PROCEEDINGS

OF THE

CAMBRIDGE PHILOSOPHICAL SOCIETY.

VOL. XVI. PART III.

[EASTER TERM 1911.]

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BY A. H. EVANS, M.A., Clare College.

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PREFACE.

THE following pages have been written with the intention of bringing the Flora of Cambridgeshire up to date, as Babington's work on the county was published as long ago as 1860; and also in the hope that they may be found useful by the workers at the Botany School of the University, and Field-Botanists in general, until a larger and more detailed work is issued.

The author, with the assistance of many kind friends, has been able to certify the continued existence of many rare species of plants in the district, as well as to add largely to the lists previously published; and he wishes to take this opportunity of expressing his warmest thanks, not only to his coadjutors, who have furnished the important articles on the Lower Cryptogams, but to his other helpers—especially Dr Moss, Curator of the Herbarium, and the Undergraduates who have formed the bulk of those taking part in the regular Botanical Expeditions.—Others will be found mentioned below, who have been specially concerned in the Botany of the County, but to these should be added Mr G. C. Druce of Oxford as well as Mr C. E. Salmon of Reigate, who has furnished much information on specimens in the Herbarium of the "Holmesdale Natural History Society." Finally we are indebted to Messrs H. and J. Groves for much help on the *Characeæ* of Cambridgeshire, the localities being in this case given fully, as they are in the genus *Potamogeton*, in the hope of stimulating further research.

The separate contributors to the Lower Cryptogams have been allowed a perfectly free hand, as the treatment best for the Phanerogams might not be equally suitable for these groups.

A. H. EVANS.

9 HARVEY ROAD, CAMBRIDGE,
October 12*th*, 1911.

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A SHORT FLORA OF CAMBRIDGESHIRE, CHIEFLY FROM AN ECOLOGICAL STANDPOINT, WITH A HISTORY OF ITS CHIEF BOTANISTS.

By A. H. Evans, M.A., F.Z.S., Clare College.

I. CAMBRIDGESHIRE BOTANISTS.

In early times the county of Cambridge was exceptionally fortunate in its Botanists; but this might perhaps be expected to have been the case, as it includes within its boundaries one of the two most ancient seats of learning in Britain. Long, however, before a regular School of Botany was recognised by the formal appointment of a Professor in the University in the year 1724, the celebrated John Wray or Ray published at Cambridge a 12mo work entitled *Catalogus Plantarum circa Cantabrigiam nascentium*, which gave a selection of synonyms, and notes on the localities where the plants were found. This was issued in 1660, and was followed by an Appendix in 1663, and a second edition of the same, published by Peter Dent, a Cambridge apothecary, in 1685. Subsequently Ray, instead of preparing a new edition of his original work, thought it better to write a book on the plants of the whole of England, which appeared in 1670 (ed. 2, 1677), under the title of *Catalogus Plantarum Angliæ* (London, 12mo), while he furnished a list of Cambridgeshire plants by marking all such with the letter *C*. A list of the rarer species in the county contributed by Ray to Gibson's edition of Camden's *Britannia* in 1695 contains nothing new, but this is not astonishing when we consider that he left Cambridge in 1662.

In this way was laid a solid foundation for all future botanical work in the county, such being then amicably shared by the University and the town, but subsequently a fresh impetus was given to the study of this branch of science by the establishment of the Professorship of Botany by the former in 1724. The first

holder of the office, Richard Bradley, F.R.S., does not appear to have written on the plants of the district, but when John Martyn, F.R.S., of Emmanuel College, was recalled from London, where he had been engaged in lecturing, and succeeded to the chair in 1733, he had already written his *Methodus Plantarum circa Cantabrigiam nascentium* (London, 12mo, 1727). In his Introduction to the *Flora of Cambridgeshire*, Professor Babington tells us that this work appears never to have been regularly published, and that it was prepared for the use of students attending Martyn's first course of botanical lectures at Cambridge, but, if so, he must have been able to predict his future appointment no less than six years before his election. In the *Methodus* he included the whole of the work of Ray and Dent, accepted the generic characters in the former's *Methodus emendata et aucta*, and other publications, and, in place of an alphabetical order, arranged the whole according to the system of classification approved in his time, but he mentions no new plants. A second edition was projected, but only a sheet and a half were printed. The third Professor was Thomas Martyn, of Sidney College, elected in 1761, who followed in his father's steps by issuing in 1763 his 8vo *Plantæ Cantabrigienses*, coupled with what he termed *Herbationes Cantabrigienses* (or thirteen botanical excursions), and therein he made a fresh advance by using the Linnean classification and nomenclature. In the body of the work only the names of the plants are given.

Our fourth Professor was J. S. Henslow, of St John's College, elected in 1825, who was a great lover of field-botany, and added much to our knowledge of local plants. He drew up in 1829 *A Catalogue of British Plants, arranged according to the Natural System, with the Synonyms of De Candolle, Smith and Lindley* (12mo), and italicized all plants not found in the county. In a ond edition he improved upon this by adding the synonyms of Hooker, and denoting Cambridgeshire species by the letter *c*. Constant references to his records are to be found in the pages of the *Flora of Cambridgeshire*, published in 1860 by our fifth Professor, C. C. Babington, F.R.S., of St John's College, who succeeded to the post in 1861, and held it till his death in 1895. Still more celebrated than his predecessor, he was an authority not only on the plants of our district, but also on those of Britain in general; while his work both in the herbarium and in the field has left a lasting impression upon botany in the University. His *Manual of British Botany* has gone through nine editions, the last having been revised and augmented by Messrs H. and J. Groves. In the *Flora of Cambridgeshire* we find details of the habitats of the various species of plants, with references in particular to the oldest authorities, while the introductory chapters and the appendices add to the value of the book. Owing to pressure

of other work Babington had to rely to a large extent on information gathered from his correspondents, who were comparatively few in some parts of the county; and this accounts for the scanty records from those parts, and the entire omission from the lists of *Cardamine amara, Silene conica, Digitalis purpurea* and other noticeable species.

But it must be remembered that it was during the latter part of the Professor's tenure of office that a great impetus was given to the study of botany, in a new direction, by the discoveries of foreign savants with regard to the internal structure and physiology of plants, which were followed up by workers in England, and Cambridge in particular—among whom we must not omit to mention the name of our well-known authority, Dr Walter Gardiner, who practically refounded the Museum of Botany, in collaboration with Mr M. C. Potter, about 1885, and has written a full account of its foundation (by Henslow) and its re-establishment (Camb. Univ. Press, 1904). Field-work was for a time overshadowed by that of the laboratory and class-room, and to some extent its value was under-estimated. Babington, as one of the old school, must have found it very hard work to keep pace with the new discoveries, and though Dr Vines (now Professor at Oxford) and Dr Francis Darwin, who is still with us, were at hand to give every assistance, it is certain that less time could be devoted to the herbarium and the field by the University authorities. Misled by appearances, many have thought that the pursuit of field-botany languished during this period, but such was by no means the case; it simply fell into the hands of those not officially connected with the Professorial staff, and many names might be given of those who did excellent work in Cambridgeshire during this "eclipse" period. It is sufficient here to mention the name of Mr Alfred Fryer of Chatteris, who from that place as a centre explored many of the least-known parts of the county and recorded many forms new to it or else of doubtful occurrence. In particular he was, and still is, a great authority on the genus *Potamogeton*. To Mr Arthur Bennett of Croydon, moreover, we owe a debt of unfailing gratitude, for the interest which he has always taken in our flora and our herbarium, and for the aid—constantly asked and never refused—which he has afforded to us all in so many cases, especially with regard to those critical forms, in the knowledge of which he is a past-master. We must here mention his 'Notes on Cambridgeshire Plants' (*Journal of Botany*, 1899, pp. 243—247), which acts as an appendix to W. West, Junr's paper of the same name in that *Journal* for 1898 (pp. 246—259), and an article on the plants of the Kirtling district by R. A. Pryor in the same periodical (1874, p. 22).

Even under the shadow of the laboratories, moreover, were men with their heart in field-work, such as Messrs Potter, Willis, Burkill, Hill, G. S. West, and Yapp, who were now rapidly coming to the front, and ensuring that in the long run field-botany should not suffer from its temporary sleep at the Museums, but wake again with renewed vigour. They have all left us to fill important posts in England or abroad, but with the death of Professor Babington came the recall to our assistance from Coopers Hill of one of the most brilliant of Cambridge scientific men, H. Marshall Ward, F.R.S., of Christ's College. He was appointed Professor in 1895, and, although hampered greatly by his duties in connexion with the building of the splendid new quarters for the Botanical Department, his laboratory work and teaching, he nevertheless found time to set on foot a scheme for collecting further material for a new Flora of Cambridgeshire, and encouraged all those presently working in that line to redouble their efforts. Himself a very great authority on cryptogams and especially microscopic fungi, on grasses and trees, he had published many important papers and books on those subjects, and was exceptionally qualified to lead the way in every part of our branch of science, so that the loss to Cambridge botany, when his career was unfortunately cut short by his death in 1906, is not easy to estimate.

Fortunately for us our present Professor, A. C. Seward, F.R.S., of St John's College, though primarily devoted to the Palæontological side of Botany, at once shewed himself fully alive to the importance of field-work, and, fearing that his other duties would not allow him time to supervise it to his satisfaction, gave practical proof of his interest in the subject by selecting for the post of Curator of the Herbarium Dr C. E. Moss (formerly of the Manchester University, now of Emmanuel College), who happily combines the qualities for the indoor and outdoor lines, and is known as an admirable worker in the field, both from the systematic and from the ecological standpoints. Under his guidance our botanical expeditions have taken a new lease of life, and the more critical forms of plants are being studied to the greatest advantage. Mr A. G. Tansley, of Trinity College, who joined the botanical staff about the same time, is another leading authority on ecological botany, and is heartily co-operating with us in the work. We expect also that the various members of the staff of the Botany School will render efficient aid, as far as their occupations will allow; and here we may especially mention Mr R. P. Gregory, of St John's College—whose mother, Mrs Gregory of Weston-super-Mare, has come to reside in Cambridge, and is working more particularly at the Violet group—and Mr F. T. Brooks of Gonville and Caius College, who is contributing to this work the article on Fungi. The Rev. P. G. M. Rhodes, of Pembroke

College, has, moreover, provided us with lists of the Mosses and Lichens, while Mr Arthur Bennett's aid must again be particularly mentioned here, as must also that of Mr Alfred Fryer, Messrs H. and J. Groves and Dr G. S. West, above mentioned, for the genus Potamogeton, the Characeæ and the Algæ respectively. Mr C. E. Salmon of Reigate, Mr G. Goode, the Secretary of the Watson Botanical Exchange Club, and Mr A. Shrubbs have also kindly furnished information for the lists below.

It will thus be seen that we have no lack of workers in field-botany at the present time, and that much may be hoped for the future; but it is now our duty to recall the names of the older botanists, other than official. Of these the earliest after Peter Dent is Israel Lyons, Junr, who published in 1763 at London an 8vo *Fasciculus Plantarum circa Cantabrigiam nascentium, quæ post Rajam observatæ fuere*; but his successor, Richard Relhan, chaplain of King's College, was a much more eminent botanist, and published in 8vo a full *Flora Cantabrigiensis* at Cambridge in 1785. He subsequently brought out three supplements dated 1786, 1788 and 1793, while two further editions of the whole work appeared in 1802 and 1820. Consequently Relhan not only brought our Flora up to date in the early twenties, but his time may be considered as the starting point of the modern period of our botany; for he not only included the records of those who wrote before him, gave generic characters, diagnoses of species, a selection of synonyms, trivial names, localities and times of flowering of the plants, but also furnished an account of the Musci, Hepaticæ, Algæ, Fungi and Lichenes. The importance of the last fact will be recognised when we note that Babington in his later work entirely omits these groups; and that those who are preparing the present lists have had practically no previous work except that of Relhan to guide them in this respect, if we except Dr West's own paper on the Algæ in the *Journal of Botany* for 1899 and some work by Mr Larbalestier on the Lichenes.

Mr H. C. Watson's *New Botanist's Guide* (1835—1837) adds a certain amount to our knowledge of Cambridgeshire plants, for information on which he was greatly indebted to the Rev. W. H. Coleman, of St John's College. Mr G. S. Gibson's 'Flora of the neighbourhood of Saffron Walden' (*Phytologist*, Vol. I., *passim*) contains a few notices of Cambridgeshire plants, and Babington acknowledges in the *Flora of Cambridgeshire* the assistance of many correspondents, who cannot be given in detail here, but among whom the Rev. W. W. Newbould of Comberton, and Mr S. W. Wanton, of St John's College, stand out prominently.

