch, Penmon, Llangwyfan, etc. (G.).

C. rubens Ellis & Soland. Llanfaethlu (Br.); Puffin Island (H. G.); Llangwyfan, Penmon, Porth Dafarch, etc. (G.).

f. corniculata Hauck. Llanfaelog (P.).
the most interested of all in the announcement of the second edition of the Pflanzenfamilien.

It perhaps hardly needs to be said that every systematist must have access to the work. The old edition has been extremely useful to mycologists in general and the new edition will take its place as the most complete and trustworthy account of the classification of fungi. The authors of the part under review deserve the thanks of mycologists for the skill with which they have condensed their matter and given an invaluable synopsis, which on that account will find its way to the many remote places where the study of fungi is carried on.

The announcement of the fact that a volume has appeared suffices for most purposes, but a few somewhat general remarks seem necessary. The present volume deals with Hemibasidiid (Ustilaginales and Uredinales) and part of the Eubesidii (Hymenomyctes). The remainder of the Basidiomycetes (together with Fungi Imperfecti) will comprise another volume, the treatment to be completed in three volumes, numbered 5, 6, and 7, in place of two volumes of the first edition with their inconvenient Teil and Abteilung.

The veteran P. Dietel has again written up the rusts and smuts, but Lindau and P. Hennings, who were responsible for the Auriculariales etc. and Hymenomyctes etc., respectively, of the first edition have died in the thirty years or so which have elapsed, and their portion has been undertaken by S. Killermann.

The first thing that strikes one in comparing the two editions is that Dietel’s portion occupies only 98 pages in place of 81 (+8) in spite of there being 50 figures instead of 55; and Killermann succeeds in compressing the 195 (+2) pages of the first edition into 185 pages with 77 figures in place of 70. This has been possible owing to the use of a slightly lower format and by shortening the parts in small type.

Most of the illustrations of the first edition are repeated and much excel in every way the majority of the additional ones, many of which look like very inferior wood-cuts, being poor in draughtsmanship and in execution; some of the figures of agarics—e.g., Tuberia furfuracea—are unrecognisable. The five plates showing ten habitat photographs of different Hymenomyctes (a new feature) for the most part are excellent.

A praiseworthy innovation is the addition of references to the original generic descriptions; another is the absence of Appendices which made the first edition difficult to use. The general method of presentation has not been altered and requires no comment beyond saying that the attempt has been made to bring the introductory portions up to date.

The treatment of the Ustilaginales with the two families Ustilaginae and Tilletiaceae is now much more satisfactory than in the first edition, where about a third of the genera were in an appendix.

The treatment of the Uredinales was generally considered one of the best of all, though it was frequently overlooked that they are reclassified in an appendix. There have been great changes here, and in place of 37 genera we have 102. A large number of these additions are due to following the generic concepts of the American urdinologist Arthur. There are two families, Melanopasraceae with 19 genera in 5 subfamilies and Pucciniaceae with 88 genera in 15 subfamilies. It is not possible here to consider the changes critically; on general grounds it does not appear advantageous to multiply genera and subfamilies to this extent in a work intended for botanical classes, though it must be admitted that it necessitates a more careful analysis than served formerly, and consequently may have good influence. Until recently Arthur has had few followers in Europe, though Sydow since the war has somewhat overrun him. That Dietel has been somewhat conservative appears from the fact that twelve synonyms are given for Uromyces and eighteen for Puccinia “weil die Ansichten über ihre Aufteilung in kleinere Genera noch zu wenig geklärt sind.”

The treatment of the Hymenomyctes seems very much better than it was formerly. In a “Vorbemerkung” Killermann pays a high tribute to Bresadola, who gave him the benefit of his wide experience, particularly with Thelephoraceae and Polyporaceae. Here one has the feeling that conservatism is too pronounced, and possibly Bresadola’s influence may be seen in this; at eighty years of age and situated as he was, it is hardly credible that he could keep abreast with mycological results, even though his pioneer work and his continued eminence were universally recognised. The Hymenomyctes are divided into Tremellineae and Hymenomycetinae with further division into Auriculariaceae, Tremellaceae, and Dacryomycetaceae and Exobasidiaceae, Hymenochaete, Thelephoraceae, Polyporaceae, Hydnaceae, and Agaricaeae respectively. There is thus a more even division than Lindau and Hennings adopted. The details of the classification call for little comment, though, as will be readily understood, there are numerous changes in the Tremellinae and the resupinate Hymenomycetaceae. The Thelephoraceae are subdivided into seven tribes, four of which have new names. There are also new names for subfamilies, tribes, and generic sections in the Polyporaceae. For the rest there is little change. The Agaricaeae have two main sections, Chromosporae and Leucosporae, the first being further split into Ochropsorae, Melanopasraceae, Rhodopasraceae, and Chloropasraceae, which is merely a slight shuffling of the older grouping and places no importance on structure and development.

Following Weese, Phleogonae replaces Pilaceae, Phleogena being adopted instead of Pilaceae.

One or two points have been noticed which call for comment, leaving out of account several minor matters chiefly concerning geographical distribution; a few errors are unavoidable in a work of this magnitude.

After many of the sections there is a list of “Zweifelhaftete Gattungen,” which sometimes is a peculiar medley. That Eozonartium should appear in one of these lists is surprising, for its life-history is well known through Fitzpatrick’s investigations.

The difficulty of a specialist keeping abreast with work on all groups shows itself here and there, but particularly in the treatment of Exobasidiaceae. No mention is made of the discussions of the
systematic position of *Microstoma*, which have continued from 1847—
for papers appeared in 1827 and 1828, the one assigning it to Hyphomy-
cytes, the other to Basidiomycetes. *Urobasidium* might well have
been placed amongst doubtful genera; in my opinion it is not a
Basidiomycete but a Hyphomycete, which has been known as *Eugyo-
tella*, *Pirunia*, and *Uroblasta*; and, moreover, is the type of
Vuilliein's *Proprialdes*. In the doubtful genera we find *Protocorono-
spora*. Wolfe has shown this also to be a Hyphomycete, and Karakulov
considers it synonymous with *Kabatiella*, *Pachybasiella*, and *Exo-
basidiopsis*, and this list might be added to.

Other Hyphomycetes which find a place are *Cladorstigma*, though
in a doubtful list—incidentally 1907 is spoken of as "newerings";
*Aureobasidium* (*Domatium* *auct.*), as shown by Arnaud, and *Hisro-
tella*, which still finds a home in Clavariaeceae in spite of recent work.
*Sporassia* is also retained in this family, though, as Cotton showed,
it is allied to *Stereoae*.

Petch's work on *Matula* likewise has been overlooked—*Michenera*,
*Arthrocarpes*, and *Matula* are not all conidial stages of *Corticium
subgiganteum* as Killermann states, but only the first; the other two
are synonyms for the conidial stage of *Peniophora Habgaliae*.

J. Ramsbottom

By A. E. Clark-Kennedy, M.D. 8vo, pp. xii, 256, pls. xiv.

The name of Stephen Hales is familiar to the botanist as the
author of *Vegetable Statics* and the pioneer in the experimental
study of transpiration and the gaseous exchanges between the leaves
of plants and the atmosphere. Few know him as the man of wide
and diverse interests—country rector, philanthropist, pioneer of ven-
tilation in prisons and on ship-board, prohibitionist, trustee of a New-
World colony, and friend of royalty—who is revealed in Dr. Clark-
Kennedy's eminently readable biography.

In 1727 the Master and Fellows of Corpus Christi College,
Cambridge, decided to celebrate the two hundred and fiftieth anni-
versary of the birth of Stephen Hales, and it fell to the lot of
Dr. Clark-Kennedy to give a short account of his life and work.
This has developed into the volume now before us.

Hales, who came of an ancient Kentish family, entered Bens't
College, as Corpus Christi was then called, in 1696. He made direct
measurements of blood-pressure by numerous experiments on living
animals, and studied the mechanics of circulation and the action
of the heart. In 1718 he was elected a Fellow of the Royal Society,
and was admitted by Sir Hans Sloane (Vice-President) on Nov. 20.
In the same year he communicated his first paper upon the effect
of the sun's warmth in raising the sap in trees. In his second paper,
read Jan. 1725, he demonstrated clearly the importance of three
factors in the upward flow of sap—transpiration, capillarity, and root-
pressure, though he was unable to explain the last. In his *History
of Botany* Sachs pays tribute to the soundness of Hales's work in his
efforts to trace the phenomena of vegetation to mechanico-physical
laws as then understood.

Hales’s work on respiration and the gaseous metabolism of plants
was hampered by the lack of knowledge as to the constitution of air.
The discovery of oxygen by Priestley and the work of Lavoisier came
some years after the death of Hales. But he was able to conclude
that the leaves of plants played a part comparable with that of
the lungs of animals, and suggested that light also, by freely entering
the expanded surfaces of leaves and flowers, may contribute much
to the ennobling of the principles of vegetables.

He was admitted Fellow of Corpus in 1703, and in the same year took
his M.A. and was ordained Deacon. Hales had studied physical science,
but now became friendly with Francis Stukeley whose interests were on
the biological side. Together they dissected frogs and other animals and
went simpling with Ray's "Catalogus plantarum circa Cantabricum
nascentium" in their pockets. It had been suggested that Stukeley
should bring out a new edition of that work, but he left Cambridge in
1709 and the idea was dropped. In the same year Hales also "went
down," having been appointed "Perpetual Curate" of the Parish of
Teddington, Middlesex. Here he spent the rest of his days, except
for long summer visits to Farrington near Winchester, of which he was
appointed Rector in 1722, holding this in addition to the living at
Teddington. Here he was a neighbour of Gilbert White of Selborne,
who writes of him as "my most valuable friend." Hales was a
conscientious parson, and the notes in the registers indicate that he
had an eye to the morals of his parishioners. His sermons, moral
dissertations based on gospel teaching and "supported by arguments
drawn from natural science," appealed to his people, and within five
years it became necessary to enlarge the church.

In this country parsonage Hales pursued the various scientific
investigations of which Dr. Clark-Kennedy gives some account in
the successive chapters of his book.

The *Vegetable Statics,* embodying an account of his experiments,
as read at several meetings of the Royal Society, was published in
1727. In the same year he was elected a member of the Council
of the Royal Society. In 1723 his "Haemastatics," embodying the
results of his twenty-year old experiments on blood-pressure, was
published, and the University of Oxford conferred upon him the
degree of D.D.