II. THE PHYSICAL FEATURES OF CAMBRIDGESHIRE, WITH ITS GEOLOGICAL FORMATIONS, AND THEIR ATTENDANT FLORA.

The county of Cambridge has still an extensive flora, with an abundance of interesting and uncommon plants, though the drainage of the low-lying fen-lands has been the cause of the disappearance of many of the rarer species, details concerning which will be found in the first of the succeeding lists. On these drained and cultivated fen-lands there has been little attempt at afforestation; thus they still present in most parts the aspect of cultivated open flats divided into sections by wider or narrower water-courses, to which the names of lodes or dikes are given according to their size. Shelter strips of poplars are in many places a conspicuous feature, as are the pollard willows which commonly line the banks of the streams, while near the villages there is no lack of hedges of hawthorn and the like. The remainder of the county is fairly well timbered, though many of the existing woods have been planted, and the vast bulk of the ancient forests have disappeared. Yet several of the existing woods on the boulder clay, the chalk, and the greensand, do possess some primitive characters, although modified to a certain extent by sylviculture, and probably represent the remains of the primæval forests of the county, which are vouched for by the remains of oaks and so forth disinterred from the base of the various recent alluvial or peaty deposits.

Plants which grow at great altitudes or are peculiar to upland moors cannot of course be expected in so flat a district, where the Gog-Magog Hills (240 ft) and Madingley Hill (175 ft) are the chief eminences that break the landscape, but the chalk downs that traverse the county from east to west, and the grassy expanse of Newmarket Heath, enable us to add to our list many species which would otherwise be lacking.

The rivers Cam, Nene, Ouse and their tributaries make Cambridgeshire a well-watered area; but there is a marked absence of any large sheets of water since the disappearance of Soham, Stretham, Benwick and other "Meres," though there is a certain amount of compensation to the botanist in the presence of

patches of marsh-land still remaining in the midst of a well-executed scheme of drainage. The only really extensive fen is that well known to exist at Wicken, and from this a mile or two of rough grassy or rushy pasture intersected by peat-holes stretches in the direction of Burwell and Reach. Thence to Waterbeach and Horningsey the Fens hardly exist except in name, and the same may be said of the northern division of the county, where we can only point to the Guyhirn washes, Chatteris Turf Fen and the so-called "Firelots" at Wimblington. An interesting piece of fen, however, occurs at Chippenham, and a still smaller area at Dernford near Shelford. The washes of the Cam are fast drying up.

Contrary to popular opinion, therefore, Cambridgeshire is by no means a land of sedge-fen and morass, but consists of a series of comparatively dry flats to the northward and of more elevated down-lands to the southward, the woods being chiefly confined to the latter portion of the county and seldom being of any great size. Estuarine plants are only to be found in the neighbourhood of Wisbech, on the tidal portion of the Nene.

Professor Babington, in his *Flora of Cambridgeshire* of 1860, divided the county into eight more or less arbitrary sections, but as his method threw parts of the fen-land and the chalk into different divisions, while it failed to keep the Gamlingay green-sand or the blown sand at Chippenham—with their peculiar flora—apart, we do not feel inclined to follow his lead. On the other hand Mr A. Wallis, who contributed an article on the Flora of the Cambridge district to Messrs Marr and Shipley's *Natural History of Cambridgeshire* in 1904, follows H. C. Watson in classifying the plants as British, English, Germanic, and Atlantic, but also classes them, with the exception of the estuarine species, as those of the Fen, Dry Soil, Meadow, or Shade Associations. The latter method is perhaps more suited to the modern ideas of Ecology than that of Babington, but can hardly be commended, for, to mention only two objections, it combines the chalk to a certain extent with the gravels, and takes no special heed of the boulder or other clays*.

On the whole it seems best to follow to a great extent the geological formations of our district, and to concern ourselves only with the following divisions:—

1. Alluvium, Peat and River Gravels.
2. Clays (Oxford Clay, Ampthill Clay, Kimmeridge Clay, and Gault)—excluding the Boulder Clay.
3. Chalk.

* Since this was written, Professor and Mrs McKenny Hughes have published an admirable account of the Geography of Cambridgeshire, including the Geology, Natural History and so forth, which will be found most useful by all interested in the county. (University Press, 1909.)

4. Lower Greensand of Gamlingay.
5. Boulder Clay.
6. Blown sand over chalk (as at Chippenham and Kennett).

It may here be stated that we include in the county the small detached piece of Suffolk adjoining Newmarket, as did Professor Babington.

1. Alluvium, Peat, etc.* This large division fills a great part of the north of the county, and, besides the present fen-land proper, includes the ancient fen-land reaching nearly from Peterborough to St Ives, and an extensive area of marine silt drained by the rivers Nene and Ouse, from Wisbech to the neighbourhood of Ely. Consequently the plants may be roughly apportioned to three groups: (1) those which are chiefly or entirely maritime, (2) those correlated with drier soil, with no special attraction to chalk, heavy clay or loose sand, and (3) those of the peat and its vicinity. Our alkaline peat exhibits a very different Flora to the acid peat of other places.

Maritime plants are only found around Wisbech, though the influence of the tide is shown in another direction as near the county boundary as Denver in Norfolk. An exception must, moreover, be made in the case of *Scirpus maritimus* and *Aster Tripolium*, which occur as high up the rivers as Sutton, and in the case of the former, as Upware, while *Apium graveolens* and other species may denote the former presence of salt water in places now far inland. Among these maritime plants we still possess at least *Spergularia salina* b. *media*, *S. marginata*, *Aster Tripolium*, *Statice maritima*, *Glaux maritima*, *Plantago maritima*, *Beta maritima*, *Atriplex portulacoides*, *Suæda maritima*, *Zostera marina* c. *angustifolia*, *Glyceria maritima*, *G. distans* and *Triticum pungens*. Others, such as *Frankenia lævis*, *Limonium vulgare*, *L. reticulatum* and *Atriplex pedunculata*, have now apparently disappeared, owing to the drainage of the salt marshes at Foul Anchor about a century ago.

For the plants of the second group, which presents no peculiar features, reference may be made to the general list below, but in the third group are many fen plants which are rare and of more than ordinary interest. A "fen" in Cambridgeshire means a sedge-fen—if it has not been drained, and a sedge-fen means a fen covered with a dense growth of *Cladium Mariscus*, with a lower carpet of *Carices* and such grasses as *Agrostis alba* and *Molinia cærulea*. *Phragmites communis* edges or chokes the smaller dikes,

* Where the Survey maps indicate the Jurassic or Cretaceous clays, or the lighter formations, such as lower greensand or chalk, there are commonly superficial deposits, which are so thick as to give a character to the soil quite irrespective of the underlying "solid geology."

and also intrudes among the *Cladium*, which responds by encroaching upon the *Phragmites* in the shallower water-courses. *Juncus subnodulosus*, *Calamagrostis epigejos* and *C. lanceolata* form a considerable portion of the vegetation of Wicken sedge-fen (and were doubtless commoner elsewhere in olden time). *Rhamnus catharticus* and *R. frangula* are the shrubs proper to this fen, with some willows, brambles and small hawthorns; *Lathyrus palustris*, *Lythrum Salicaria*, *Peucedanum palustre*, *Lysimachia vulgaris*, and *Cnicus pratensis* are specially conspicuous, while *Lastrea Thelypteris* occurs here and there in profusion. Others of the rarer species are *Viola stagnina*, *Stellaria palustris*, *Sium latifolium*, *Utricularia vulgaris*, *U. minor*, *Myrica Gale*, *Liparis Loeselii*, *Helleborine longifolia*, *Sparganium minimum*, and *Butomus umbellatus*, besides several members of the genera *Potamogeton* and *Carex* and of the *Characeæ*. *Carex paradoxa* and *Nitella tenuissima* may be more particularly mentioned. *Senecio paludosus*, *S. palustris*, and *Sonchus palustris* have not been found for many years, as will be seen below, nor does it appear that the two latter ever grew at Wicken. From the records of Ray, Relhan and others the very wet neighbourhood of Stretham seems to have possessed a particularly rich flora, and the same may be said of Hinton Moor near Cambridge, in the times of old. But it may be suspected that in still earlier days, and also in less accessible places, many of the rarer species were unnoticed. The valley fen at Chippenham still furnishes *Liparis Loeselii*, *Drosera rotundifolia*, and *Selinum Carvifolia*, while it is a well-known locality for other plants by no means common in the district.

2. Clays, other than Boulder Clay.

These do not form a continuous area, as will be seen from the Survey map; they are found as patches of Oxford and Ampthill Clay west of Gamlingay, near Longstanton, and elsewhere; as similar patches of Kimmeridge Clay situated for the most part on the "islands" or eminences of the fen country; and as considerable stretches of gault in various places along a line running in a north-easterly and south-westerly direction. The flora of this division has no very peculiar features.

3. Chalk. This division occupies the county between Newmarket and Royston; it is of considerable width throughout, and contains the main uplands of Cambridgeshire, of which the best known are the Gog-Magog Hills to the southward of the town of Cambridge. It is barely interrupted by a few areas of gravel, chiefly in the valleys of streams, and is marked by two long dykes of prehistoric date with high banks, near Fulbourn and Newmarket, Fleam and the Devil's Dyke respectively. Many of our rarest

plants are to be found in this division, among which especial attention may be drawn to *Anemone Pulsatilla, Linum perenne, Seseli Libanotis, Carum Bulbocastanum, Senecio integrifolius, Hypochœris maculata, Orobanche elatior, Muscari racemosum,* and *Carex ericetorum*; the orchids *Cephalanthera grandiflora, Orchis ustulata, Ophrys apifera* and *O. muscifera* still occur, though *O. sphegodes* and probably *Herminium monarchis* are now extinct; while a large number of species peculiar to chalk or with a preference for dry soils complete the list. *Onobrychis viciæfolia* is a favourite crop in these parts, and is almost as strictly limited to them in Cambridgeshire, as *Fagopyrum sagittatum* is to the fen country.

4. Greensand. In this division we may pass over the small patches of the Lower Greensand in the Isle of Ely and near Cottenham, and devote ourselves to the tract stretching from Gamlingay towards Sandy, where alone we find plants of a very different type to those of the rest of the county. The presence of some of these, such as *Teesdalia nudicaulis, Trifolium subterraneum, T. scabrum, Ornithopus perpusillus* and *Galium saxatile* is apparently due to the comparatively dry nature of the soil and not to the fact of it being composed of greensand, as they occur also eastward on the blown sand near Chippenham and Mildenhall; but a considerable list may be formed of plants few of which probably ever grew in Cambridgeshire much outside of the limits of the Gamlingay tract. Among these are *Mœnchia erecta, Hypericum humifusum, Solidago Virgaurea, Gnaphalium sylvaticum, Arnoseris minima, Oxycoccos quadripetala, Erica Tetralix, E. cinerea, Digitalis purpurea, Quercus sessiliflora, Convallaria majalis, Narthecium Ossifragum, Rynchospora alba, Deschampsia flexuosa* and *Lycopodium inundatum*; but it is evident on inspection of the list that only in Cambridgeshire can we call them, for our purposes, peculiar to the greensand. Associated with these we have the trees *Tilia cordata, Pyrus Aucuparia* and the above-mentioned *Quercus sessiliflora*, while *Ulex europœus, Cytisus scoparius* and *Pteris aquilina* are conspicuous features of the district. The Bogs were drained by 1855.

5. Boulder Clay. This division is here kept separate from that including the other clay soils on account of the very different character of its flora. In the first place certain of our plants are practically confined to this formation, as *Pyrus torminalis, Cnicus eriophorus, Primula elatior, Melampyrum cristatum, M. pratense, Lamium Galeobdolon, Daphne Laureola, Helleborine media, Colchicum autumnale, Carex remota* and *C. pendula*. In the second place many of the rarer species are hardly found elsewhere or are much more plentiful on it, as *Lathyrus sylvestris,*

Genista tinctoria, Trifolium ochroleucon, Bupleurum rotundifolium, Caucalis daucoides, Serratula tinctoria, Linaria Elatine, L. spuria, Euphorbia platyphyllos, Iris fœtidissima, Paris quadrifolia, and so forth; so that its peculiarities are sufficiently obvious even to the uninitiated.

Omitting small detached patches, for which reference may be made to the Survey map, the Boulder Clay extends over three very considerable areas in the county, one from near Huntingdon and Swavesey southwards to Gamlingay and the Orwell district, reaching eastward to within about two miles of Cambridge; a second running not quite continuously from Chishall near Royston to Linton; and a third hardly separated from the last-named, which extends from the east of Linton in a north-easterly direction along the higher ground towards and past Newmarket.

6. Blown sand. This division, mainly in the parish of Chippenham, begins between Fordham and Freckenham and extends past Chippenham village as far as Kennett. Part of it is cultivated, and part consists of sandy warrens, similar to those in the neighbouring districts of Norfolk and Suffolk, while the valley fen at Chippenham is in close connexion with it. Here, as on the Cretaceous sands of Gamlingay, *Ulex europœus, Cytisus scoparius* and *Pteris aquilina* are abundant, several of the less common species of *Trifolium, Ornithopus perpusillus* and *Calluna vulgaris* re-appear, while *Teesdalia nudicaulis* and several other rare species occur just outside the county. Of the plants which are not uncommon in this district, but are hardly ever or never found elsewhere in Cambridgeshire, the chief are *Silene conica, S. Otites, Medicago sylvestris, M. falcata, M. minima*; *Galium anglicum* also was recorded by Babington from the Park wall at Chippenham, and *Apera interrupta* is moderately plentiful. The last-named, however, was also found in 1855 at Pampisford near Cambridge.

With regard to the more critical forms of plants in general a considerable amount of work has been done, and specimens have been submitted to well-known authorities, whose assistance—and especially that so ungrudgingly given by Mr Alfred Fryer of Chatteris and Mr Arthur Bennett of Croydon—we must here most gratefully acknowledge; but in all probability further investigation will increase our lists and greatly add to the value of a new general Flora of Cambridgeshire, which it is intended to publish before many years have elapsed.

We may now proceed to consider the lists of plants stated to be lost or unknown in the county by Professor Babington in Appendices IX and X of his *Flora of Cambridgeshire.*

Of the plants reported to be lost, the following are still to be found: *Thlaspi arvense, Geranium rotundifolium, Lathyrus Nissolia, Pyrus torminalis, Sedum Telephium, S. album, Lactuca saligna, Senecio viscosus, Beta maritima, Polygonum minus, Salix purpurea, Colchicum autumnale, Setaria viridis, Phleum arenarium*; of those said to be probably extirpated we still have *Myosurus minimus, Œnanthe silaifolia, Kentranthus ruber, Limosella aquatica, Veronica spicata, Myrica Gale* and *Liparis Loeselii*. On the other hand many species—*Senecio paludosus* in particular—have not been seen for a considerable period.

Of plants said to be unknown in the county we have *Lychnis dioica, Digitalis purpurea, Festuca duriuscula, Tragopogon pratense, Epilobium angustifolium, Lepidium Smithii, Zostera marina* c. *angustifolia, Cardamine amara, Sagina maritima* d. *densa, Quercus sessiliflora, Teesdalia nudicaulis, Vicia lathyroides*, and possibly *Anagallis fœmina*.

III. ANNOTATED LIST OF SOME OF THE RARER PLANTS, MANY OF WHICH ARE NOW EXTINCT.

1. *Roemeria hybrida*, DC. This Poppy was at one time frequently found in the chalky fields lying between Reach, Burwell and Swaffham Prior. Judging from specimens in the Winch Herbarium of the Linnean Society and that of the Philosophical Society of York (Henslow) it was not extirpated before 1835, while the dates reach back to 1820. Probably the plant was introduced with agricultural seeds, and probably also it occurred in the district before our earliest record and after our latest. Babington records it on his own authority, and does not include it in his list of lost plants in 1860; but there seems to be no sure evidence of its maintaining itself to a later date than 1835.

2. *Arabis Turrita*, L. Ray does not mention this species, which is first recorded by T. Martyn in 1763 as growing on old walls about Trinity and St John's Colleges. It is still found in the grounds of the latter College, though in its present locality it may have been introduced more recently than in its former.

3. *Sisymbrium Irio*, L. This plant, always of interest on account of the story of its appearance after the Great Fire of London, was reported from Barnwell in 1818 by Mr Job Watson, of Hemingford, Hunts., and by Mr W. Skrimshire from Wisbech, prior to 1802. It is a species that usually lingers for a long time when it has once taken to the ground, as at Berwick-on-Tweed in the present day; and we should have expected further records from the county, unless it was a temporary casual of the rubbish-heap.

4. *Lepidium latifolium*, L. This Pepperwort is recorded from Leverington near Wisbech by Mr Skrimshire, but has never been noticed since his time. The locality, being near the sea, is natural, and there is no more reason to doubt this ancient record than those of later date, while modern lists, rightly or wrongly, consider the plant a true native.

5. *Frankenia lævis*, L. This plant was recorded by Professor T. Martyn from the salt marshes at Tydd Gout, near Wisbech.

These marshes were, however, drained before 1860, and *Frankenia* seems to have been extinct long before that date, although it is still fairly plentiful on the Wash, no further away than Holme, near Hunstanton.

6. *Hypericum elodes*, L. This species used to grow in the bogs at Gamlingay, but does not seem ever to have occurred in the Fens. The late W. West, junr, writing in 1898 (*Journ. Bot.*, July, 1898), says that it "grew until recently by the stream near the site of the old bog at Gamlingay, but I could not find it in 1894." We have, however, no means of knowing what "recently" means in this connexion, but from a letter of Babington to A. G. More (*Memorials &c. of Babington*, p. 344), we learn that the plant had not vanished in 1860. Perhaps stray individuals lingered to a later date.

7. *Vicia sylvatica*, L. Relhan's record of "Hall Wood, near Wood Ditton" still stands alone for the county. The wood was cut down long ago, but the specimen sent thence by the Rev. John Hemsted is worth noticing, as having been figured in Sir J. E. Smith's *English Botany* (1792). The plant occurs in the adjoining county of Hertfordshire.

8. *Drosera anglica*, Huds. Recorded of old from Sawston and Hinton Moors by Relhan. From a note kindly communicated by Mr C. E. Salmon, we find that there is a specimen from Whittlesey in the collection of J. A. Power, now in the Herbarium of the Holmesdale Natural History Society at Reigate, but it is more than likely that the habitat was in the direction of Whittlesey Mere, and therefore not in Cambridgeshire.

9. *D. longifolia*, L. Ray gives Hinton Moor as a locality for this species, Relhan gives Teversham and Sawston Moors. Without the specimens it is impossible to speak with certainty; but this species might possibly have been confounded with the last-named, though the "moors" before they were drained were as likely to have furnished it as *D. anglica*. It may be noted that *D. rotundifolia* is still found in the county at Chippenham.

10. *Lythrum Hyssopifolia*, L. Babington's own records are from the neighbourhood of Cambridge and Chippenham, while he gives others from Teversham, Hinton, Chesterton, Histon, Oakington, Madingley and Ely, taken from his predecessors or coadjutors. Newmarket must be added on the strength of a specimen in the Winch Herbarium of the Linnean Society, as we are informed by Mr Arthur Bennett; but not one of the records gives any idea of

the *status* of the plant, or furnishes any indication of whether it was a casual or not.

11. *Cicuta virosa*, L. The old record of Professor J. Martyn gave as the locality a spot between Ely and Prickwillow, and we are again indebted to Mr Bennett for the information that the Rev. J. Dalton's collection in the Herbarium of the York Philosophical Society contains a specimen gathered by Dr Goodenough in 1786. We are still unable to discover the plant in the county —as was Babington—but live in hopes of doing so, for Professor Yapp of Aberystwith tells us that he found it so near to our boundaries as Stalode Wash in Norfolk in 1908.

12. *Caucalis latifolia*, L. Formerly abundant in the county, now exceedingly rare (Babington in 1860). No doubt a casual of corn fields, as it is considered in the London Catalogue; but the fact remains that *C. daucoides*, though local, is still not uncommon, while, for no apparent reason, its congener has disappeared.

13. *Gnaphalium luteo-album*, L. As the figure in Sir J. E. Smith's *English Botany* was taken from a specimen sent by Relhan from between Hauxton and Little Shelford, we can certainly claim the plant for the county; but we have only Relhan's record.

14. *Pulicaria vulgaris*, Gaertn. Judging from the account in Babington's *Flora of Cambridgeshire*, this species was still to be found in or about 1860; but we have been quite unable to discover even a single specimen in the county, and the plant seems to have become extinct in Cambridgeshire, as there is reason to suppose is the case in more than one place in southern England. It loves grassy road-sides and commons and is therefore easily extirpated, especially by the builder.

15. *Senecio paludosus*, L. This species has been found in the counties of Norfolk, Suffolk, Cambridge and Lincoln, as will be seen from Mr Arthur Bennett's article in the *Transactions of the Norfolk and Norwich Society* (vol. VI, p. 457), where the details are fully given. Mr Bennett has kindly allowed me to use his MS. notes, from which many of the following facts have been taken.

The first record for Cambridgeshire seems to be that of Ray in his *Catalogus Plantarum circa Cantabrigiam nascentium*, p. 37 (1660).

In the Wilkinson collection belonging to the York Philosophical Society is a specimen from the county, gathered in 1800. The Rev. J. Holme of Peterhouse, subsequently Vicar of Cherry Hinton and Rector of Freckenham, is responsible for at least six

of those still in existence. One of these is that in the Wilkinson Herbarium at York, one is in the collection of Mr Arthur Bennett, one in that of the Holmesdale Natural History Society at Reigate.

All of them were gathered between 1800 and 1825 in Wicken Fen. Professor Henslow found the plant about three miles below Ely in 1833, and Professor Babington saw one of the specimens. Another in the Salt Herbarium at Sheffield ("Ely, 31.7.1833") may have been gathered by Henslow or by Mr W. Marshall of Ely, who gives Padnal Fen and Barraway Washes as localities somewhere about the same time.

One of Marshall's specimens is in Mr F. J. Hanbury's collection, a second cannot now be traced.

In 1857 Babington saw a plant in Wicken Fen, which may have been that transplanted later into the Botanic Garden at Cambridge. Two specimens were gathered, now in Babington's Herbarium.

Between 1878 and 1883 Mr Bennett is able to state, on the authority of Mr Wilton of Soham, that eleven specimens were discovered, and there our information comes to an end, while it is to be feared that since 1883 this *Senecio* has become extinct.

Two undated specimens, gathered by Dawson Turner in the county, are in the Winch Herbarium of the Linnean Society; Ray states that he found the plant "in many places about the Fens, as by a great ditch side near Stretham Ferry"; T. Martyn (1763) gives Chatteris; and Relhan (1785) Littleport and Burwell Fen as localities.

16. *Senecio palustris*, Hook. The first record of this plant in Cambridgeshire is that of Ray in his *Catalogus Plantarum circa Cantabrigiam nascentium* of 1660. He found it about March and Chatteris. Relhan reports it in the year 1820 from "a ditch at the edge of the moor next to the Park at Chippenham." Considering that it was a less uncommon species than *S. paludosus*, and not confined to the Eastern Counties, it is disappointing to find that we have no later record than those noted above; for that given by Babington (*Flora of Cambridgeshire*, p. 129) on the authority of Mr W. Marshall of Ely is stated in that gentleman's own notes to have been due to some error. See *Journ. of Botany*, 1899, p. 244.

17. *Arnoseris minima*, Schweigg. and Koerte. Professor Babington, writing in 1860, records this species from fields on the old Heath at Gamlingay, but it was not again noticed, as far as it is possible to ascertain, until 1910, 1911, when Mr N. Simpson of Trinity College and Mr A. H. Evans each found a single specimen on the site of the old Heath.

18. *Crepis fœtida*, L. Recorded from several localities in the county in Babington's *Flora of Cambridgeshire*. They need not be given in detail, but it must be noted that Mr Arthur Bennett has examined a specimen dated 1854 in the Herbarium of the York Philosophical Society, and has thus vouched for the Professor's identification of the plant, though it does not appear to have been found since 1860.

19. *Sonchus palustris*, L. We may perhaps assume, from our knowledge of the Fens of old, that this species occurred in several localities in early days; but even Mr Israel Lyons, writing in 1763 on plants observed round Cambridge after the time of Ray, can only record it from "near Stretham Ferry." In the Hailstone Herbarium at York, however, Mr Arthur Bennett found a specimen from Bottisham Fen dated 1839, and another gathered in 1843 "opposite the Knave of Clubs Alehouse" near Bottisham, the last known from the county.

20. *Oxycoccos quadripetala*, Gilib. The Cranberry, though once abundant, seems to have been restricted to the Gamlingay Bogs, and in 1859 was confined to "one small spot" (Babington). It is now extinct in that locality.

21. *Erica cinerea*, L. This species, unlike *E. Tetralix* and *Calluna vulgaris*, has not been found since 1860, when Babington records it in the *Flora of Cambridgeshire* from Gamlingay.