Hales was now becoming known in the outside world. He became
interested in missionary work in the New World, was appointed one
of the Trustees for the colony of Georgia, and played an active part
in promoting the Gin Act of 1736. Later we find him engaged in
experiments upon the ventilation of ships, prisons, and mines. In
1754 he played an active part in the foundation of the Royal Society
of Arts. On the death of Sir Hans Sloane, President of the Royal
Society in 1755, Dr. Hales was elected in his place as British repre-
sentative and one of the eight Foreign Members of the Royal
Academy of Sciences in Paris. In 1751 he had been appointed Clerk
of the Closet and Chaplain to the Princess Dowager, and frequently

...
BOOK-NOTES, NEWS, ETC.

IMPERIAL MYCOLOGICAL CONFERENCE.—The second Conference, under the auspices of the Imperial Bureau of Mycology, was held in the Imperial College of Science and Technology, South Kensington, from September 23 to 28. The Conference was opened by the Rt. Hon. the Earl Buton, Chairman of the Managing Committee, after which Dr. E. J. Butler, the Director of the Bureau, reviewed the activities of the Bureau during the last five years. Subjects for discussion included Root-diseases of Orchards and permanent Plantation-crops, the existing organization of plant-pathological (plant protection) services in various parts of the Empire, Virus Diseases, Seed-borne Diseases, Epidemiology of common diseases in Cereals, Diseases developed in Fruit shipped Overseas, Soil-borne and Soil-induced Diseases, and the Control of Insect-pests by Entomogenous Fungi. Visits at the close of the Conference were arranged to the Research Stations at East Malling, Rothamsted, Long Ashton, and Cambridge.

Lt.-COL. GEORGE HENDERSON, M.D., F.L.S.—The death, on June 23 last, at the advanced age of 82, is announced of Dr. George Henderson, late I.M.S. In 1870 he joined, as Medical Officer and Scientific Collector, Sir Douglas Forsyth's mission to Yarkand, and with the late A. O. Hume, published an account of the expedition—Lahore to Yarkand—illustrated by his own photos and drawings of birds and plants. In 1872 he was appointed Director of the Royal Botanic Gardens, Calcutta, and introduced Ipeacacuanha to the Cinchona plantations at Darjeeling. He designed or improved numerous public gardens at Lahore and elsewhere in Northern India and introduced the Eucalyptus, as a shade tree, with success. He was elected F.L.S. in 1872.

THE EDITOR returns grateful thanks to Mr. Gepp for his assistance in producing the August and September numbers of the Journal. Some delay in the issue of the October number is due to the fact that the Editor did not return from Africa till towards the end of September.
terrestrial vegetation, or our imagination may enable us to picture a pre-Cambrian land occupied by colonies of primitive plants simpler than any so far discovered in the older Palaeozoic strata. Passing higher in the geological series to the marine sediments and associated lavas and volcanic ash included in the Cambrian, Ordovician, and Silurian systems we find clear evidence of the existence of lime-secreting Algae, the precursors of some of the modern reef-forming seaweeds, and in Silurian strata, a few traces of plants which probably lived on dry land. It is true to say that as yet we know practically nothing of the terrestrial vegetation of the world before the beginning of the Devonian period. The lapse of time represented by that portion of the earth's crust comprised within the pre-Cambrian, Ordovician, and Silurian periods is much longer than the duration of all the other geological periods put together. What is the story of evolution hidden in the pre-Cambrian and in the earlier Palaeozoic formations? This is a question which appeals with especial force to the imagination: though it is too much to expect that we shall ever discover the earliest links in the chain of life, we may with confidence expect to find remains of pre-Devonian terrestrial plants which, I venture to think, will surprise us by their relatively high level of organisation. The more we know of the older floras, the more difficult it becomes to form a clear conception of the course of evolution in the plant-world. We are unable to define the properties of generalised types and primitive ancestral forms, but while among the earliest-known members of the plant-kingdom there are undoubted examples of structure which may be described as more primitive than anything we know in the world to-day, we note a surprising resemblance in the general plan of construction between the inconceivably ancient and the most modern members of the plant-kingdom. Attention has been directed by many writers to the recently acquired knowledge of the floras that have left well-preserved samples in rocks of the Devonian period: we speak of Devonian plants as the oldest known relics of terrestrial vegetation; but we cannot believe that in them we have the first of a succession of colonists which spread over the face of the earth. Whether they are regarded as the modified descendants of more ancient types, which evolved in the sea and subsequently accommodated themselves to existence above the tides; or whether we prefer to think of Devonian plants as descendants of Silurian or still older progenitors, the fact remains that there are many that are shrouded in mystery. Stress has been laid on certain morphological features presented by members of the older Devonian floras; on the other hand, we must remember that the best-known of these extinct plants lived in swamps and under conditions that were favourable to their preservation as fossils. We know only in part: our knowledge is based largely on a particular kind of plant association, which from the nature of its habitat escaped destruction during recurrent geological convulsions; and it is reasonable to assume that there were contemporary associations occupying other situations of which we know nothing.

A few plants have been recorded from Devonian rocks in South Africa, but the records so far obtained from beds below the Karroo system are very disappointing. It is almost entirely from Devonian rocks of the northern hemisphere that our information has been gained: Australia has furnished a few specimens, and a few fragmentary remains have been described from the Falkland Islands.

Leaving the Devonian period we pass to the Carboniferous and Permian periods, and here there is much to discuss which has a special application to South Africa. In the northern hemisphere the rocks of the Carboniferous system tell a fairly clear story: during the first half of the period comparatively deep seas spread over wide areas in North America and Europe in which there slowly accumulated masses of calcareous material, derived mainly from shells of marine organisms and the framework of lime-secreting algae.

At many localities abundant disjuncta membra of plants have been found in sediments deposited in shallow water near the coast, and in volcanic ash flung from craters over forest- clad regions beyond the reach of the sea. This Lower Carboniferous vegetation, though more varied than that of the latter part of the Devonian period, was its direct derivative. Identical genera and identical, or at least very closely allied, species have been found in North-eastern Greenland, in Spitsbergen, in Europe and North America, in South America and Australia. Many instances of the wide geographical range of early Carboniferous plants might be given: it is evident that during the first half of the period the vegetation of the world, so far as we can tell, was less diversified than it is at the present day. Here again we lack data from South Africa.

Returning to the Northern hemisphere we pass from the Lower Carboniferous rocks, many of which are marine, to the thick series of Upper Carboniferous sedimentary beds and seams of coal rich in remains of still more varied and luxuriant floras. Over thousands of square miles a monotonous landscape of swamps, occasional sheets of open water, in places the sea near at hand, low hills and plateaux clothed with trees; forests on inundated marshes, jungles with no song of birds, and uninhabited by mammals. Groves of Calamites, their strong columns bare below, where branches had been cast off and the bark torn by the expansion of the growing wood within, the tapering upper parts of the stems hidden by closely set tiers of whorled branches bearing star-like clusters of leaves, might suggest to a visitor from the modern world comparison with enlarged Equiseta. Trees such as Lepidodendron with forked branches forming a crowded mass of needle-studded shoots would at a distance recall some familiar conifers. A greater contrast to the ordinary type of forest tree would be presented by the tall bare stems of Sigillaria, some unbranched, others with an occasional fork, the arms soaring upwards with an elongated cone encased in a tuft of Pine-like needles. The handsome Cordaites, with long strap-like leaves similar to those of a Yucca, would invite comparison with the Kauri Pine of New Zealand.

Here and there among the Calamites and Lepidodendron would be found Tree-Ferns superficially indistinguishable from existing species. There were other Ferns much too small and inconspicuous to attract...
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attention on a general view. A member of Section K wandering through the forests of the Coal Age would be struck by the abundance and variety of plants which to him appeared to be Ferns; some with stems like miniature Tree Ferns, others of lower growth with fronds borne on creeping rhizomes, and possibly some living as epiphytes, their green leaves standing out against the more sombre-coloured trunks of supporting trees. On closer inspection he would discover that most of the supposed fern bore seeds—some small, others larger than hazel-nuts—and clusters of inconspicuous spore-capsules filled with pollen. The dominance of these seed-bearing Fern-like plants, the Pteridosperms, is one of the more arresting features of the later Palaeozoic floras. During the latter part of the Carboniferous period and the first half of the Permian period the vegetation of North America and Europe was more uniform in comparison with the floras of the old and new world to-day. Prof. Halle, of Stockholm, in his scholarly volume on the late Palaeozoic floras of Central Shansi, in China, has shown that some of the vegetation of the Far East agreed closely with that of North America and Europe. The coal- seams of China, though probably rather younger in age than the richest seams of Europe and America, consist of the altered débris of forests which had spread across the world.

"The Glossopteris Flora and the Late Palaeozoic Ice Age.

"At the stage of geological history we are considering a broad expanse of water—the Tethys sea—formed a well-defined boundary between the northern continent and Gondwanaland. In that part of Gondwanaland that is now South Africa no undoubted examples of Lower Carboniferous plants have been found: the lowest beds of the Karroo system, which rest on Devonian or pre-Devonian rocks, consist of glacial deposits similar to those which are spread over a wide area in South America, the Falkland Islands, India, and Australia. There is proof of a long-continued reign of ice-sheets and glaciers. The occurrence of well-preserved impressions of plants at the base of the coal measures at Vereeniging shows that some members of the Glossopteris flora co-existed with the ice. The problem which I now propose to discuss is this: at what period did the Ice Age begin, and what is the geological age of the first phase of the Glossopteris flora? As Prof. Sues said: following the events recorded in the Coal Measures of the northern hemisphere, in the south, 'the outlines of a great continent became disclosed to us, and from the closing days of the Carboniferous this remains for a long period one the most prominent features of the earth, Gondwanaland.'"

The President dwelt in some detail with the arguments recently advanced by Prof. Schuchert, of Yale University, for placing the Glossopteris flora at a later date, namely, the Middle Permian period, but maintained that evidence from Australia, India, and South Africa was in favour of the Carboniferous age of the oldest phase of this flora.