22. *Limonium reticulatum*, Mill. Found at Tydd Marsh by Mr Skrimshire, about 1820, and also by the Rev. J. Hemsted, below Wisbech, whence Mr Algernon Peckover reports it shortly before 1860. A specimen dated Sept. 1796 is in the Herbarium at the British Museum and is marked T. Sowerby. The plant has quite disappeared from the county though still common in Norfolk. *L. vulgare* may still linger at Wisbech.

23. *Lysimachia nemorum*, L. "Hall Wood, Wood Ditton," the locality given by Relhan, was already cut down when Babington wrote in 1860, but the botanists of the county are still in hopes of finding the plant elsewhere.

24. *Veronica spicata*, L. This species, confined to the counties of Cambridge, Norfolk and Suffolk, used to be found in various places on Newmarket Heath and the immediate vicinity. Now it is possibly confined to one or two, though this cannot be positively asserted; but that it still exists may be taken for certain. Owing to the grass among which it grows being constantly cut, the plant may not flower every year, but about a hundred spikes were seen a few years ago. Mr Arthur Bennett

states, moreover, that he possesses an old specimen from Litlington, near Royston.

Mr R. B. Smart's record from near Fleam Dyke has never been confirmed.

25. *Teucrium Scordium*, L. The Water Germander is still found near Upware and at Roswell Pits, Ely, but has presently disappeared from Sutton Gault, Horseway near Chatteris and localities between Cambridge and Ely given in Babington's *Flora of Cambridgeshire*. It grows in pits or on banks of ditches, and is hardly to be called a fen plant.

26. *Chenopodium urbicum*, L. Unlike *C. murale* and *C. hybridum*, which have been re-found recently, this species is only known to us by the records of Relhan from Barnwell, Coton and Cottenham, and of Lyons from Hinton.

27. *Atriplex littoralis*, L.
28. *A. pedunculata*, L. } Neither of these plants can now be found near Wisbech, but whereas the former is still mentioned as present in Babington's *Flora of Cambridgeshire* (1860) the later only dates up to about 1830.

29. *Urtica pilulifera*, L. (*b*) *Dodartii* (L.). This alien and casual species has never been found in the county since it was discovered near Wisbech by Dr Jermyn and Upwell by the Rev. L. Jenyns.

30. *Myrica Gale*, L. Professor Babington considered that the Bog-Myrtle was destroyed by drainage and cultivation before 1850, but in this he was in error, as it still grows in two spots in Wicken Fen, and Mr Alfred Fryer saw a small patch in the "Firelots" near Wimblington in 1884 which was still there in 1892.

31. *Malaxis paludosa*, Sw. Hinton Moor, an old station for this species, was drained long before Babington wrote, but he records this Orchis from "Bogs, Gamlingay, formerly very abundant, nearly extirpated in 1855." This constitutes the latest record.

32. *Liparis Loeselii*, Rich. This species must have disappeared from Ray's station on Hinton Moor at the same period as *Malaxis*, and no doubt from Teversham Moor at about the same time. It is not likely now to be re-discovered at Fulbourn or Sawston, whence Relhan records it, or where Henslow found it at Bottisham Fen; but it still occurs in very small quantity in Chippenham and Wicken Fens, though Babington considered it extinct by 1836. Near Reach it may possibly still exist, judging

from the condition of some parts of that district. Mr Arthur Bennett has seen a specimen gathered long ago at Gamlingay by J. A. Power which is now in the Herbarium of the Holmesdale Nat. Hist. Soc. at Reigate. (Cf. *Trans. Norf. and Norw. N. H. Soc.* 1902, p. 335).

33. *Ophrys sphegodes*, Mill. Babington found this plant near Abington, May 24, 1837, older records being from near Bartlow, Hildersham and Shelford, but the disappearance of balks or wide grassy paths between small holdings or between fields, has probably been the cause of the extirpation of this Orchis, which is now never found in the county. (Cf. *Memorials &c. of Babington*, p. 88.)

34. *Fritillaria Meleagris*, L. Not recorded for the county, except by Relhan from Westhoe near Linton. If his plant was not the outcast of a garden, this species might still be rediscovered, as will be seen from the case of the next.

35. *Colchicum autumnale*, L. This species was only known to Babington as reported by Relhan "in a close on the south side of Mr Eaton's house at Wood Ditton." If the exact position of this close could be ascertained, the plant might be once more found there, as on August 17th, 1908, Mr R. L. Wormald of Weston Colville shewed a patch of it to a small company of Cambridge botanists in a wood near that village, and told them that he had picked the flowers there for ten or fifteen years. We have therefore to thank Mr Wormald for this modern record.

36. *Narthecium Ossifragum*, Huds. Extinct at Gamlingay Bogs since Babington's time, so far as can be ascertained.

37. *Triglochin maritimum*, L. The same may be said of this plant as of the last, except that it grew on the river-side below Wisbech.

38. *Rynchospora alba*, Vahl. Babington considered that this species might still survive at Gamlingay in 1860, as he had found specimens there "very recently, but it has not been observed since."

IV. GENERAL LIST OF SPECIES.

In this list the London Catalogue (ed. 10) has been, in general, followed. Square brackets imply that a plant is doubtfully native either in Britain or at least in Cambridgeshire.

I. ANGIOSPERMÆ.

Dicotyledones.

RANUNCULACEÆ.

Clematis Vitalba L. 3, 5.
Thalictrum minus L.
(*a*) *collinum* (Wallr.) 3.
T. flavum L. 1, 2, 3.
(*c*) *rufinerve* (Lej. and Court) 1.
Anemone Pulsatilla L. 3. Found on the Furze Hills, Hildersham, where the surface soil is sandy, as well as on the barer chalk dykes.
A. nemorosa L. 3, 4, 5.
Myosurus minimus L. 1, 2, 3, 4.
Ranunculus circinatus Sibth. 1, 2, 3, 5.
R. fluitans Lam. 1, 2, 3, 6.
R. trichophyllus Chaix. 1, 2, 3, 5.
R. Drouetii (F. Schultz) 1, 2, 3, 5.
R. heterophyllus Weber, 1, 2, 3, 5.
R. peltatus Schrank.
(*d*) *floribundus* (Bab.) 5.
(*e*) *penicillatus* (Hiern.) 1.
[*R. Baudotii* Godr. 2.]
R. hederaceus L. 1, 2, 3, 4, 5.
R. sceleratus, L. 1, 2, 3, 5.
R. Flammula L. 1, 2, 4.
R. Lingua L. 1, 3, 4.
R. auricomus L. 1, 2, 3, 5.
R. acris L. 1, 2, 3, 4, 5, 6. The sub-species are not yet worked out for the county, but we seem to have (*c*) *Borœanus* and (*d*) *Steveni*.
R. repens L. 1, 2, 3, 4, 5, 6.
R. bulbosus L. 1, 2, 3, 5, 6.
R. sardous Crantz 1, 2, 3, 5. Very uncommon; in fact hardly ever seen.
R. parviflorus L. 1, 2, 3, 5. Not recently found.
R. arvensis L. 1, 2, 3, 5. Locally common.
R. Ficaria L. 1, 2, 3, 4, 5, 6.

Caltha palustris L. 1, 2, 3, 4, 5, 6.
(*b*) *Guerangerii* (Bor.) 1.
Helleborus viridis L.
(*b*) *occidentalis* (Reuter) 1, 2, 3. Doubtfully wild.
[*H. fœtidus*, L. 1, 3.]
[*Eranthis hyemalis* Salisb.]
Aquilegia vulgaris L. 1, 3, 4, 5.
[*Delphinium Ajacis* L. 1, 2, 3, 5.]

BERBERIDACEÆ.

[*Berberis vulgaris* L.]

NYMPHÆACEÆ.

Nymphœa lutea L. 1, 2, 3, 4, 5.
Castalia alba Wood 1, 3, 5.

PAPAVERACEÆ.

[*Papaver Somniferum* L.]
P. Rhœas L. 1, 2, 3, 4, 5, 6.
(*c*) *Pryorii* Druce 3.
P. dubium L. 1, 2, 3, 4, 5, 6.
P. Lecoqii Lamotte 1, 2, 3, 5. Now very seldom found in most parts; *P. dubium*, which was extremely rare thirty or forty years ago, seems to have supplanted it.
P. Argemone L. 1, 2, 3, 4, 5, 6.
P. hybridum L. 1, 3, 5. Much less common than formerly.
Roemeria hybrida. See former list.
Chelidonium majus L. 1, 2, 3, 4, 5, 6.

FUMARIACEÆ.

[*Corydalis lutea* DC.]
Fumaria Borœi Jord. 1.
F. Bastardi Bor. (= *confusa* Jord.) 1.
F. officinalis L. 1, 2, 3, 4, 5, 6.
F. densiflora DC. 3, 6.
F. parviflora Lam. 1. 3, 6.
F. Vaillantii Lois. 1, 3.

CRUCIFERÆ.

[*Cheiranthus Cheiri* L.]
Radicula Nasturtium-aquaticum Rendle & Britten 1, 2, 3, 4, 5, 6.
(*b*) *siifolia* (Rendle & Britten) 3.
R. sylvestris Druce 1, 3, 5.
R. palustris Mœnch. 1, 2, 3.
R. amphibia Druce 1, 3, 5.
Barbarea vulgaris Ait. 1, 2, 3, 6.
B. stricta Andrz. 3.
Arabis hirsuta Scop. 1, 3, 5, 6.

A. Turrita L. See former list.
Cardamine amara L. 1.
C. pratensis L. 1, 2, 3, 4, 5, 6.
(*b*) *dentata* (Schultes) 3 (Cherry Hinton: extinct).
C. hirsuta L. 1, 2, 4, 5.
[*Alyssum alyssoides* L.]
Erophila verna E. Meyer 1, 2, 3, 4, 6.
E. præcox DC. 1, 6.
E. virescens Jord. 4.
Cochlearia anglica L. 1. Apparently extinct near Wisbech, and not found nearer to the county than Denver.
[*C. Armoracia* L.]
Sisymbrium Thalianum Gay 1, 3, 4, 6.
S. officinale Scop. 1, 2, 3, 4, 5, 6.
(*b*) *leiocarpon* DC.
S. Sophia L. 1, 2, 3, 5, 6.
S. Irio. See former list.
S. Alliaria Scop. 1, 2, 3, 4, 5, 6.
Erysimum cheiranthoides L. 1, 2, 3, 5, 6.
[*E. orientale* Mill. 1, 3.]
[*Brassica campestris* L.
(*a*) *Napus* (L.).
(*b*) *Rutabaga* (DC.).
(*c*) *Rapa* (L.).]
B. nigra Koch 1, 2, 3, 5.
B. arvensis O. Kuntze 1, 2, 3, 4, 5, 6.
B. alba Boiss. 1, 2, 3, 5, 6.
[*B. Erucastrum* Vill. 3 (Devil's Dyke, near Newmarket).]
Diplotaxis muralis DC. 1, 2, 3.
(*b*) *Babingtonii* Syme 1, 2, 3.
D. muralis, and its biennial form *Babingtonii*, are thoroughly naturalized in districts 1, 2, 3, but not necessarily confined to them, especially on the railway lines.
Capsella Bursa-pastoris Medic. 1, 2, 3, 4, 5, 6.
Coronopus procumbens Gilib. 1, 2, 3, 4, 5.
Lepidium latifolium L. See former list.
L. ruderale L. 1, 3.
[*L. sativum* L.]
L. campestre Br. 1, 3, 5.
L. heterophyllum Benth.
(*b*) *Smithii* Hook. 1.
[*L. Draba* L. 1, 2, 3, 5.]
Thlaspi arvense L. 1, 2, 3. Babington gives no record later than that of Relhan, but we can now give Chatteris, Aldreth Bridge, Waterbeach, Bottisham Lode, Devil's Dyke, Six Mile Bottom and Abington Park.

Iberis amara L. 2, 3. Perhaps native in 3.
Teesdalia nudicaulis Br. 4. Still occurs in small quantity at Gamlingay, and may perhaps yet be found in 6 at or near Kennett, close to its Suffolk habitats.
[*Isatis tinctoria* L. 1. Cultivated for the Woad Mills at Parson's Drove, about six miles from Wisbech. The balls of manufactured woad are still used in combination with indigo to dye cloths for the Army and Navy. The mixture is said to give a more permanent colour than indigo alone.]
Raphanus Raphanistrum L. 1, 2, 3, 5, 6.

RESEDACEÆ.

Reseda lutea L. 1, 2, 3, 6.
R. Luteola L. 1, 2, 3, 4, 6.

CISTACEÆ.

Helianthemum Chamæcistus Mill. 3, 4, 5, 6. A pale form occurs on the Hildersham Furze Hills, an orange form at Stetchworth.

VIOLACEÆ.