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"If we reconstruct in broad outline the closing scenes in the Palaeozoic era on the continent of Gondwanaland, we see an enormous land-region comparable in its mantle of ice with Greenland at the present day: in some places glaciers piled up moraines, and their streams deposited seasonally banded mud and sand; in other places from the cliffs of an ice-barrier were detached icebergs carrying boulders that found a resting-place in the mud of a sea-floor. In the course of the latest phase of the Palaeozoic era, ice-sheets and glaciers spread from the remote south beyond the equator: lands that are now tropical were then ice-bound. The world was divided into at least two sharply contrasted regions, a northern region where rank vegetation covered thousands of square miles of swamp and low hills, and a vast southern continent where another and less luxuriant vegetation flourished in proximity to retreating glaciers.

"Prof. Schuchert has stated his case clearly, though not convincingly, and has collected a mass of material for which many of us are grateful; he has rendered good service by directing attention to a problem which appeals both to geologists and to palaeobotanists. We are not yet in a position to make positive statements on the age of the Glossopteris flora or on the precise correlation of the late Palaeozoic plant-beds of Gondwanaland and those north of the Tethys Sea. More evidence is needed; and I venture to hope that Prof. Schuchert's contribution will stimulate South African geologists to obtain additional evidence which will bring us a stage nearer to an agreement upon this much-debated question. Meanwhile, I am not shaken in my opinion that if we could transport ourselves back through the ages into a forest of the northern hemisphere in the latter part of the Upper Carboniferous period, and thence travel by aeroplane to the land that is now South Africa, we should find retreating glaciers and a vegetation in which Glossopteris and Gymnosperms were prominent plants.


"There is another exceptionally interesting problem on which more light is urgently needed, a problem too formidable to consider in the latter half of an address, but attractive enough to mention as a subject worthy of attention on the part of South African investigations. It is this: the closing stages of the Palaeozoic era in the northern hemisphere were marked by widespread crustal displacements; a geological revolution brought into being chains of Palaeozoic Alps; the scenes were shifted, the forests of the Coal period replaced by a less luxuriant vegetation growing under a new set of climatic conditions. Crustal movements are a determining factor in the evolution of the plant kingdom; in other words, geological revolutions afford an impressive example of the co-ordination of the inorganic and organic worlds, a theme that has been elaborated by General Simms in his fascinating book 'Holism and Evolution.' The vegetation of the early part of the Permian period, though generally similar to that of the latest stage of the Carboniferous period, was
relatively much poorer in genera and species. The later Permian Floras were still poorer, and the records of the early days of the Triassic period point to the further development of the arid conditions foreshadowed before the end of the Permian age. Later in the Triassic period the vegetation became richer as the environment improved, but it was a transformed vegetation in comparison with the forests of the Coal Age, a much more modern company dominated by a different set of plant communities. There were connecting links between the Palaeozoic and the early Mesozoic Floras, but in the main the two Floras differed widely from one another. The more orderly succession of plant-bearing strata in most parts of the southern hemisphere justifies the hope that an intensive and comparative study of the transitional stage between the earliest and the latest phase of the *Glossopteris* flora will furnish valuable data.

"**Fossil Plants as Tests of Climate.**

"Nearly forty years ago I wrote an essay on a prescriped text, "Fossil Plants as Tests of Climate," an essay which was mainly a compilation and not an original contribution. It is unnecessary to remind my audience that fossil plants of many different ages frequently occur in unexpected and, from some points of view, very inconvenient places where they raise problems which have so far baffled the ingenuity of students. The best examples are from Arctica region, and there is also the rich Jurassic flora described some years ago by Prof. Halle from the edge of the Antarctic region. Prof. Northrop demonstrated the occurrence on Ellesmere Land a few degrees south of lat. 80° N. of an Upper Devonian flora in which species of the fern-like fronds of * Archaeopteris* are abundantly represented: it is noteworthy that these fronds—probably the foliage of a Pteridosperm—are in no way inferior in size to those of the same type discovered in Southern Ireland and Southern Russia. Farther south, but still well within the Arctic Circle, the rocks of the desolate and mist-shrouded Bear Island, in latitude 75° N., have yielded an unusually rich flora which is also Upper Devonian: here, too, well-developed fronds and thick stems of various plants bear eloquent testimony to climatic conditions entirely foreign to European Arctic regions at the present time. The Lower Carboniferous flora of Spitsbergen compares favourably in the dimensions of the *Lepidodendron* and other trees with floras of the same age in Central Europe. From lat. 80° N. on the north-eastern corner of Greenland, a few fragmentary remains of widely distributed species mark the most northerly outpost of the early Carboniferous floras. Turning to the Rhaetic period, the work of Dr. Hartz, of Copenhagen, and the more recent and more extended labours of Mr. Harris have given us a thrilling picture of an estuary bordered by a luxuriant and varied vegetation, which can best be described as a detached arctic outlier of the well-known Rhaetic forests of Southern Sweden. Further east the New Siberian Islands (lat. 75° N.) have afforded samples of Triassic and later floras which give no sign of the stunting effects of Arctic conditions. Many Jurassic plants are recorded from Franz Josef Land, Spitsbergen, and Northern Siberia which include leaves hardly distinguishable from those of the Maidenhair tree (*Ginkgo biloba*), the only surviving genus of a once prolific and cosmopolitan group; also twigs and cones of Conifers, some of which appear to be closely allied to the Californian Sequoias; some recall existing Lycopodium and other genera, which long ago deserted their northern home for southern lands. The best known Arctic Cretaceous flora is that from Western Greenland (lat. 70° N.), a flora especially rich in Ferns near of kin to species of *Gleichenia* that are now mainly tropical in range. Among other Greenland plants are species of *Ginkgo*; Conifers allied to *Sequoia, Cupressus*, and other genera; leaves and fruit differing but little from those of the living Breadfruit tree, leaves believed to belong to a Leguminous plant closely allied to existing species of *Dalbergia*, species of *Magnolia*, many forms of plane-tree (*Platanus*), and examples of other South temperate, sub-tropical, and tropical families.

"It is superfluous to quote more examples. An important point is that if we plot on a map of the Arctic regions the distribution of ancient floras, it becomes clear that no shifting of the earth's axis, even if this favourite device were admissible, would give a satisfactory explanation of the contrast between the past and the present. These facts are well known; but it is time we made a more serious effort to solve the problems which they raise. Discarding as inadequate, and as a method wholly disengaging to astronomers, an attempt to create a geographical environment consistent with paleobotanical facts by altering the position of the North Pole, we turn to the alternative of rearranging, within the Arctic Circle, the distribution of land and sea and the consequent shifting of cold and warm oceanic streams. Assuming the permission of geologists to treat the earth's crust as a jig-saw puzzle, we appeal to meteorologists. Mr. Brookes, in his book on 'The Evolution of Climate,' suggests a possible rearrangement of land and water which, he believes, would go some way towards the provision of climatic conditions such as the fossil plants of the Tertiary period appear to demand; but it would seem from a more recent contribution by Dr. Simpson, the Head of the British Meteorological Department, that we cannot hope to obtain all we need, or nearly all we need, by any method of redistribution of land and sea on the assumption of a fixed pole and without recourse to Wegener's hypothesis of drifting land areas. We are left with two other alternatives: the adoption of Wegener's hypothesis of the modification of them, or the possibility that plants are less trustworthy as indices of climates than has generally been supposed. It may be that a combination of these two methods of attack is the clue to our problem. Let us take the second first: assuming that the ferns to which reference has been made flourished on the parallels of latitude where their remains have been found, and assuming such amelioration of the present Arctic conditions by a rearrangement of land and water as meteorologists permit, there must have been in the past, as there is to-day, a long and relatively dark period of sleep, and a sum
no longer than the growing season now available for the almost miraculous development of Arctic plants. Can we imagine, to take one instance, the Cretaceous flora of Greenland enduring a sunless Arctic night more than six months in duration? This raises a question to which no complete answer can be given: we lack experimental data. It would be worth while to take advantage of modern methods of research and devise means of reproducing on a small scale the Arctic summer season with continuous illumination followed by a longer period of darkness. In considering possibilities we must not forget the marked difference in the present position of the tree-limit: in some places it dips far below the Arctic Circle, while in others it invades much higher latitudes. In Western Greenland on latitude 70° N. the willows seldom reach a height of three feet; on the same latitude in Canada and Alaska the White Spruce (Picea canadensis) attains fifty feet in sheltered places.

"There is another, and to my mind an important and neglected consideration: we are too prone to speak of such a genus as Gleichenia as tropical because it happens to be one of the commoner ferns in tropical countries; but like many other genera characteristic of the warmer parts of the world it includes species which grow vigorously at an altitude of 10,000 ft., where the climate is by no means tropical. Is it not legitimate to suggest that the relation of genera and species to climate to which we are accustomed is merely a phase in the history of plants? A plant that is now confined to the tropics may at a much earlier stage of its career have been able to live under other conditions. In using plants as thermometers of the ages we accept as an axiom the principle—what is now has always been. Our vision is limited by what we see and beyond the horizon we see only in imagination. Is it unscientific to express the opinion that we may think of plants not only as organisms which have changed in form and structure in the course of thousands or millions of years, but as organisms which have changed also in their susceptibility to external factors? There is another point, and an obvious one: instances are common enough of species of living genera which exist under conditions sharply contrasted with those characteristic of the majority of species of the same genus. The Cretaceous and other plants are practically all specifically distinct from their living descendants: we are not entitled to attribute to extinct and recent alike the same constitutional qualities.

"The proposal to regard the present land-surface as a portion of the earth's crust which has not only changed its form in the course of geological history, but as a collection of slabs slowly drifting from place to place is no new idea; but we are indebted to Wegener for the development and extension of a theory which in its present form has provided an incentive to speculative minds and, it may be, a valuable clue to the solution of diverse problems. Wegener speaks of the upper portion of the crust as travelling in an easterly and westerly direction; he also assumes a slight movement of the poles. If it is permissible to postulate a drifting of fractured slabs of the crust in a north and south direction, we can then think of the distantly placed, now occupying positions more or less remote from one another, as the severed portions of a formerly compact region.

"To take a concrete example: the Rhetic plant-beds of Eastern Greenland, now remote from those of Sweden, may formerly have been portions of one mass well to the south of the Arctic Circle. This may be merely a figment of the imagination: on the other hand, some such expedient is almost forced upon us if we are to find a solution to the problem presented by the records of the rocks. There are, we are told, serious objections to Wegener's hypothesis: it is, at any rate, true that the principle of drifting continents has still to be proved tenable. But such evidence of correspondence, both in the succession and nature of the stratified rocks and in the fossil contents, as Mr. Du Toit has obtained from a comparative study of the rocks of South America and South Africa, or as Mr. Harris is finding in his comparison of the Greenland and SWedish Rhetic Strata, is arresting enough to make us pause before abandoning the principle of continental drift.

"PALEOBOTANY AS A KEY TO THE PRESENT DISTRIBUTION OF PLANTS.

"If time allowed it would be tempting to deal with still another aspect of Paleobotany: the importance of a critical study of the floras which immediately preceded the Pleistocene Ice Age. Progress made in recent years in the improvement of methods of deciphering the relics of plants of other days increases the confidence with which it is possible to recommend, as a promising field of work, the investigation of Tertiary floras. It is only by following the varying fortunes of genera and species during the successive stages of the Tertiary period that we can hope to understand or to explain the present distribution of plants. Let me give one illustration: the work of Mrs. Clement Reid and Miss Chandler, as well as the results obtained by many other palaeobotanists, has brought into relief the destructive effects of the conditions which culminated in the last Glacial period. We know that the floristic characters now distinguishing European floras from those of North America and China are in no small degree the direct consequence of the Ice Age: this caused the elimination from the European area of many plants which, had they survived, would give a greater uniformity to the vegetation of the northern hemisphere than there is at present. In North America and in Asia the way was open; the northern species were able to migrate far to the south and thus escaped the fate of their companions which were unable to cross the barrier of the Alps and the Mediterranean Sea.

"The Tertiary floras were more uniform than the floras of to-day. We cannot understand the present distribution of human races if we confine attention to the present, nor can we appreciate the significance of the geographical distribution of floras and their composition unless we consult the herbaria of the rocks."

In conclusion, the President said: "My desire is to see a wider
RECENT OBSERVATIONS ON THE POLLINATION OF **OPHrys**

**By Colonel M. J. Godfrey, F.L.S.**

**Ophrys muscifera** Huds.

On May 12, 1928, together with Colonel G. H. Evans, F.L.S., I watched some cut spikes of this species at Chailles-les-Eaux, Savoie, France, close to an arbour with leaves sticky with honey-dew, which attracted many insects. Suddenly a small wasp-like insect with a yellow abdomen banded with black (**Gorytes mystaceus** Linn.) alighted on a spike of **O. nitidissima** Canes in the same vase with **O. muscifera**, evidently by accident rather than choice, for we never again saw **Gorytes** alighted on **O. nitidissima**, though the latter was constantly exposed in 1929 with **O. muscifera**. Presently **Gorytes** was taken on **O. muscifera**, but it had not withdrawn the pollinia. Then another settled, his wings quivering while he remained on the flower. I could see a short brown sting-like organ (ileoagus?) protruding from the end of the abdomen. The insect placed himself lengthwise on the labellum, with the head uppermost. In all, three visits were observed.

Although called the Fly Orchid, the dark thread-like petals are too suggestive of long antennae for the visiting insect to be a fly, but they do resemble the antennae of **Gorytes**. The closed wings of the latter agree well with the contour of the labellum, and conceal the banded abdomen. The gap between the thorax and the abdomen (due to the slender wasp-like waist), seen through the bluish semi-transparent wings, corresponds clearly with the leonid oblong marking in the middle of the labellum. When quiescent on the flower the insect is hard to see. While we were intently watching for the arrival of another visitor, a slight movement caught the eye, and we realised that a **Gorytes** had alighted and remained unseen until he began to vibrate his wings. The weather then broke, and, although watch was kept on subsequent fine days, no more visitors appeared. Whilst we were satisfied that **O. muscifera** possessed a real attraction for **Gorytes**, we felt that until the actual removal of the pollinia by the latter had been witnessed, it would be premature to conclude that that insect was responsible for the pollination of **O. muscifera**.

In May 1929, in the same spot, Colonel Evans, my wife, and I watched **O. muscifera** systematically for many hours on suitable days, and witnessed a number of visits by **G. mystaceus**. On some days nothing came to the flowers, on others several visits occurred. **O. aranifera**, **O. nitidissima**, and **O. arachnites** were exposed at the same time, and also various other orchids, but **Gorytes** never went to any of these, nor did any other insect go near **O. muscifera**. The flower of the latter appears to be organised for the attraction of the male by its mimicry of the female **Gorytes**. As in the case of **O. arachnitisformis**, **O. fusca**, **O. lutea**, and **O. speculum** in S. Europe and N. Africa, all the visitors appear to be males. The pollinia appear to be somewhat difficult of withdrawal, for not infrequently **Gorytes** failed to remove them. They are attached to the head between the eyes and below the antennae.

On May 24th I was watching a vase of various orchids, including **Ophrys arachnites**, **O. nitidissima**, and a single spike of **O. muscifera** with rather small flowers. A fine **Gorytes** singled out this solitary spike from all the others, and visited a flower. He was quite oblivious of my presence, and I was able to watch him so closely that every motion was visible. He kept on vibrating his wings and waving his antenna—doubtless a preliminary phase of courtship, for the same movements were observed whenever **Gorytes** alighted on a flower of **O. muscifera**. He tried again and again to pierce the
Ophrys arachnitides Lamk.

On May 6, 1928, I was sitting with my wife in a garden at Challes-les-Eaux with two or three recently gathered spikes of O. arachnitides in my hand, when a bee circled rapidly round me. We kept very still, and it came and glanced at the flowers. Presently it returned and alighted on a flower, but at once flew away. Twice it came back, but never stayed more than a moment on the flower. I then put several spikes in a vase on a low terrace-wall. Six times a rather large grey bee with very long antennae came, alighting five times, but always immediately flying away. It was generally extremely swift, but once it gave me an excellent close view, sailing towards me slowly, keenly on the alert for danger. As it approached the flower, it made a sudden and rapid pounce, and seized the labellum with alacrity, like a hawk darting on its prey, but at once flew away. In 1928 we never succeeded in catching this elusive bee.

On May 12, 1929, my wife and I gathered a few spikes of O. arachnitides on the hills at Challes-les-Eaux, the flowers were in flower that year. I carried them home in my hand, hoping they might attract a bee on the way. Nothing happened till we reached the gate of the hotel grounds, when suddenly several bees whirled round us. We stopped dead. Several times a bee circled round the flowers at rather long intervals and went off. Finally, a grey long-horned bee alighted on a flower. Immediately another pounced on him and tried to push him off, but he held on, and the second bee flew away. I have more than once seen the same thing happen with O. muscifera in the South of France. We saw the first bee withdraw the pollinia—so easily and neatly as compared with O. muscifera—and
waste fifteen minutes on a single flower and then return to it later. On the other hand, its behaviour was quite different from that of *Eucera*, which at once assumes the correct position for withdrawing pollinia, and remains in this attitude till it leaves the flower. Though we witnessed a large number of visits, the pollinia were never once removed. It seems doubtful whether it has anything to do with the pollination of *O. atrochilus*.

**Ophrys arantifera** Hudson. This *Ophrys* was rare at Challes-les-Eaux. A few specimens were exposed with the other species, but no insect ever went near them.

**Ophrys littigora** Camus. This was very frequent higher up on the hills at Challes-les-Eaux, but not on the level of the garden in which the observations were made. Although always exhibited with the other species of *Ophrys*, no insect was ever seen to alight on it, with the exception of *Gorytes neglectus* as referred to above. It flew to a bush of *O. muscifera*, among which was the spike of *O. littigora*, and evidently alighted on the latter by accident. The adherence of the pollinia to one of its legs showed that it had not assumed the position taken up when a flower is intentionally visited.

The curious phenomena described above have been sometimes criticised as “unnatural acts,” and doubts have also been raised as to whether the resemblance of the flower to the female is exact enough to attract the nectar. The first objection is due to the unconscious application of human ideas of purity to the insect world, to which they have no relevance.

As to the second, it should be remembered that at least in some, if not in all, such cases, the males emerge some time before the females. They have then never seen a female, and can have no exact conception of her appearance. They are thus easily misled by a resemblance which to our physically clearer and better-informed eyesight appears imperfect. If the flower of *O. muscifera* suggests to intelligent human beings the name Fly Orchid, why should it not convince *Gorytes* of the presence of a female of its kind, to which the resemblance is actually closer than to a fly? Insects are driven on by two strong impulses—the spur of hunger, which makes them voracious, and an irresistible sexual urge, which makes them seek eagerly for a mate. No one who has seen Hymenoptera incessantly quartering the ground in this quest, with a speed the eye can scarcely follow, will have any doubt as to the violence of the force which drives them on. When they think they have at last scented or seen the prey, are they likely to hesitate? So far from being an unnatural act, their conduct is the direct result of natural forces.

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**ABSTRACTS OF PAPERS ON INTEREST TO STUDENTS OF BRITISH BOTANY**

“The Vegetation of Berrow Flats, Somerset,” by H. Stuart Thompson (Proc. Brist. Nat. Soc. ser. 4, vol. vii. pt. i. p. 25, 1928).—During the summer and autumn of 1921 the author made a fairly exhaustive survey of the coast and its vegetation between Burnham-on-Sea and Berrow. Particular attention was paid to the new salt-marsh which had developed during the decade, and which formed so conspicuous a feature from about 400 yards N.W. of Burnham lower Lighthouse to about 600 yards N.W. of Berrow Church, which is situated on the sand-hills. A synopsis of the work, with three photographs and a map, was published in the *Journal of Ecology*, May 1922, under the title “Changes in the Coast Vegetation near Berrow, Somerset.” The present is an account of the sequence of the vegetation up to the present date.

In August 1921 the author observed and mapped a new tributary channel some 10 feet deep and 40 feet wide near where it entered the Parrett, about 600 yards west of the lighthouse. This was not shown on the 6-in. Ordnance map. The channel drained a portion of the muddy Berrow Flats and may have been the chief cause of the new vegetation by diminishing the force of scour over the flat between it and the sand-hills. It was nearly a mile long and for some distance it formed the western boundary of the *Glyceria-Salicornia* association.

In July 1921 three clumps of Cord-grass (*Spartina townsendii*) were noticed, two of them being 9 feet across, well established on the mud. By June 1922 the original clumps of *Spartina* were much larger, and many subsidiary plants extended 10 or 12 yards from the parent clumps. By August 1928 the cord-grass had extended everywhere and was dominant on the western area, with dwarf patches of *Glyceria maritima* here and there.