Viola odorata L. 1, 3, 5, 6.
(*c*) *dumetorum* (Jord.) 1, 2, 3.
× *hirta* 1, 3.
V. hirta L. 1, 2, 3, 4, 5, 6.
(*b*) *Foudrasi* (Jord.) 3.
(*c*) *glabrata* Beeby.
(*d*) *pinetorum* Wiesb. 4.
V. calcarea Greg. 3.
V. sylvestris Kit. 1, 2, 3, 5.
(*c*) *punctata* Druce 2, 5.
V. Riviniana Reichb. 1, 3, 4, 5.
(*b*) *nemorosa* (N. W. & M.) 5.
V. ericetorum Hayne 1, 4.
(*b*) *crassifolia* (Grönv.) 1 (Chatteris Turf Fen, A. Fryer: first British record).
× *stagnina* 1.
× *Riviniana* 4.
V. stagnina Kit. 1. Still in Wicken Fen.
V. tricolor L. 1. The forms are not yet worked out for the county, but there is a large form near Haddenham.
(*b*) *arvensis* Murr. 1, 2, 3, 4, 5, 6.

POLYGALACEÆ.

Polygala vulgaris L. 1, 3, 4, 5.
P. serpyllacea Weihe 1. 4. Wimblington Firelots (Fryer), Chippenham Fen (Bennett), Gamlingay (Evans and Moss).

P. calcarea, F. Schultz. Recorded from Chippenham Moor by A. Fryer (*in litt.*), and allowed by A. Bennett.

Frankeniaceæ.

Frankenia lævis L. See former list.

Caryophyllaceæ.

Dianthus deltoides L. 3, 4. Found with pink and with white flowers at Hildersham; with pink at Gamlingay (1910).

[*D. Caryophyllus* L. 1, 6. Relhan records this species from Chippenham and Leverington.]

[*Saponaria officinalis* L. 1, 2, 3, 4, 6.]

Silene latifolia Rendle & Britten 1, 2, 3, 4, 5, 6.

(*b*) *puberula* (Jord.) 1, 2, 3, 5, 6.

S. conica L. 6.

S. Otites Wibel 6. In Babington's *Flora of Cambridgeshire* this species is erroneously entered as *S. anglica*, which grows in Suffolk near Chippenham, and may yet be found in the county.

S. noctiflora L. 1, 2, 3, 5, 6.

Lychnis alba Mill. 1, 2, 3, 4, 5, 6.

L. dioica L. 1. Found only as yet between Linton and Bartlow.

L. Flos-cuculi L. 1, 4, 5, 6.

L. Githago Scop. 1, 2?, 3, 5, 6.

Cerastium semidecandrum L. 1, 2, 3, 4, 6.

C. viscosum L. 1, 2, 3, 4, 5, 6.

C. vulgatum L. 1, 2, 3, 4, 5, 6.

C. arvense L. 1, 3, 4, 5, 6. Even on gault banks in 1.

Mœnchia erecta Gaertn. 4.

Stellaria aquatica Scop. 1, 2, 3, 5.

S. media Vill. 1, 2, 3, 4, 5, 6.

(*b*) *apetala* Ucria 1, 4, 6.

S. Holostea L. 1, 2, 3, 4, 5, 6.

S. palustris Retz. 1, 2, 3, 4.

S. graminea L. 1, 2, 3, 4, 6.

S. uliginosa Murr. 1, 4.

Arenaria tenuifolia L. 1, 2, 3, 6.

(*b*) *laxa* (Jord.) 1, 3.

A. trinervia L. 1, 4, 5.

A. serpyllifolia L. 1, 2, 3, 4, 5, 6.

A. leptoclados Guss. 1, 2, 3, 4, 5, 6.

Sagina maritima Don.

(*c*) *debilis* (Jord.) 1.

(*d*) *densa* (Jord.) 1 (Wisbech).

S. apetala Ard. 1, 2, 3, 4, 5, 6.
(*b*) *prostrata* Gibs. 1.
S. ciliata Fr. 1, 3, 4, 5, 6.
S. procumbens L. 1, 2, 3, 4, 5, 6.
S. nodosa Fenzl. 1, 3, 4, 6. A curious prostrate form of a dark green colour with opposite lateral branches, found at Wisbech, has not yet been determined.
Spergula arvensis L. 3, 4, 6.
S. sativa Bœnn. 4.
Spergularia rubra Pers. 1?, 3, 4.
S. salina Presl.
(*b*) *media* 1. River below Wisbech.
S. marginata Kittel 1. River below Wisbech.

PORTULACEÆ.

[*Claytonia perfoliata* Don 6. In great abundance at Kennett.]
Montia fontana L.
(*a*) *minor* All. 1, 2, 4.

HYPERICACEÆ.

Hypericum perforatum L. 2, 3, 4, 5, 6. *H. dubium* is said to occur near Kirtling (*J. of B.*, 1873, p. 274).
H. quadrangulum L. 1, 4, 5, 6.
H. humifusum L. 3, 4.
H. pulchrum L. 3, 4. Still found at Gamlingay, but Babington alone records the plant from Hinton.
H. hirsutum L. 3, 4, 5.
H. elodes L. See former list.

MALVACEÆ.

Althœa officinalis L. 1.
Malva moschata L. 1, 3, 5. Some of the records may refer to *heterophylla.*
(*b*) *heterophylla* Lej. 2.
M. sylvestris L. 1, 2, 3, 4, 5, 6.
M. rotundifolia L. 1, 2, 3, 5.

TILIACEÆ.

[*Tilia platyphyllos* Scop. Planted. Rare.]
[*T. vulgaris* Hayne. Planted.]
T. cordata Mill. 1, 4, 5.

LINACEÆ.

Radiola linoides Roth. 3. We have only Babington's record "near Newmarket."
Linum catharticum L. 1, 3, 4, 5, 6.

L. perenne L. 1, 3, 5.
[*L. usitatissimum* L.]

GERANIACEÆ.

Geranium sanguineum L. 3, 5. Records from Wood Ditton, Stetchworth and Balsham need confirmation, but the plant is still found on the Devil's Dyke not far from the two places first named.
[*G. phæum* L.]
G. pratense L. 1, 2, 3, 5.
G. pyrenaicum Burm. 1, 2, 3, 6. The pale-flowered form occurs on the Hills Road, the darker-flowered form elsewhere.
G. molle L. 1, 2, 3, 4, 5, 6.
G. pusillum L. 1, 2, 3, 4, 5, 6. Especially common in 6, and on fen banks.
G. rotundifolium 1, 3, 4. Only known at present in or near gardens at Chatteris and Newmarket; older records from Cambridge and Gamlingay will be found in Babington's *Flora of Cambridgeshire.*
G. dissectum L. 1, 2, 3, 4, 5, 6.
G. columbinum L. 3. Once found at Harlton (Babington's *Flora of Cambridgeshire*).
G. lucidum L. 1, 3. We have only the records in Babington's *Flora of Cambridgeshire,* from Wisbech, Quy, Chesterton and Barnwell.
G. Robertianum L. 1, 2, 3, 4, 5, 6.
Erodium cicutarium L'Her. 1, 3, 4, 5, 6 (on sandy or gravelly soil).
E. moschatum L'Her. 1, 4. In all probability a casual, but recently observed by A. H. Evans in Burwell Fen.

OXALIDACEÆ.

Oxalis Acetosella L. 5. Not recently observed. Babington's records probably all refer to 5.
[*O. stricta* L.]

BALSAMINEÆ.

[*Impatiens parviflora* DC.]

AQUIFOLIACEÆ.

Ilex Aquifolium L. Perhaps native in 4, 5, 6.

CELASTRACEÆ.

Euonymus europœus L. 1, 2, 3, 5, 6.

RHAMNACEÆ.

Rhamnus catharticus L. 1, 2, 3, 5, 6.
R. Frangula L. 1, 3, 4. Besides Wicken and Chippenham Fens, we have old records for Fulbourn, Wilbraham, Hildersham, Odsey, and Gamlingay.

ACERACEÆ.

[*Acer Pseudo-Platanus*, L. Planted.]
A. campestre L. 1, 2, 3, 4, 5, 6.
(*b*) *leiocarpon* Wallr. 5.

LEGUMINOSÆ.

Genista anglica L. 3, 4, 5.
G. tinctoria L. 3, 5.
3 refers to the Furze Hills, Hildersham, where sand overlies the chalk.
Ulex europœus L. 2, 3, 4, 5, 6. (Chiefly in 4, 6.)
U. minor Roth. 3. Probably extinct.
Cytisus scoparius Link. 1, 3, 4, 5, 6.
Ononis repens L. 1, 2, 3, 4, 5, 6.
(*b*) *horrida* Lange 3.
O. spinosa L. 1, 2, 3, 5, 6.
[*Medicago sativa* L.]
M. sylvestris Fr. 3, 6 (Hildersham, Snailwell, Chippenham).
M. Falcata L. 3, 6.
M. lupulina L. 1, 2, 3, 4, 5, 6.
M. arabica Huds. 1, 2, 4.
M. minima Desr. 3, 6.
Melilotus altissima Thuill. 1, 2, 3, 4, 5.
[*M. alba* Desr.]
[*M. officinalis* Lam. 1, 2, 3, 5, 6.]
[*M. indica* All. 2.]
Trifolium subterraneum L. 3, 4, 6?
T. pratense L. 1, 2, 3, 4, 5, 6.
(*c*) *parviflorum* (Bab.) 1.
T. medium L. 3, 5.
T. ochroleucon Huds. 1, 2, 3, 4, 5. Common in 5.
[*T. incarnatum* L.]
T. arvense, L. 1, 3, 4, 5, 6.
T. striatum L. 1, 2, 3, 4, 6. (On dry soil.)
T. scabrum L. 1, 2, 3, 4, 5, 6. (On sandy or gravelly soil.)
[*T. hybridum* L.]
T. repens, L. 1, 2, 3, 4, 5, 6.
T. fragiferum L. 1, 2, 3, 5.
T. procumbens L. 1, 2, 3, 4, 5, 6.
T. dubium Sibth. 1, 2, 3, 4, 5, 6.
T. filiforme L. 4. Records from near Cambridge and Ely need confirmation.
Anthyllis Vulneraria L. 1, 3, 6.
(*d*) *Allionii* DC. 1.
Lotus corniculatus L. 1, 2, 3, 4, 5, 6.
L. tenuis Waldst. & Kit. 2, 3, 4, 5.

L. uliginosus Schk. 1, 2, 3, 4, 5, 6. (With var. *glaber* Bréb. in 4.)
Astragalus danicus Retz 3, 5, 6.
A. glycyphyllos L. 1, 2, 3, 5.
Ornithopus perpusillus L. 4, 6.
Hippocrepis comosa L. 3, 6.
Onobrychis viciæfolia Scop. 1, 2, 3, 4, 5, 6.
Vicia hirsuta Gray 1, 2, 3, 4, 5.
V. tetrasperma Mœnch. 3, 4, 5.
V. gracilis Lois. 1, 2, 5.
V. cracca L. 1, 2, 3, 4, 5, 6.
V. sylvatica. See former list.
V. sepium L. 1, 2, 3, 5. (Very local.)
[*V. sativa* L.]
V. angustifolia L. 1, 6.
(*b*) *Bobartii* Koch 4.
V. lathyroides L. 5?, 6.
Lathyrus Aphaca L. 1, 2, 3, 5.
L. Nissolia L. 2. Near Long Stanton. Also recorded from near Ely by W. Cross (in litt. to A. Bennett) possibly from Haddenham, where Ray found the plant.
L. pratensis L. 1, 2, 3, 4, 5, 6.
L. sylvestris L. 3, 5.
L. palustris L. 1. There is also an old record by J. Martyn for Little Eversden.

ROSACEÆ.

Prunus spinosa L. 1, 2, 3, 4, 5, 6.
(*b*) *macrocarpa* Wallr. 3, 5.
P. insititia L. 2, 3, 5, 6.
[*P. domestica* L.]
P. avium L. 3, 4.
P. Cerasus L. 3 (extinct).
[*P. Padus* L. Planted.]
Spiræa Ulmaria L. 1, 2, 3, 4, 5, 6.
S. Filipendula L. 1, 3, 4, 5, 6.
Rubus idæus L. 3, 4, 5.
(*b*) *obtusifolius* (Willd.) 5?
R. thyrsoideus Wimm. 1, 2?, 3, 5.
R. rusticanus Merc. 1, 2, 3, 4, 5, 6.
R. radula Weihe 5.
R. Koehleri Wh. & N. 3, 5.
R. dumetorum Wh. & N.
(*c*) *diversifolius* 3, 5.
R. corylifolius Sm.
(*a*) *sublustris* (Lees) 1, 2, 3, 5, 6.
R. Balfourianus Blox. 1, 3, 5.