In 1921 *Salicornia* of several species was at least subdominant on the mud of Berrow Flats. *S. ramosissima* and *S. stricta* were here and there interspersed with *S. dolichonotata*, some of which consisted of a single long spike of 4 to 6 inches on an unbranched stem of similar length. That year the writer saw only two small plants of *Suaeda maritima* on the Flats and no *Spergularia*, *Statice*, or *Armeria*. The absence of Sea-Lavender and Thrift tended to show how recent was the vegetation and how wet the marsh. *Aster Tripolium* was present here and there.

The year 1926 saw important changes. *Aster Tripolium* and *Glyceria* were then dominant. A belt of taller *Aster*, 2-3 feet high, extended 250 yards or more, and was edged with a 2-4 yards’ belt of *Glyceria*. There was also on the hard sand the curious association of *Armeria repens*, small *Salicornia herbacea*, *Plantago Coronopus*, and minute plants of *Aster Tripolium*. Short clumps of Reed-mace, probably *Typha angustifolia*, were here and there for 100 yards in wet mud at the eastern border of the marsh. A remarkable bend in the vegetation towards the south end, noted in 1924,
was still more marked in 1928; and Salicornia, especially S. dolichostachya, was still diminishing everywhere. Among strand-plants in 1926 were two small Polygonum Rats, which is extremely rare on the Somerset coast. Near them Sally Sal was remarkably abundant, but very little Castile. Probably in 1926 the present remarkable colonies of Sea Club-rush (Scirpus maritimus), of the sand-hills by a strip of hard and usually bare sand which has become narrower each year.

In 1928 very little Salicornia of any kind was seen, and none of the rare S. dolichostachya. At the present time the marsh has appreciably diminished in size. Roughly, the vegetation extends for 1100 yards along the shore, and is separated from the Sea Couch-grass (Triglochin maritima), which adjoins, the Marram (Poastrum arenaria), of the sand-hills by a strip of hard and usually bare sand which has become narrower each year.

This interesting study of Berrow Flats is accompanied by four plates.—E. G. B.

WATSON BOTANICAL EXCHANGE CLUB REPORT, 1928—29 (vol. iii. no. 12).—Mr. H. S. Thompson’s interesting Report contains many valuable notes upon the 1942 sheets of plants sent in by the Members. Mr. E. C. Wallace not only acted as distributor but was the largest contributor (474 sheets). We note that the Club is in need of a few fresh members, particularly from Ireland, Scotland, Wales, and the North of England.

The following notes from the Referees and others seem worth reprinting for botanists who are not members of the Club:—

P. 475. Rosa [Ref. Z53]. Hedgebank by Pebblecombe, Surrey, Sept. 2, 1928. J. E. Lowley. This agrees very well with R. canina var. sparsa (Pug.). I should until recently have called it var. insignis, but now think sparsa is a better name, since the true insignis Désgr. & Rip. should have very decidely biseriate leaflets; thus sparsa is a new name only, not a new variety for Britain. The specimens sent are from a very slightly prickly form, which is not a normal feature of the variety; its very slight biserration and absence of glands take Mr. Lowley’s gathering very much towards the Lutetiana, sparsa being ranked under the Transitoria.—A. H. WOLLEY-DOD.

P. 475. Callitriche intermedia Ruffin. [1287]. Pond at Lynes, near Wyke Regis, Dorset, June 14, 1928,—E. C. Wallace. A very interesting form of Callitriche, the first I have seen from our Islands. Dr. Williams (Prod. Fl. Brit. 590, 1912) records it from “Loch Alsh, a sea-inlet on the coast of Ross-shire (G. C. Drace), 1881.” This is in the extreme south-west corner of v. 165, E. Ross. Williams divides the species into two varieties, “A. virens, B. lutea.” This plant he names as var. lutea L. calophylla Klotz.—C. autumnalis var. lutea L. calophylla Klotz in Reich. Leon. Fl. Critica, cent. ix, p. 44, fig. 1908 (1881). The upper leaves, which form a rosette at the apex, much resemble those of C. deflexa A. Braun, t. 4, fig. 45, in Hegelmaier, Monogr. Gatt. Callitriche, p. 58 (1864).—A. BENNETT.

ABSTRACTS OF PAPERS ON BRITISH BOTANY

P. 476. Valerianella eriocarpa Desv. [1265] det. H. W. Puglsey. Rocks below Rufus Castle, Portland, Dorset, June 12, 1928.—E. C. Wallace. This has very pronounced acute teeth to the calyx-limb of fruit, and the fruit itself is practicaly glabrous. This glabrous state of V. eriocarpa I have not seen before, and it must, I think, be rare. It is, however, mentioned that it occasionally occurs thus both here and on the Continent.—C. E. SALMON.

P. 479. Hieracium auranticum L. Cult. Wimbledon; origin, Yorkshire (naturalised), June 1928. No. 425. This now little-known plant is sent with H. brunneo-crocum to illustrate their points of difference, as described at length in Journ. Bot. 1921, 60-69. Since writing that paper I have seen wild plants of the group near St. Anton in the Tyrol, and in Canton Graubunden, Switzerland. This experience tends to confirm my opinion that there are at least two species in the group, distinct not only morphologically but also in the nature of their habitats. At St. Anton a tall broad-leaved form, with intensely red flowers, grows in the sub-alpine meadows which are cut for hay. When brought into my garden, its flowers become paler in colour, but its foliage more luxuriant. This plant is almost identical with these specimens of H. auranticum L., which was probably first obtained from a similar locality, where the peculiarly bright colour of its flowers would attract attention.

In alpine pastures at higher altitudes near St. Anton quite different forms occur, some with red and some with orange flowers, but all with the lingulate leaves of H. brunneo-crocum. These are usually relatively dwarf plants in the wild state, but one form that I cultivated in the garden quickly developed the very rampant habit of H. brunneo-crocum, to which it was clearly closely allied.

Last summer in Graubunden I saw hawkweeds of this group in several localities, but always in extremely small quantity. They were all in rough alpine pastures, sometimes among scattered bush. These plants were tall and very slender; one, with bright red flowers and fairly broad leaves, would come under H. auranticum L., but the rest, with more orange flowers, were nearer to H. brunneo-crocum. None of them exactly matched those from St. Anton, and I have not yet attempted to identify them with Naegeli and Peter’s subspecies.

—H. W. PUGLSEY.

‘THE VASCULE,’ vol. xiv. (1929), contained the following:—

P. 69. An interesting note by Mr. A. W. Bartlett upon the occurrence of Cyclamen hederaefolium Ait. in Northumberland. Two plants were found by Mr. F. E. Lupton four years ago on a wild part of Corby Moor, altitude over 850 feet, and more than 2000 yards from nearest human evidences of recent times. It is a problem how and when the seeds reached this spot, but the discovery is not sufficient justification for adding the species to the flora of the county.


CALLUNA VULGARIS, A RECENT ADVENTIVE ON SABLE ISLAND, NOVA SCOTIA.

By Harold St. John, Ph.D.

Soon after the publication of Sable Island, with a Catalogue of its Vascular Plants, it was reviewed in the Journal of Botany (1921, p. 148). The review was unsigned—hence, presumably written by the editor, Mr. James Britten. The tone of this notice was so complimentary that the present writer could have no cause to start an argument. That eight years have been allowed to pass without the writer's making any reply should indicate that he now submits a rebuttal of one point in a distant and impersonal mood.

The reviewer made one critical comment at the end of a sentence largely abstracted from the writer: "Calluna vulgaris is adventive but now well established; it was probably used for or carried in the packing round trees imported from a French nursery; Mr. St. John says that Macoun did not find it, but Mr. Arthur Bennett (Journ. Bot. 1901, 198) writes: 'Prof. Macoun has sent me specimens from Sable Island, just such as one might gather on a Scottish moor.'"

The overlooking of a single plant record mentioned incidentally in a foreign journal would not be a serious charge. However, in this case it is of some importance. If John Macoun did find the heather on Sable Island, there would be strong presumptive evidence of its being native there, and not an adventive as the writer stated. This is a matter of considerable interest, as evidenced by the many notes already published on the occurrence of Calluna vulgaris in the eastern United States.

It would be better to quote the entire passage from Mr. Bennett’s article, but since it occurs in the Journal of Botany (1901, 198), and for the sake of brevity, it will be abstracted and only the essential sentences quoted. The first paragraph of the passage by Mr. Bennett is headed Potamogeton polygonifolius Pour., and this pondweed is the principal subject discussed. He refers to Chamisso’s early record of the aquatic plant on St. Pierre and Miquelon, then to the occurrence of Calluna in Nova Scotia and Newfoundland.


BIBLIOGRAPHICAL NOTES.

XCIV. "Benardregyn."

This puzzling name is given by Lobel (Stirp. Adv. Nova, 1570, p. 145) as the locality for "Coniza minima zinc Palciaria" (now Pulicaria vulgaris Gaertn.), "In Benardregyn arc & fossis, alter & Londino lapide frustat minima inter Camemillam Romanam, inter & Pulgium Regale," which may be translated as At Benardregyn mound and ditch, second stone from London, growing with Roman Camomille and Pennyroyal." Trimen and Dyer (Fl. Middl. 151)
state: "This may be a Middlesex station, but we have not been able to identify Benard Greyn."

I think the name can be identified with "Baynard's Watering," part of the Westbourne river, now merged in the Serpentine. This was named after Baynard or Bainardus, a Norman follower of the Conqueror, whose name is also associated with the City Castles and Ward, or a descendant or namesake. It is the piece of ground lying between Craven Hill and the Bayswater Road, the approximate site of Baynard's ponds being that of Christ Church, Lancaster Gate. In the course of time "Bear's," "Byard's," or "Baynard's Watering" became Dr. John Hill's botanic or physic garden, the Bayswater, Flora (~1830), Victoria (~1854) Tea Gardens, Hopwood's Nursery, and, finally, the district of Bayswater.

The distances on the road were, up to 1825, measured from the turnpike close to St. Giles's Pound (now St. Giles's Circus), and Clusius (Rar. Pl. Hist. 1601, lib. vi. p. ccxxi) gives a clue to the location of the first stone under "Typha media" (now T. angustifolia L.), "Rosasudul Tyburnae oxeum, nam praelat ab eo loco, in quo sepeliantur, quibus ob male dicia laqueo gula fracta est, primo ab urbe Londinensis milliari, quâ spectat occidentem," which Trimen and Dyer (p. 289) translate as "Plentifully 1581, in a pit by Tyburn churchyard, not far from the place where those who have been hung for crimes are buried, at the first milestone from London towards the west," but, as stated in a MS. note in Trimen's copy of Fl. Middl., in Herb. Mus. Brit., it should be quoted from 'Rariorum aliquid Stirpium, per Panoniam, 1588,' 716. The place referred to is the little country church of Tyburn (St. John's), which stood in the lonely road, between or near Marylebone-lane and Stratford-place; the church was removed to Marylebone High-street, taken down 1741, and the present edifice erected; this must not be confused with the new Marylebone Church, on the south side of Marylebone-road, opposite York Gate, Regent's Park. A mile further on the west road was the west stone referred to by Lobel.

This identification is apparently confirmed by a letter, dated 7 May, 1697, from Augustus Quirinus Riviarius at Leipzig (Birch MSS., Brit. Mus. 4227, f. 142), addressed "For Mr Edward Lhwyd at the Museum in Oxford: to be left with Mr Walter Thomas at Bernards Grene in London." Thomas was apparently a fellow-countryan of Lhwyd, who acted as a London agent, and handed letters to the Oxford carrier when he called. He is also mentioned as an intermediary in letters from Ray to Lhwyd (12 Mar., 1697), Lhwyd to Martin Lister (28 Mar., 1697), and Ray to Lhwyd (1 Feb., 1698), all printed by Dr. R. T. Gunther in Further Correspondence of John Ray (1928, pp. 270, 273, 274).

It is curious that Pulsarea vulgaris is also recorded from watery spots on Barnard's Green, Worces (Lees, Bot. of Malvern Hills, 39), this place being named from the Barnard family, mentioned 1225 (Mawe and Stenton, Place Names of Worces, 211), but it may be only coincidence, as the plant is usually found in damp situations.

J. ARDAGH.

THE JOURNAL OF BOTANY

BOTANISMS.

WILLIAM VINCENT FITZGERALD.

Botanists interested in the Australian flora will be sorry to learn of the death of Mr. William Vincent Fitzgerald, from blackwater fever, at the Daru River in the Mandated Territory of New Guinea, on August 6th. At the time of his death, it is understood that Mr. Fitzgerald was in New Guinea exploring for sandal-wood. He was a son of Mr. and Mrs. Ambrose Fitzgerald, and was born on the goldfields at Mangana, Tasmania. In his younger days he was an assistant in the National Herbarium, Melbourne, then under the control of the famous Baron Sir Ferdinand Von Mueller.

Mr. Fitzgerald is best known among botanists for his work on the flora of Western Australia, his most important contribution to the flora of that country being an account of the botany of the Kimberleys, North-West Australia, published in the Journal and Proceedings of the Royal Society of Western Australia, vol. iii., during his absence on active service. The paper was communicated by the late J. H. Maiden, to whom Mr. Fitzgerald had entrusted his manuscript before departing for the front. It contained the results of two expeditions to this as even yet little-known territory.

In 1903, Mr. Fitzgerald was a member of the Royal Commission on Forests, and in 1904 the Chairman of the Forests Advisory Board of Western Australia. He had done considerable exploratory work both in the Territory of Papua and New Guinea, but did not publish anything so far as I am aware on the flora of these places.—C. T. WHITE.

DEDR. EDWARD AUGUST VAINIO (1853-1929).—The recent issue of the Lund Botaniska Notiser (October 1929) contains a portrait, and an appreciation by A. H. Magnusson of the work, of the eminent lichenologist, Dr. E. A. Vainio, of Helsingfors, who died on May 14 last. He was born in 1853. Among his numerous contributions to lichenology, we recall his account of the lichens collected by Dr. Wiltz in Angola, which is included in the Catalogue of Wiltzich's African Plants, published by the Trustees of the British Museum in 1901.

PIERRE TRANQUILLE HUSNOT (1840-1929).—A memoir by Auguste Chevalier of the life and work of this eminent Norman bryologist appears in the last issue of the Bulletin de la Société Botanique (Sept. 25, 1929). Husnot died on May 25 last, in his ninetieth year, at his native place, Cahan, Athys (Orne). His important Muscologia gallica (1884-94) was followed by the Hepaticologia gallica. In 1889 he published a Monographie des Graminées de France et d'Europe Centrale, and later similar accounts of the Cyperacées (1906) and Juncées (1908). In 1877 he founded the Revue Bryologique, which he edited for fifty years.

E. humilis, adscendens; ramulis pedicellisque pubescentibus et hispidissimis; foliis, bracteolis segmentis calycinis apice longe piliferis, margine utrinque longé 6-8-ciliatis, ciliis pilisque omnibus apice incassatis; foliis quaternis, planis, uscis, ovato-lanceolatis, facie et ad nervum dorsalem cum petiolulo pubescentibus, lateribus dorsalisbus pruinoso-canis; floribus oppositis, breviter racemosis; bracteolis in summo pediculo geminis, oppositis, linearis-lanceolatis, segmentisque calycinis dorso lanatis; corolla cylindrca, calyx segmentis triglo so longior, ore hiane; antheris muricatatis, basi antica bigibbosae, postica bicalcaratis, calcaribus antheris dimidio brevioribus, subulatis, obscure denticuloatis; ovario villoso; stylo longudine corolla, apice clavato; stigmatibus planiusculis.

Habitat in Cornubia paludosis, promiscue cum (nuper ibi detecta, prius in Anglia non visa) *E. ciliarii*. Misit amiosis, Hooker.

**Inter ciliariem et Tetralicium ex octo media, carunculo procub dubio hybrida proles, ut recte jam Hooker us (ex ejus litteris) supasicitas est.**

Nostrae sunt folia ovato-lanceolata, dorso pruinoso; inflorescentia racemosa; bracteolae in summis pedicellis gemine; corolla cylindrica, ore non constricta; antherae oblonge muricate, antice bigibbose; suve apice incrassata; que omnis autem habet *E. ciliariam*. *Tetralicium* prodeciscantur folia quaterna; ciliorum in foliis, bracteolis, calycinisque segmentis numeros, bracteolarum et calycis tomantur, laciniae calycinae marginis non revolutae, antherae calcaratae, et ovario villosum.

Mulo proprius sunt calcaria antherarum dimidio triplo breviora (non, ut in *Tetralicium*, antherae longitunide et stylus in parte clavatae obscuriusculi, non glaberrimis).

Ovarium (certum quadriloculare, loculamentis multiloculatis) in normillis floribus friabile est visum, infirmitate seminalis signum.


Perennis, totus glabulus-pubescentis; caulibus uno pluribus, ramosis, basi imbricatim-multissquamatis, ramis 2-4-cilatis, foliis caulinae sessilibus, amplexicaulibus, pinnaflidiis, laciniae ovatis obovatis, sinuato-dentatis, auriculis base late ratis, rotundatis; capitulis campanulatis, radiatis, radio patente; periclinii phyllis linearis-lanceolatis, glabro-inclusis, calycinis dimidio breviores, olivophyllos; acheniis sulcatos-triangulis, suis hispida.

Habitat in montium Asturicum occidentalem (port de Leitariov et pie de Aruvs) regio alpina, locis declivibus lapidosis, Augusto ineunte flore florentibus (Durii). *Radix* (ex uno specimine) recte descendens, plus semipedalis, flexuosa, crassa, durum, apice verisimiliter perennis. *Caules* ex ea radice pluribus, inequalibus, erectis ramosis, striatis; centralis 1-2-pedalis, ramis distanibus, axillaribus, patentibus, foliatis, 3-4-cilatis; laterales breviores, maximum pedales, apice tantum ramosi, ramis 3, erectissimis, subphyllos, 1-3-cilatis, corymbose-fastigiatis; omnes squamis imbricatis (foliis vermis centriortum petiolaris residuis?) basi tuncati! *Folia* radiculata non visa. Caules folia mollia, flaccida, minus quam relique partes glandulosas, petioli hirsuta; inferiora majora, oblongo-obovata, maximum clina longa, suprae nitueta, medio pinnaflida, lobis latibus, sinuato-grosso dentatis, dein plus minus attenuata, basi vero in auriculis 2, rotundatis, crenatae, caulis amplaxantes valde dilatata; superiors semin minora, supra basis non ita attenuata, magis regulariter pinnaflida; summa pedicellis triplo brevior, linea-lanceolata, denticulata, basi non aut vix dilatata. *Pedicelli* 1-1½-pedunculii, in minorioribus speciminebus erecti, in majori bus plus minus patentes, omnes valde glandulosi et phyllis 2-3-remosis, setaceis, adpressus muniti. *Capitulum* campanulata, apice 4-6 lin. lata; calyceolo 6-8-phyllo, phyllis setaceo-subulatis, granduloso-lispidis, apice non maculatis. *Ligula* 12-13, patensissime vel reflexa, longituine periclinii (4-5½ lin. longe), linearis-lanceolatae saturatae flavae ferè aurantiaca, apice 3-crenatae, in vivo plane, non revolutae, tubo graciosi, basi inflato, ore villosusculos, stigmatibus glabris, demum exsertis. *Achena* teretisculi, sulcatov-10-striatae, inter striae pilis brevibus candidis adpressis hispida; inferiora fusco-nigra, exterius pallidiiora, fulvescentia.

*Obs.* Species habitu ferè *S. viscosus*, foliis ferè *S. lividus* (funicola Ten.) ab hisce autem et ab omnibus ejusdem tribus quos aut vidi aut descripsit conveni, diversissima, ob radicem validam descendem, verisimiliter perennem, caules firmiores, basi squamatos, capitula multiflorum, hemisphericum, et ligulas elongatas, in vivo non aut vix revolutas. *Achena* omnia in *viscoso* glaberrima, in nostro omnia hispida.


E. perenne, glaberrimum; cauliflori solitario, simplici, oligocephalo; foliis ramosis-nervis, indivisis, margine spinoso-dentatis, radicalibus spathulatis, basi attenuatis, caulinae late linearibus, semi-amplexicaulibus; capitolo terminali cylindraceo; involucro sub 20-phyllo, foliolio 8-10 majoribus, lanceolatius, utrinque spinoso-1-4-dentati, capitolo dimidio ferè brevioribus, paleis tricispatis, flore longioribus; calyceis tubo vesiculos crebris tota quasi pubulosis; carpellis quinquevittatis.