R. cæsius 3, 5.
Geum urbanum L. 1, 2, 3, 4, 5, 6.
G. rivale L. 1, 5.
× *urbanum* (= *intermedium* Ehrh.) 5.
Fragaria vesca L. 1, 2, 3, 4, 5, 6.
Potentilla sterilis Garcke 1, 2, 3, 4, 5.
P. verna L. 3, 4. (4 refers to "White Wood, Gamlingay," Relhan.)
P. erecta Hampe 1, 2, 3, 4, 5, 6.
P. procumbens Sibth. 4, 5.
P. reptans L. 1, 2, 3, 4, 5, 6.
P. Anserina L. 1, 2, 3, 4, 5, 6.
P. argentea L. 1, 3, 4, 6. (1 refers to St Peter's College Grove, Cambridge.)
P. palustris Scop. 1, 4.
Alchemilla arvensis Scop. 1, 2, 3, 4, 5, 6.
A. vulgaris L. 3, 5. (Not found recently.)
Agrimonia Eupatoria L. 1, 2, 3, 4, 5, 6.
Poterium Sanguisorba L. 2, 3, 5, 6.
[*P. polygamum* Waldst. & Kit. 3, 5, 6.]
P. officinale A. Gray 1, 3, 5.

(The following list of Roses is only tentative and, it is hoped will soon be augmented.)

Rosa arvensis Huds. 1, 2, 3, 4, 5. (Chiefly in the west.)
R. stylosa Desv.
(*b*) *systyla* 1, 2, 3, 4, 5.
R. canina L. (agg.) 1, 2, 3, 4, 5.
(*o*) *surculosa* (Woods) 1, 3, 5.
R. micrantha Sm. 5, 6.
R. Eglanteria L. 3, 5, 6. (Other records doubtful.)
R. agrestis Savi.
(*d*) *inodora* Hook fil. 3, 5.
R. mollissima Willd. (= *tomentosa* Sm.) 3, 5.
var. *sherardi* (Davies).
R. villosa L. 1, 4. Recorded from near Cambridge and Gamlingay, and by Mr A. Fryer from near Chatteris. There are specimens, confirmed by Crépin, in Babington's Herbarium from Grantchester Lane and Balsham.
R. spinosissima L. 1. Recorded by Henslow only, from hedges in the fens near Swaffham Prior. Needs confirmation.
Pyrus torminalis Ehr. 5. (Little Gransden and Gamlingay Wood.)
P. Aucuparia Ehrh. 4, 5.
P. communis L. 3, 5.
P. Malus L.
(*a*) *acerba* (DC.) 1, 2, 3, 4, 5, 6.
(*b*) *mitis* (Wallr.) 5, 6.

Cratægus Oxyacantha L. 1, 2, 3, 4, 5, 6.
(*b*) *laciniata* Wallr.
(*c*) *kyrtostyla* (Fingerh.).
C. oxyacanthoides Thuill. 1, 2, 3, 4, 5, 6. Much less common than the last species; yet not rare.
× *Oxyacantha* 1, 2, 3.

SAXIFRAGACEÆ.

Saxifraga tridactylites L. 1, 2, 3, 4, 5, 6.
S. granulata L. 1, 2, 3, 5, 6.
Parnassia palustris L. 1, 3, 4.
[*Ribes Uva-crispa* L.]
[*R. nigrum* L.]
[*R. rubrum* L.]

CRASSULACEÆ.

Sedum Telephium L. 3, 5, 6.
[*S. album* L.
(*b*) *micranthum* Bast.]
[*S. dasyphyllum* L.]
S. acre L. 1, 2 ?, 3, 4, 5, 6. (Chiefly in 4, 6.)
[*S. sexangulare*, L.]
[*S. reflexum* L.]
[*Sempervivum tectorum* L.]

DROSERACEÆ.

Drosera rotundifolia L. 1, 3, 4. (Still in Chippenham Fen.)
D. anglica Huds. See former list.
D. longifolia L. See former list.

HALORAGACEÆ.

Hippuris vulgaris L. 1, 2, 3, 5.
Myriophyllum verticillatum L. 1, 2, 3, 4.
(*b*) *pectinatum* DC. 1 (W. West).
M. spicatum L. 1, 2, 3, 5.
M. alterniflorum DC. Gamlingay Brick Pits.
Callitriche stagnalis Scop. 1, 2, 3, 4, 5.
C. obtusangula Le Gall. 1, 2 (*C. palustris* L. and *C. intermedia* Hoffm. (= *hamulata* Kuetz) need confirmation).

LYTHRACEÆ.

Peplis Portula L. 4 (apparently extinct).
Lythrum Salicaria L. 1, 2, 6.
L. Hyssopifolia L. See former list.

ONAGRACEÆ.

Epilobium angustifolium L. 1, 4, 5.
E. hirsutum L. 1, 2, 3, 4, 5, 6.

E. parviflorum Schreb. 1, 2, 3, 5.
E. montanum L. 1, 2, 3, 4, 5, 6.
E. tetragonum Curt. 1, 2, 4, 5.
E. obscurum Schreb. 4. (See Babington's *Flora of Cambridgeshire.*)
E. palustre L. 1, 3, 4, 5.
[*Œnothera biennis*, L.]
Circœa lutetiana L. 1, 3, 4, 5.

CUCURBITACEÆ.

Bryonia dioica Jacq. 1, 2, 3, 4, 5, 6.

UMBELLIFERÆ.

Hydrocotyle vulgaris L. 1, 2, 3, 4.
Sanicula europœa L. 2, 3, 5.
Conium maculatum L. 1, 2, 3, 4, 5, 6.
Smyrnium Olusatrum L. 1, 2, 3.
Bupleurum rotundifolium L. 1, 3, 5.
B. tenuissimum L. 1, 3, 5. Hinton Moor (J. Martyn), Eltisley (Ray): near Wisbech, Sutton, Ely and Reach.
Apium graveolens L. 1, 2, 3, 5.
A. nodiflorum Reichb. fil. 1, 2, 3, 6.
(*e*) *repens* (Koch) 1, 3.
A. inundatum Reichb. fil. 1, 2, 3, 4.
Cicuta virosa L. See former list.
[*Carum Petroselinum* Benth. & Hook. fil.]
C. segetum Benth. & Hook. fil. 2, 3, 5.
[*C. Carvi* L. 1, 2, 3.]
C. Bulbocastanum Koch 3.
Sison Amomum L. 1, 2, 3, 4, 5.
Sium latifolium L. 1, 2.
S. erectum Huds. 1, 2, 4.
Ægopodium Podagraria L. 1, 2, 3, 4, 5, 6.
Pimpinella Saxifraga L. 2, 3, 4, 5, 6.
P. major Huds. 2, 5.
Conopodium majus Loret 2, 4, 5.
Chœrophyllum temulum L. 1, 2, 3, 4, 5, 6.
Scandix Pecten-Veneris L. 1, 2, 3, 5, 6.
Anthriscus vulgaris Bernh. 1, 2, 3, 4, 6.
A. sylvestris Hoffm. 1, 2, 3, 4, 5, 6.
Seseli Libanotis Koch 3.
[*Fœniculum vulgare* Mill. 3, 5.]
Œnanthe fistulosa L. 1, 2, 4, 5.
Œ. silaifolia Bieb. 1. Extinct in Grantchester Fields, but still found on Sutton Washes.
Œ. Lachenalii C. Gmel. 1, 2, 3, 5.

Œ. aquatica Poir. 1, 2, 3, 5.
Œ. fluviatilis Colem. 1, 2, 3.
Æthusa Cynapium L. 1, 2, 3, 4, 5.
[*Siler trilobum* Crantz. (Cherry Hinton.)]
Silaus flavescens Bernh. 1, 2, 3, 5, 6.
Selinum Carvifolia L. 1.
Angelica sylvestris L. 1, 2, 3, 5, 6.
Peucedanum palustre Mœnch. 1.
P. sativum Benth. & Hook. fil. 1, 2, 3, 5, 6.
Heracleum Sphondylium L. 1, 2, 3, 4, 5, 6.
Daucus Carota L. 1, 2, 3, 4, 5, 6.
Caucalis latifolia L. See former list.
C. daucoides L. 1, 3, 5.
C. arvensis Huds. 1, 2, 3, 5, 6.
C. Anthriscus Huds. 1, 2, 3, 4, 5, 6.
C. nodosa Scop. 1, 2, 3, 5, 6.

Araliaceæ.

Hedera Helix L. 1, 2, 3, 4, 5, 6.

Cornaceæ.

Cornus sanguinea, L. 1, 2, 3, 5, 6.

Caprifoliaceæ.

Adoxa Moschatellina 1. Shelford (Relhan) and round Cambridge.
Sambucus nigra L. 1, 2, 3, 4, 5, 6.
[(*b*) *laciniata* Mill.]
S. Ebulus L. 1, 2, 3, 5.
Viburnum Opulus L. 1, 2, 3, 5, 6.
V. Lantana L. 1, 3, 5.
Lonicera Caprifolium L. 1, 2, 3, 6.
L. Periclymenum L. 1, 2, 3, 4, 5, 6.

Rubiaceæ.

Galium Cruciata Scop. 1, 2, 3, 4, 5, 6.
G. verum L. 1, 2, 3, 4, 5, 6.
× *erectum* 1? (Wicken Fen).
G. erectum Huds. 1, 2, 3, 4, 5.
G. Mollugo L. 1, 2, 3, 4, 5, 6.
G. saxatile L. 4, 6.
G. palustre L. 1, 2, 3, 4, 5, 6.
(*b*) *elongatum* (Presl.) 1, 2, 4, 5.
(*c*) *Witheringii* (Sm.) 1, 5.
G. uliginosum L. 1, 3, 4, 5, 6.
G. anglicum Huds. 1, 6.

G. Aparine L. 1, 2, 3, 4, 5, 6.
G. tricorne Stokes 1, 2, 3, 5.
Asperula odorata L. 3, 5. No record since 1860.
A. cynanchica L. 3, 5.
Sherardia arvensis L. 1, 2, 3, 4, 5, 6.

VALERIANACEÆ.

Valeriana dioica L. 1, 3, 5.
V. officinalis L. (= *Mikanii* Syme) 1, 3, 5.
V. sambucifolia Mikan. 1, 2, 3, 5.
[*Kentranthus ruber* DC.]
Valerianella olitoria Poll. 1, 2, 4.
V. rimosa Bast. 1, 5.
V. dentata Poll. 3, 5. Also found near Cottenham.

DIPSACACEÆ.

Dipsacus sylvestris Huds. 1, 2, 3, 5.
D. pilosus L. 1, 2, 3, 5.
Scabiosa Succisa L. 1, 2, 3, 4, 5, 6.
S. Columbaria L. 1, 3, 5, 6.
S. arvensis L. 1, 2, 3, 5, 6.

COMPOSITÆ.

Eupatorium cannabinum L. 1, 2, 3, 5, 6.
Solidago Virgaurea L. 4.
Bellis perennis L. 1, 2, 3, 4, 5, 6.
[*Aster salignus* 1 (Wicken Fen).]
A. Tripolium L. 1. (Extends inland as far as Sutton.)
[*Erigeron canadense* L. Thoroughly established and common in many places.]
E. acre L. 1, 3, 6. A record from Barton may refer to the gault (2).
Filago germanica L. 1, 2, 3, 4, 5, 6.
F. apiculata (G. E. Sm.) 4. Also in a garden at Chatteris.
F. spathulata (Presl.) 1, 2, 3, 4, 5, 6.
F. minima Fr. 1, 3, 4, 6.
Antennaria dioica Gaertn. 3, 4, 6 (not found recently).
Gnaphalium uliginosum L. 1, 2, 3, 4, 5.
(*b*) *pilulare* (Wahl.) has been found at King's Hedges near Cambridge, at Toft and near Chatteris.
G. luteo-album. See former list.
G. sylvaticum L. 4.
[*Inula Helenium* L. (not found recently).]
I. squarrosa Bernh. 1, 3, 6.
Pulicaria dysenterica Gray 1, 2, 3, 5, 6.
P. vulgaris Gaertn. See former list.