*Obs.* Species pulchra, inter descritas nulli arcte cognata! Nomen habeat a meritisissimo inventore, cui multa jam accepta refert scientia nostra amabili, plura in posterum, si Dis placet, acceptura.


* A. caule tereti pedunculosque glabris; foliis bipinnatisectis, segmentis ovatis, glabris, inciso-pulvinatis, margine scabris, omnibus distinctis; involucro nullo; radii dorso laevibus; petalis (viridulis) ellipticis emarginatis, acuminis subulato, inflato; fructu elliptico, alii lateralis subcoriaceis, vittis in commissura geminis.

Habitat in Asturiae occidentalis convallibus alpinis, nominatim in valle Trexost, ad rivos, in plagis subalpinis *Brochas de tubo* non descendens, ibi jam exequiae *Julio fructiferum* (*Durieu*).

Herba valida, 5–7-petalis (*Durius in litt.*), cujus non nisi superior pars fructiferia, et folium unum in parte inferiore sectum suppetunt, e quibus tamen patet verum esse *Angelica*, nulli descriptarum respondentem, quamvis *sylvestri*, montanam et *Razouliae* cognominat. Differt enim ab hisce speciebus (reliquis in DC. priorie sectione recentissimae sunt) caule non aut viri striato; follicorum dentibus profundiobs, paucissimis utrinque 4–8, non 20 et utra pedunculis, seu ultimo caulis et ramosorum internodio, glabris, non nisi apice summo, sub umbella pubescenti-scaparis; involucro nullo; petalis minoribus, viridulis, ellipticis, non cuneatis, acuminis persistenter reflexo, non demum surrecto et fructu triente minore, brevisquis elliptico, alii lateralis crassinucleus, opacis, ferre coriaceis, non membranaceis. Suppetos folium inferius plus quam pedale est, bipinnatisectum petiole plus semipedale, gracili, basi parum dilatato piniois 2 inferioribus 3-jugis, pinnulis petiolulatiss sessilibusque, ovato-oblongis, non acuminatis, omnibus distinctis renunciatis, una inferiore impari triolobis. Quibus notis ad *Ang. sylvestre* maximè quidem accedit, ab *A. verum* *Razouliae* et montana, in quibus folii elementa superiora decruntur, multum differt nostra. Umbellae radii minus quam in affinis angustati, dorso, ut in *A. razouliae*, glabri, non ut in *sylvestre* et *montana*, circumcirca densi pubescentes. Petalorum acumen, ut in *A. sylvestre* et *montana*, subulatum, non, ut in *A. Razouliae*, setaceum. *A. sylvestris*, in planitie, Septembris exequae semina perfecta, *A. Razouliae* et *levii*, in subalpinis jam exequae Julio fructiferum inveniuntur. Fructus partes singulas (margo calycinis, jugo dorsali, vittae tum valleculare tum commissures, carpophorum), prater alas laterales incassatas, in comparatis species similimine appaerunt.


E. radice stolonifera; caule stricto, simplici, tereti, pubescente, foliis rudimentibus imbricatis basi quasi squamato; foliis ovato-oblongis, remotis serrulatis, margine et ad basin dorsale pubescentibus, ceterum glabris, inferioribus oppositis sessilibusque, superioribus quandoque alternis et petiolaribus; petalis calycis majoribus, obcordatis; stigma quadrilobato.

Habitat in alpium Asturicarum occidentali auginis dehiscentibus latissimis, non paulum super cellum port de Leitigorigu in ascensu ad castelum montem *pic d'Aruas*, etiam in subjectis subalpinis ad pagum Brena de Abaso, 8-17° Jul. flores et fructificans (Durieu).

**Epilobio montano et Ep. originifolio** habitu simile, sed a priore diversum statum dimidio minore, 5-10-unciali; caule simplici, non ramoso; radicis collo stolonifero; foliis inferioribus sessilibus, non petiolaribus; petalis majoribus (4-5 mm. longis), saturaté violaceis, non roseis carneis.

*Ab originifolium* magis adhuc distat, ob caule tomentoso, circumcera pubescentem, non ex foliis decurrente lineis 2-4 elevatis filiformibus notatam et inter lineas glabrum, foliis margine basique ad et nervum medium pubescentia, non glabrum; capsula breviter, non longe pedicellata; et stigma quadrilobatum, lobis divergentibus, ovato-lanceolatis, inferiore labio triente longiore, apice tridentato. *Petalis pallidi flava, unguis glaberrimis, limbo basi barbatu; vexillum erectissimum, amplum, ellipticum, emarginatum, dorso serico-villosum; carina longitudine vexilli, apice emarginato subgaleolata genitalia retinens, dorso serico-villosissimum; alae carinæ paulo breviores, praeter basim barbatam glaberrime. Filamenta monadelpho, tubo glaberrimo, antheris alternè brevioribus, alternè longioribus. *Onogrammum* filiforme, serico-villosum, 6-7-ovulatum. *Stigma* glaberrimis, stigmatibus terminalibus, hemisphaericis. **Legumina sessili**, compressa, lanceolata, 8-10 mm. longum, 2-2½ mm. latum, ad semina torulosi, inter semina quandoque coarctatum, tota superficie lanato-hirsutissima. Semina in unoque legumine 1-2, perfecta, compressa, oblongo-elliptica, basi non strophilato.

**Obs.** Characteristica sunt in haec specie folia minissima, bracteola maxima rudimentales et ramuli prismatice-tetragoniti, valde tuberculati, apice obtusae. Pariter modo obtusatos ramulos non vidit, nisi in *Genista purpurea* et *Cytisus subgenus*, quibus etiam habitus subsimilis, qui vero siatur vessel, calycis formata, seminibus strophilatis, etc., longè recondit. Ceterum nec in herbaris nec in libris illam invenit *Genistam*, nostri aquapandam. Quae inter inermes reccentur, onmis diversissime. In spinoceentum turba, codem ferè habitu, codem ferè saturà gaudent tum *Anthoxanthum praeclare*, tum *Gen. coris*, *acantholoides*, *Lobelia et Salzmann*, facie tamen distinguenda, ob ramulos non ita abbreviatis, semper subulatis et in spinam inducatos, pedicello apice vel basi distincte bracteolatis, legumina pubescentia, non lanata, etc.


G. humilis, ramosissima, densè caespitos, rigidula, ramis alternis, irregularibus, cumulatis, cristoso, prismatice-tetragoniti, sucktis, tuberculatis, sub apice columnari! obtuso! 1-2-floris; foliis rarius, alternate, paucifloribus (in ramulis noviolos simplicibus, lineari-lanceolatis, plerisque (in ramulis anni precedentis) trifoliatis, foliis sessilibus, ovatis, utrinque pubescentibus; floribus axillariis, erectis, pedicello infra medium obscurecundum dibracteolato; calyce bilabiato, adpressis pubescentibus; petalis omnibus basi barbatis, vexillo carinaque dorso adpressae villosis, albis paulo brevioribus, glabris; ovario 6-7-ovulato; stigma capitato; leguminibus compressis, lanceolatis, densè lanatis, 1-2-spermatis, ad semina torulosis; seminibus ellipticis, hilo non strophilato.

Habitat in caelostrum Asturicarum occidentalis montium (pic d'Aruas, pic de Canallar, etc.) summis acuminibus, 1200 fortes hexapod, super mare, cum *Junip. nano* W., sublimem hanc sedem non dere-linguens. Flores exuente Julio, et semina perfecte Augusto exuente (Durieu).

**Frutex** humilis, depressus, ramosissimus, densè caespitosus (caespites diametro 3-4-pedali), rigidulus, non spinosus. *Rami* alterni, glabri; principes teretiusculi; secundarii patuli, aphylli, teretiusculi, sucktis, remotè tuberculati; tertiariorum numerosissimi, congesti, alterni vel fasciculati, subsimplices, oligophylli, breves, glabri, prismatice-tetragoniti, sucktis, per intervalla tuberculati, basi fragiles, apice obtusi! Ibique distincte quadrutriculati; quaternari (novelli) brevisimi, serico-pubescentes, minus distincte tetragoniti. *Folia* alterna, minuta, sessilia, in ramulis noviolis simplicia, linear-lanceolata; in ramulis terciarii sparsa, trifoliolata, foliis aliquibus, ovatis, utrinque pubescentibus, intermedia quandoque longiore; in tertiariori et secundarii nulla. *Stipula* nulla. *Pulvinaria* in noviolis obsolèta, in tertiariori incassata, dura, bisulcata, in tuberculum persistente, quibus tuberculis aphyllis exasperatis inuenitur ramus secundus ordinis. *Flores* inodori, in summis tertiariori ramis solitarii vel gemini, axillares, breviter pedicellati, pedicello infra medium dibracteolato, bracteolis exiguis, oculo arnato sepæ inconspicuis. *Calyx* bifidè bilabiat, adpressus pubescentis, tubo oblongo, labio superiori bipartito, lobis divergentibus, ovato-lanceolatis, inferiore labio triente longiore, apice tridentato. *Petalos* pallidè flava, unguis glaberrimis, limbo basi barbatu; vexillum erectissimum, amplum, ellipticum, emarginatum, dorso serico-villosum; carina longitudine vexilli, apice emarginato subgaleolata genitalia retinens, dorso serico-villosissimum; alae carinæ paulo breviores, praeter basim barbatam glaberrime. **Filamenta** monadelpho, tubo glaberrimo, antheris alternè brevioribus, alternè longioribus. *Onogrammum* filiforme, serico-villosum, 6-7-ovulatum. *Stigma* glaberrimis, stigmatibus terminalibus, hemisphaericis. **Legumina** sessili, compressa, lanceolata, 8-10 mm. longum, 2-2½ mm. latum, ad semina torulosi, inter semina quandoque coarctatum, tota superficie lanato-hirsutissima. Semina in unoque legumine 1-2, perfecta, compressa, oblongo-elliptica, basi non strophilato.

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suffultia, medio bifractaetatis; calyce bilabiato, sericeo adpresso pubescente, labii superioris lobis divergentibus; petalis subequalibus, vexillo preter summam dorsalem lineam medium glaberrimo, alis perindis glaberrimi, carina adpressa pubescente; ovario 6-7-ovulato; stigmati laterali, superoem stylis partem occupante.

Habitat in alpinum Asturicarum, oppido Conegas de Tineo ab austro immittentium, zona media, exinde usque in zonam subalpinam vagans, lignique ignarii copiam ieci montanis suppeditatis. Ad laterem montium pico de Canudades et pico de Arves imperitis frequens. Initialis ejus, ex Conegas de Tineo in pico de Arves per vallem del Nivio tendenti, ad pagum S. Luado observatur, finis vero in montibus de Ladredo, de Leitariegos, et. Etiam sed occisimae in montibus humilioribus, per quos est Conagas de Tineo in Asturiam inferiorem iter est, nominatim ad vicum el Puelo et in septentrioinali latere vallis de Argenza visa. Floret Julio et Augusto (Durieu).

Frutex eatus quandoque 15-pedalis, ramossimissimae, ramis inerpisibus, glaberrimis, sulcatis, non aut vix tuberculatis, ramulis multis, aequalis, erectis, longiusculis, subvirgatis, filiformibus, obscuris striatis, sub-pubescentibus, superoem aphylsis ibique racemoso-floriferis. Folia in ramis principibus vix uilla, iibi forte nonnuncum trifoliotata, quod ego non distincte vidi, in ramulis vero frequentia, omnipes simplex, alba, erecta, petiololata, plana, lineari-lanceolata, rostrata, facie glaberrima, dorso griseo adpresse pubescente. Stipalis planae nulla. Pulvinaribus absotae. Flores a foliis remotae (non axillares), solitarii (non fasiculati), in ramorum apice 5-7-sequtibus spatius distincti, laxae racemosi, secundit, subscutantes, inmodori. Pedicelli filiformes, 1-14 lin. longi, bracteis ipsis dimidio breviores lati sociis media opposittis bifractate, bracteolis parvis, subulatis, hirsutis. Calyce bifiide bilabiatus, adpressse sericeo-pubescentes, labio superiore bipartito, lobis divergentibus, inferiore labio paulo longiore, apice tridentato. Petala subequalia, flavo, omnibus dorso pallida; vexillo vix patulum, ellipticum, emarginatum, ad lineum medium dorsalem, sub apice villosum, ceterum glaberrimum; carina longitudine vexilli, apice emarginato subgastato genitalia retinens, dorso pilis adpressis, minus densis pubescens; alae carinae vix breviores, glaberrimae. Filamenta monadelpha, tubo toto asperulo-pubescente, antheris alterni brevioribus, alterno longioribus. Ovarium lineari-lanceolatum, sericeo-villosum, 6-7-ovulatum. Stylus glaberrimus, stigmatici laterali, superoem stylis partem occupante. Fructus ignotus.

Obs. Pessimus hucusque definita G. cinerea DC. aliquam est longinquum cum nostra similidinem monstrat, differt vero maximae statuta humilii, ramis floriferis non filiformibus; foliis eorum fumus omnibus trifoliolatis, vel imo stipitarum? plus minus completa evolutione quasi 4-5-foliotata; floribus axillariis fasciculatis, rar vestri, labii calycinici inferioris lobis apice convergentibus; alii basi barbatis, non glaberrimi; tubo staminis glaberrimo ; et stigmatici inferiores, non superiores, stylis latus occupante. Eadem differentias prabat G. ramosissimum Poir. (Spartium ramosissimum Desf.) quam ego ad cinerea non nisi varietatis lege (floribus paulo majoribus, calyce et petalis hirsutioribus) distinguo. Diversissima vero est ex ad G. virgatum DC. forte accensa G. cinerea Cambess. ! Enum. Balear. p. 60.

Structurae partium longae affini, quamvis habitu magis diversa, est G. polypodifolia DC. seu G. tinctoria lusitanica maxima Tournef. Inst. ii. 483. Haec autem differt ab nostra, foliis (in ramis principibus sine dubio trifoliatis) triplo longioribus latioribus, Genista tinctoria sumula, perinde ramulosa glabratissima, viridis; racemis (perinde aphyllis) elongatis, 12-20-floris; floribus trinete majoribus; calyce glabriusculo; petalis satiarius flavis, dorso non pallidis; aliique carinae paulo longioribus.


Se et G. virgata DC. (juxta specimen Maderenæ à cl. Webb communicatum) differt a nostra ramulis confortissimis rigidulis, non ita tenuibus, floribus in ramulorum apice congestis, erectis (non seceduis) inferioribus axillariis; pedicellis suprâ medium bracteolatis; calyce minus profunde bilabiato, densius pubescente; vexillo hirtissimo, non glabro, et stigmatici terminali, non lateralii.

Comparanda restat una G. congesta W. (a me non visa) qui floribus racemosi et vexillo glabrum tribuuntur, cuius vero differentia ex patris diversitatem (si quidem Verem Canarianæ) facilis praebuisset potest.


E. circis simplicibus, 2-3-foliate; foliolis 6-10, oblongo-ellipticis, mucronatibus; pedunculis 1-7-floris, folium aquatibus vel superantibus; laciniis calycinis subequalibus, subulato-setaceis, tubo longioribus; leguminibus oblongis, compressis, adpressis villosulis, obscuris reticulatim nervatis, 6-8-spermis.


Habitat in umbrosis Mauritianæ circa Tingidem (Salzm.), in pascuas maritimis et sylvaticis Corsicae (Salis-March.), et in decliviis subumbrosas Asturiae inferioribus, tum ad rupes pontis de Pesaflor, tum in sylva quadam supra Gradum (Durieu).

Statura et habitu similis E. tetraspernum et E. gracillii, a quibus recedit foliolis multo latioribus, dentibus calycinis subulato-setacisis, tubo multo longioribus, non in habitu latifolitis tufo brevioribus, et leguminibus pubescentibus. Calycinis dentibus elongatis et leguminos pubescentes accedit ad E. agrifoliim Guss., quod tamen stipulis profunde dentatis, pedunculis folio brevioribus, leguminibus ovatis, non oblongo-satis superque differt. Nequit esse, a me nonum visum, E. pubescens DC. cui laciniis calycinis latiusculae, tubo
water, and probably no other factor is so much related to the form of plants. Water constitutes 70 to 90 per cent. of the mass of most growing plants, and its significance in the physiology of the plant is obviously of the greatest. A work dealing adequately in English with the water-relations of the plant is therefore very desirable. Professor Maximov’s book treats of the plant in its relation to water in a very thorough and clear manner. It is divided into three parts, treating respectively of water-absorption by the plant, the loss of water by the plant, and the water-balance and drought-resistance of plants. The third section of the book is the longest, comprising about half the text. Indeed, the first two parts may be regarded as more or less preliminary matter, expounding, as they do, the scientific principles necessary for the proper understanding of the third part, which constitutes the main theme of the work, for, as Professor Maximov indicates in his Introduction, it is with drought-resistance and its physiological basis that he is particularly interested.

The book can be thoroughly recommended to all botanists who wish for information on the water-relations of the plant; indeed, no botanical library, private or public, should be without it. It is the only English book dealing in such exhaustive manner with the water-relations of the plant, and it is an extremely well-presented and well-arranged account of these relations.

One or two points call for comment. In the footnote on p. 39 the reviewer’s use of the term “suction-pressure” has been misquoted; his use of the term is the same as that therein suggested. Again, on p. 52 it is stated that the value of the suction-pressure of the root could be independent of that of the surface-cells, which might even possess no suction-pressure at all. But, although the suction-pressure of the root as a whole may be determined by the concentration of the solution of its vessels, it is not made clear how water could possibly enter the root if the surface-cells possessed no suction-pressure.

Finally, the work of the late Professor Yapp in preparing the book for publication in English deserves some words of appreciation. Professor Yapp practically re-wrote the book, while he also supplied abundant additional information in the form of footnotes. It must be a lasting regret to all botanists that Professor Yapp was not spared for many years of work on the subject of the water-relations of the plant in which he was so interested, and that he did not live to witness the publication and success of this book, a success which he did so much to secure.—

W. STELER.
very considerable amplification of the typewritten Monograph of 1968. It embodies a surprising wealth of information about European orchids from the systematic, microscopic, biological, and almost every point of view except the horticultural.

The first part deals with the internal morphology of the various organs and the life-history of orchids generally, from germination to pollination and fructification. There are keys to the genera and species, and also keys to the latter founded solely on microscopic structure. The synonymy is unusually full, and practically constitutes a bibliography of each species, with references to previous iconography and exsiccatas. The work has been brought throughly up to date by the inclusion of recently discovered species, varieties, and hybrids, both British and Continental, of which many are figured for the first time. A special feature peculiar to this work and its predecessor of 1908 is the microscopic morphology of each species, illustrated by 227 text-figures, a subject which Mademoiselle Camus has made especially her own. An entirely new feature is the method of cross-pollination of various species, and enumeration of the insects by which it is effected, so far as is at present known. The eleven coloured plates include the most recently-discovered species and hybrids, and are of great interest. The book is beautifully printed, and there is a pleasing absence of unnecessary changes of name. It is an epitome of present-day knowledge of European Orchidaceae, embodying the work of wide botanical and literary research.—M. J. G.

BOOK-NOTES, NEWS, ETC.

NEW YORK BOTANICAL GARDEN.—We learn that Dr. Elmer D. Merrill, Director of the Botanical Garden and of the experimental station of the University of California, will take up his duties as Director of the New York Botanical Garden on January 1, 1930, in succession to Dr. N. L. Britton. Dr. N. L. Britton has been Director-in-Chief since the Garden was organized in 1896, and the remarkable growth and development of the Garden and Museum are a monument to his energy and skill. We understand that Dr. Britton wishes to have more time for private research, especially on the vegetation of Porto Rico and the Virgin Islands which for some years past he has been studying. Our best wishes follow him in his retirement.

Mr. Charles Wright, A.I.S.—Our best wishes also to Mr. Charles Wright, who retires from the Herbarium of the Royal Botanic Gardens, Kew, after forty-five years' service. Mr. Wright's courtesy and willingness to help have been familiar for many years to home botanists and those from overseas who have worked in the Kew Herbarium. In addition to his published papers he has rendered yeoman service in the production of the African Floras, the reading of the proofs of which has formed no inconceivable part of his work.

The Cryptogamic Section, Department of Botany, British Museum, will be closed to visitors for a few weeks, owing to structural alterations.

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