Bidens cernua L. 1, 3, 5.
B. tripartita L. 1, 2, 4, 5.
Achillæa Millefolium L. 1, 2, 3, 4, 5, 6.
A. Ptarmica L. 1, 2, 3, 4, 5. Rare in the county.
Anthemis Cotula L. 1, 2, 3, 5, 6.
A. arvensis L. 2, 3, 4, 5, 6. No recent record.
A. nobilis L. 1.
Chrysanthemum segetum L. 1, 2, 3, 4.
C. Leucanthemum L. 1, 2, 3, 5, 6.
[*C. Parthenium*, Bernh.]
Matricaria inodora L. 1, 2, 3, 4, 5, 6.
M. Chamomilla L. 1, 2, 3, 4, 5.
[*M. suaveolens* Buch. 1. (Foul Anchor.)]
Tanacetum vulgare L. 1, 2, 3, 4, 5.
Artemisia Absinthium L. 1, 2, 3, 4.
A. vulgaris L. 1, 2, 3, 4, 5, 6.
A. maritima L. 1.
Tussilago Farfara L. 1, 2, 3, 4, 5, 6.
[*Petasites fragrans* Presl.]
P. ovatus Hill 1, 3, 5, 6.
Senecio vulgaris L. 1, 2, 3, 4, 5, 6.
× *squalidus*. A weed in the Botanic Garden, introduced from Oxford.
S. sylvaticus L. 1, 2, 3, 4.
S. viscosus L. 1, 2?, 4? (Recently found on waste ground at Cambridge.)
S. erucifolius L. 1, 2, 3, 4, 5.
S. Jacobæa L. 1, 2, 3, 4, 5, 6. (Has increased much during the last thirty years on fields that were once wet fen.)
S. aquaticus Hill 1, 2, 3, 4, 5, 6.
S. paludosus L. See former list.
S. palustris Hook. See former list.
S. integrifolius Clairv. 3.
Carlina vulgaris L. 1, 2, 3, 5.
Arctium majus Bernh. 1, 2, 3, 5, 6.
(*b*) *subtomentosum* Lange 1, 2, 5.
A. nemorosum Lej. 1, 2, 3, 5.
A. minus Bernh. 1, 2, 3, 5, 6.
A. pubens Bab. (= *intermedium* Lange *fide* Bab. in Herb.) 1, 2, 3, 5, 6.
Carduus nutans L. 1, 2, 3, 5, 6.
C. crispus L. 1, 2, 3, 5, 6.
Cnicus lanceolatus Willd. 1, 2, 3, 4, 5, 6.
C. eriophorus Roth. 2, 3, 5. (Also as a casual at Cambridge.)
C. palustris Willd. 1, 2, 3, 4, 5, 6.
C. pratensis Willd. 1, 3.

C. acaulis Willd. 1, 2, 3, 4, 5, 6.
(*b*) *caulescens* Pers. 3.
C. arvensis Hoffm. 1, 2, 3, 4, 5, 6.
[*Onopordum Acanthium* L. 1, 2, 3, 4, 5, 6.]
[*Silybum Marianum* Gaertn. 1, 2, 3.]
Serratula tinctoria L. 1, 2, 3, 5.
Centaurea nigra L. 1, 2, 3, 4, 5, 6.
C. Scabiosa L. 1, 2? 3, 4, 5, 6.
C. Cyanus L. 1, 2, 3, 4, 5, 6. (Now very rare.)
C. Calcitrapa L. 1, 3. Not recorded since Babington wrote in 1860.
[*C. solstitialis* L. 1, 2, 3. Still occurs near Hildersham, Dullingham and Doddington.]
Cichorium Intybus L. 1, 2, 3, 5, 6.
Arnoseris minima Schweigg. & Koerte. See former list.
Lapsana communis L. 1, 2, 3, 4, 5, 6.
Picris hieracioides L. 1, 3, 4, 5.
P. echioides L. 1, 2, 3, 5.
Crepis fœtida L. See former list.
C. taraxacifolia Thuill. 1, 2, 3, 5.
C. capillaris Wallr. 1, 2, 3, 4, 5, 6.
C. biennis L. 2, 3.
Hieracium Pilosella L. 1, 3, 4, 5, 6.
H. boreale (Fr.) 4.
H. umbellatum L. 3, 4. Recorded from Hildersham by J. Martyn and from Gamlingay by P. Dent.
Hypochœris glabra L. 4, 6.
H. radicata L. 1, 2, 3, 4, 5, 6.
H. maculata L. 3.
Leontodon nudicaule Banks & Soland L. 1, 3, 4, 5, 6.
L. hispidum L. 1, 2, 3, 5, 6.
L. autumnale L. 1, 2, 3, 4, 5, 6.
Taraxacum officinale Weber. Common.
T. erythrospermum Andrz. 1, 3, 4, 6.
T. palustre DC. 1. The true plant is common in parts of the Fens, and is said to have occurred elsewhere.
(*b*) *udum* (Jord.) 1.
Lactuca virosa L. 1, 3. (Not observed since 1860.)
L. Serriola L. 1, 2, 3. This species was probably always an alien: it was last seen about 1885 by Mr A. Fryer, at Chatteris.
L. saligna L. 1. (Still found near Mepal.)
L. muralis Gaertn. 1, 6.
Sonchus oleraceus L. 1, 2, 3, 4, 5, 6.
S. asper Hill 1, 2, 3, 4, 5, 6.
S. arvensis L. 1, 2, 3, 4, 5, 6.
S. palustris L. See former list.

Tragopogon pratense L.
(*b*) *minus* (Mill.) 1, 2, 3, 4, 5, 6.
[*T. porrifolius* L.]
× *pratense* 1. (Found at Chesterton by Mr A. Wallis.)

Campanulaceæ.

Jasione montana L. 3, 4. (Newmarket, Hildersham and still at Gamlingay.)
Campanula glomerata L. 3, 5.
C. Trachelium L. 3, 5.
C. latifolia L. 2 ?, 5. (Comberton, Wood Ditton, Cheveley, Ely, not confirmed as a native.)
[*C. rapunculoides* L.]
C. rotundifolia L. 1, 3, 4, 5, 6.
Legousia hybrida Delarbre. 1, 2, 3, 5, 6.

Vacciniaceæ.

Oxycoccos quadripetala Gilib. See former list.

Ericaceæ.

Calluna vulgaris Hull. 3, 4, 6. Local.
Erica Tetralix L. 4.
E. cinerea L. See former list.

Monotropaceæ.

Monotropa Hypopitys L. 3, 5.

Plumbaginaceæ.

Limonium vulgare Mill. 1.
L. reticulatum Mill. See former list.
Statice maritima Mill. 1.

Primulaceæ.

Hottonia palustris L. 1, 2, 3. (Almost confined to 1.)
Primula elatior Jacq. 5.
× *veris* 5. Rare.
× *vulgaris* 5. Locally abundant.
P. vulgaris Huds. 1, 3, 5.
(*b*) *caulescens* Koch 5.
P. veris L. 1, 3, 5, 6.
× *vulgaris* 5. Rare.
Lysimachia vulgaris L. 1, 2, 3, 5.
L. Nummularia L. 1, 2, 3, 5.
L. nemorum L. See former list.
Glaux maritima L. 1.

Anagallis arvensis L. 1, 2, 3, 4, 5, 6. (With blue flowers in 1.)
A. fœmina Mill. 1, 2, 3. Some of the records may refer to blue-flowered *A. arvensis*.
A. tenella Murr. 1, 3, 4.
Centunculus minimus L. 4. (Not recorded since 1860.)
Samolus Valerandi L. 1, 2, 3, 4, 5, 6.

OLEACEÆ.

Fraxinus excelsior L. 1, 2, 3, 4, 5, 6.
Ligustrum vulgare L. 1, 2, 3, 4, 5, 6. Often planted.

APOCYNACEÆ.

[*Vinca major* L.]
[*V. minor* L. 1, 3, 5.]

GENTIANACEÆ.

Blackstonia perfoliata Huds. 1, 2, 3, 5.
Centaurium umbellatum Gilib. 1, 2, 3, 4, 5, 6.
C. pulchellum Druce 1, 2, 3, 5, 6.
Gentiana Amarella L. 1, 3, 5.
(*b*) *axillaris* Murb. 1, 5.
Menyanthes trifoliata L. 1, 3, 4.
Nymphoides peltatum Rendle & Britten 1, 2. (Locally abundant.)

BORAGINACEÆ.

Cynoglossum officinale L. 1, 2, 3, 5, 6.
[*Asperugo procumbens* L. Recorded by Ray from Newmarket.]
Symphytum officinale L. 1, 2, 3, 5.
(*b*) *patens* (Sibth.) Wisbech (Skrimshire).
[*Borago officinalis* L.]
[*Anchusa sempervirens* L.]
Lycopsis arvensis L. 1, 2, 3, 4, 6.
Myosotis cespitosa Schultz 1, 2, 4, 5.
M. palustris Hill 1, 3, 4, 6.
(*b*) *strigulosa* (Reichb.) 1.
M. arvensis Hill 1, 2, 3, 5, 6.
(*b*) *umbrosa* (Bab.) 1, 5.
M. collina Hoffm. 1, 3, 4, 6.
M. versicolor Sm. 1, 3, 4.
Lithospermun officinale L. 1, 2, 3, 5, 6.
L. arvense L. 1, 3, 5, 6.
Echium vulgare L. 1, 3, 5, 6.

CONVOLVULACEÆ.

Calystegia sepium Br. 1, 2, 3, 4, 5, 6. Well established in Wicken Fen and elsewhere.
Convolvulus arvensis L. 1, 2, 3, 4, 5, 6.

Cuscuta europæa L. 1, 2, 3, 5
C. Epithymum Murr. 4.
C. Trifolii Bab.? (West, *J. of Bot.* 1898, p. 254.)

SOLANACEÆ.

Solanum Dulcamara L. 1, 2, 3, 4, 5, 6.
S. nigrum L. 1, 2, 3, 4, 5, 6.
[*Lycium chinense* Mill.]
Atropa Belladonna L. 1, 2, 3, 5.
[*Datura Stramonium* L.]
Hyoscyamus niger L. 1, 2, 3. 5, 6 (of uncertain appearance).

SCROPHULARIACEÆ.

Verbascum Thapsus L. 1, 2, 3, 4, 5, 6.
V. nigrum L. 3, 5, 6.
[*Linaria Cymbalaria* Mill. 1, 2, 3, 4, 5, 6.]
L. Elatine Mill. 1, 2, 3, 5, 6.
L. spuria Mill. 1, 2, 3, 5, 6.
[*L. purpurea* Mill.]
L. vulgaris Mill. 1, 2, 3, 4, 5, 6.
L. minor Desf. 2, 3, 4, 5, 6.
[*Antirrhinum majus* L.]
A. Orontium L. 3, 6.
Scrophularia aquatica L. 1, 2, 3, 4, 5, 6.
S. nodosa L. 1, 2, 3, 4, 5.
[*S. vernalis* L.]
Limosella aquatica L. 1, 4.
Digitalis purpurea L. 4, 5. First found by Mr R. H. Adamson and Dr C. E. Moss in 1909 in White Wood, Gamlingay. It also occurs in Gamlingay wood.
Veronica hederæfolia L. 1, 2, 3, 4, 5, 6.
V. didyma Ten. (=*polita* Fr.) 1, 2, 3, 4, 5, 6.
(*b*) *grandiflora* (Bab.) 3, 5?
V. agrestis L. 1, 2, 3, 4, 5, 6.
V. Tournefortii C. Gmel. 1, 2, 3, 4, 5, 6.
V. arvensis L. 1, 2, 3, 4, 5, 6.
V. serpyllifolia L. 1, 2, 5.
V. spicata L. See former list.
V. officinalis L. 3, 4, 5, 6.
V. Chamædrys L. 1, 2, 3, 4, 5, 6.
V. montana L. 2, 3, 4, 5. (Observed in Doddington Wood by A. Fryer (1881).)
V. scutellata L. 1, 2, 3, 4, 5, 6. (Decidedly rare, though widely spread.)
V. Anagallis L. 1, 2.
V. Beccabunga L. 1, 2, 3, 4.

Euphrasia Kerneri Wettst. 3.
E. borealis (Towns.) 1.
E. stricta (Host.) 3.
E. nemorosa H. Mart. 5.
Bartsia Odontites Huds. 1, 2, 3, 4, 5, 6.
Pedicularis palustris L. 1, 3, 4.
P. sylvatica L. 3, 4, 5. Last found at Chippenham (A. Fryer, 1883, in litt.).
Rhinanthus Crista-galli L. 1, 3, 5.
R. stenophyllus Schur. 1.
Melampyrum cristatum L. 4, 5.
M. pratense L. 4, 5. (Not observed of recent years.)

OROBANCHACEÆ.

Orobanche major L. 1, 4.
O. elatior Sutton 1, 3, 5. (*O. hederæ* and *O. rubra* are grown in the Botanic Garden at Cambridge from seed.)
O. Picridis F. Schultz 5.
O. minor Sm. 1, 3, 5, 6.
Lathræa Squamaria L.

LENTIBULARIACEÆ.

Utricularia vulgaris L. 1, 2, 3. (*U. major* is suspected by Mr A. Bennett to occur in Burwell Fen. See *J. B.* 1903, p. 245.)
U. minor L. 1, 2, 3, 4. (Now confined to 1.)
Pinguicula vulgaris L. 1, 3, 4.

VERBENACEÆ.

Verbena officinalis L. 1, 2, 3, 5, 6.

LABIATÆ.

[*Mentha rotundifolia* Huds. 1 ?, 3. Reported only by Dent and Relhan.]
[*M. longifolia* Huds. 1, 2, 3. The records are somewhat doubtful.]
[*M. spicata* L.]
M. piperita L. 1, 2, 3, 5.
M. aquatica L. 1, 2, 4, 5.
× *arvensis* (*sativa* L.) 1, 3, 5, 6.
(*b*) *paludosa* Sole 1, 5.
M. gentilis L. 1.
M. arvensis L. 1, 2, 3, 4, 5, 6.
M. Pulegium L. 1, 3. (Not observed recently.)
Lycopus europæus L. 1, 2, 3, 4.
Origanum vulgare L. 1, 3.
Thymus Serpyllum L. 3, 5.
T. præcox Opiz 1.

T. Chamædrys Fr. 1, 3, 4, 6. *T. lanuginosus* Schk has been recorded from the Gog-Magog Hills (*J. of B.* 1908, p. 313); but see *Watson Botanical Exchange Club*, 1909—1910, p. 251.
Clinopodium vulgare L. 1, 3, 4, 5, 6.
Calamintha Acinos Clairv. 1, 3, 5, 6.
C. Nepeta Savi. 1, 3, 6.
C. montana Lam. 1, 3, 5, 6.
Salvia Verbenaca L. 1, 3, 5, 6.
Nepeta Cataria L. 1, 2?, 3, 5, 6.
N. hederacea Trev. 1, 2, 3, 4, 5, 6.
Scutellaria galericulata L. 1, 2, 3, 4.
Prunella vulgaris L. 1, 2, 3, 4, 5, 6.
P. laciniata L. 1. Recently found near Cambridge by Mr G. Goode.
Marrubium vulgare L. 1, 2, 3, 4.
Stachys officinalis Trev. (= *Betonica* Benth.) 1, 3, 4, 5.
S. palustris L. 1, 2, 3, 4, 5.
× *sylvatica* (= *ambigua* Sm.) Fen Ditton (Relhan), Coton (Newbould).
S. sylvatica L. 1, 2, 3, 4, 5, 6.
S. arvensis L. 1, 3, 5.
Galeopsis angustifolia Ehrh. 1, 3, 5, 6.
G. speciosa Mill. 1, 2, 3.
G. Tetrahit L. 1, 2, 3, 4, 5, 6.
[*Leonurus Cardiaca* L. 1, 3.]
Lamium amplexicaule L. 1, 2, 3, 4, 5, 6.
L. hybridum Vill. 1, 2, 3.
L. purpureum L. 1, 2, 3, 4, 5, 6.
[*L. maculatum* L.]
L. album L. 1, 2, 3, 4, 5, 6.
L. Galeobdolon Crantz 3, 5.
Ballota nigra L. 1, 2, 3, 4, 5, 6.
Teucrium Scordium L. See former list.
T. Scorodonia L. 4. (Henslow also gives Ely.)
Ajuga reptans L. 1, 2, 3, 5.
A. Chamæpitys Schreb. 3.

Plantaginaceæ.

Plantago major L. 1, 2, 3, 4, 5, 6.
P. media L. 1, 2, 3, 4, 5, 6.
P. lanceolata L. 1, 2, 3, 4, 5, 6.
[(*b*) *Timbali* (Jord.)]
P. maritima L. 1.
P. Coronopus L. 1, 4.
Littorella uniflora Aschers. 3, 4 (Ray and Relhan only).

ILLECEBRACEÆ.

Herniaria glabra L. 3. Found in 1855 by Newbould near Six Mile Bottom. It grows near our borders in Suffolk.
Scleranthus annuus L. 1, 3, 4, 6.

AMARANTHACEÆ.

[*Amaranthus Blitum* L.]

CHENOPODIACEÆ.

Chenopodium polyspermum L. 1, 2, 4, 5.
(*b*) *cymosum* Moq. 1.
C. Vulvaria L. 1.
C. album L. 1, 2, 3, 4, 5, 6.
(*b*) *viride* (Syme) 1, 4.
(*c*) *paganum* (Reichb.).
C. serotinum L. 1, 2, 3, 4.
C. murale L. 1. (Disappears and reappears—Waterbeach, 1906, A. H. Evans.)
C. hybridum L. 1, 2.
C. urbicum L. See former list.
C. rubrum L. 1, 2, 3.
C. Bonus-Henricus L. 1, 2, 3, 4, 5.
Beta maritima L. 1.
Atriplex littoralis L. See former list.
A. patula L. Common.
(*b*) *erecta* (Huds.) 1, 2, 3, 5.
(*c*) *angustifolia* (Sm.) 1, 2, 3, 5.
A. hastata L. Common.
A. deltoidea Bab. 1, 2, 3, 5
A. Babingtonii Woods 1.
A portulacoides L. 1.
A. pedunculata L. See former list.
Salicornia europœa L. (= *stricta* Dum.) 1.
Suœda maritima Dum. 1.
(*b*) *procumbens* Syme 1.

POLYGONACEÆ.

Polygonum Convolvulus L. Common.
(*b*) *subalatum* V. Hall 2, 4.
P. aviculare L. Common. The forms of this species need further working out before the distribution can be properly given for the county.
P. Hydropiper L. 1, 4, 5.
P. minus Huds. 1. Now only known from the Old Bedford River.
P. mite Schrank 1.

P. Persicaria L. Common.
P. lapathifolium L. Common.
P. maculatum Trim. & Dyer 1.
P. amphibium L. 1, 2, 3, 4, 5.
P. Bistorta L. 1, 2, 3. Not seen recently.
[*Fagopyrum sagittatum* Gilib. A common crop with Fen farmers.]
Rumex conglomeratus Murr. 1, 2, 3, 5.
R. sanguineus L. We have only Newbould's doubtful records from Eversden and Kingston Woods.
(*b*) *viridis* (Sibth.) 1, 2, 3, 4, 5, 6.
R. maritimus L. 1, 2, 5.
R. limosus Thuill. 1.
R. pulcher L. 1, 2, 3, 4, 5, 6.
R. obtusifolius L. 1, 2, 3, 4, 5, 6.
R. crispus L. 1, 2, 3, 4, 5, 6.
× *obtusifolius* 1, 2.
R. Hydrolapathum Huds. 1, 2, 3.
R. Acetosa L. 1, 2, 3, 4, 5, 6.
R. Acetosella L. 1, 2, 3, 4, 5, 6.

Thymeleaceæ.

Daphne Laureola L. 1, 2, 3, 5 (mainly on boulder clay).

Loranthaceæ.

Viscum album L. Cambridge, doubtless introduced; Borley Wood on the oak (W. West).

Santalaceæ.

Thesium humifusum DC. 3. As a locality, Chippenham Park Avenue (A. H. Evans) is interesting, as it confirms Relhan's locality "Chippenham."

Euphorbiaceæ.

Euphorbia Helioscopia L. 1, 2, 3, 4, 5.
E. platyphyllos L. 2, 5.
E. amygdaloides L. 5.
E. Peplus L. 1, 2, 3, 4, 5, 6.
E. exigua L. 1, 2, 3, 4, 5, 6.
Mercurialis perennis L. 1, 2, 3, 4?, 5.
M. annua L. 4, 6. (On greensand at Ely; at Fordham and Chippenham.)

Urticaceæ.

Ulmus glabra Huds. *nec* Mill (= *montana* Stokes). Rare in all the districts.

U. procera Salisb. (= *glabra* Mill *nec* Huds.). Common and widely spread.

× *glabra* (= Huntingdon Elm). Commonly planted.

U. campestris L. (= English Elm). Round most towns and villages. Local in hedgerows.

U. hollandica Mill (= *major* Sm.). Local, in hedgerows.

U. sativa Mill. Rather common.

Humulus Lupulus L. 1, 2, 3, 4, 5, 6.

Urtica dioica L. Common.

(*b*) *angustifolia* Wimm. & Gräb.

[*U. pilulifera* L.

(*b*) *Dodartii* (L.). See former list.]

U. urens L. 1, 4, 6.

Parietaria ramiflora Mœnch. 1, 2, 3, 5, 6.

Myricaceæ.

Myrica Gale L. See former list.

Cupuliferæ.

Betula alba L. Frequently planted.

B. pubescens Ehrh. 1, 2, 4, 5, 6. Perhaps native in the Fens and on Gamlingay greensand.

(*b*) *denudata* E. S. Marshall 1, 4, 6.

Alnus glutinosa Gaertn. 1, 3, 4, 5, 6.

Carpinus Betulus L. 1, 2, 3, 4, 5.

Corylus Avellana L. 1, 2, 3, 4, 5.

[*Quercus Cerris* 4. Introduced. At Gamlingay it springs up on the greensand from self-sown seed.]

Q. sessiliflora (Salisb.) 4. First record 1908, from White Wood, Gamlingay, by C. E. Moss.

Q. Robur L. Common.

× *sessiliflora* 4. First record 1908, from White Wood, Gamlingay, by C. E. Moss.

[*Castanea sativa* Mill. Self-sown on the Gamlingay greensand.]

Fagus sylvatica L. Perhaps native on the Gamlingay greensand and on the chalk.

Salicaceæ.

Salix triandra L. 1, 2, 3, 4.

(*b*) *Hoffmaniana* (Sm.) 1, 4, 6.

S. fragilis L. 1, 2, 4.

S. alba L. 1, 2, 3, 4, 5, 6.

(*c*) *vitellina* (L.) 1.

× *fragilis* (= *viridis* Fr.).

× *triandra* (= *undulata* Ehrh.). Relhan records this form from Chesterton and Aldreth.

S. purpurea L. 1, 6.
var. *Forbyana* (Sm.) 1, 5.
× *viminalis* (= *rubra* Huds.) 1, 3.
S. viminalis L. 1, 2, 3, 5.
× *acuminata* 1, 3.
S. Caprea L. 1, 2, 3, 4, 5, 6.
S. aurita L. 1, 3, 4, 5, 6. The records need confirmation.
S. cinerea L. 1, 2, 5, 6.
var. *aquatica* (Sm.) 2, 3, 5.
var. *oleifolia* (Sm.) 1, 5.
S. repens L. 1, 3, 4.
[*Populus alba* L. Planted.]
P. canescens Sm. 1, 3, 4, 6.
P. tremula L. 1, 2, 3, 4, 5. Perhaps native at Gamlingay.
(*b*) *villosa* (Lange) 5.
P. nigra L. 1, 2, 3, 6. Rare.
[*P. canadensis* Mœnch. Very common, but always planted.]

CERATOPHYLLACEÆ.

Ceratophyllum demersum L. 1, 2, 3, 5.
C. submersum L. 1.

Monocotyledones.

HYDROCHARIDEÆ.

[*Elodea canadensis* Michx. 1, 2, 3, 5.]
Hydrocharis Morsus-ranæ L. 1.
Stratiotes Aloides L. 1, 2.

ORCHIDACEÆ.

Malaxis paludosa Sw. See former list.
Liparis Loeselii Rich. See former list.
Neottia Nidus-avis Rich. 5.
Listera ovata Br. 1, 3, 5, 6.
Spiranthes spiralis Koch 1, 3.
Cephalanthera grandiflora Gray 3. Locally plentiful.
Helleborine latifolia Druce 5?
H. media E. S. Marshall 3, 5.
H. longifolia Rendle & Britten (= *Epipactis palustris* Crantz) 1, 3, 4. Extinct at Gamlingay.
Orchis pyramidalis L. 1, 3, 5.
O. ustulata L. 3.
O. morio L. 1, 2, 3, 5.
O. mascula L. 1, 3, 5.
O. incarnata L. 1, 3.

O. latifolia L. 1, 3, 5.
O. maculata L. 1, 2, 3, 4, 5.
Aceras anthropophora Br. 3.
Ophrys apifera Huds. 1, 2, 3, 5.
O. sphegodes. See former list.
O. muscifera Huds. 1, 3, 5.
Herminium Monorchis Br. 3.
Habenaria conopsea Benth. 1, 2, 3, 5.
H. viridis Br. 1, 3, 5.
H. bifolia Br. 3.
H. virescens Druce (= *chloroleuca* Ridley) 2, 3, 5.

IRIDACEÆ.

Iris fœtidissima L. 1, 3, 5.
I. Pseudacorus L. 1, 2, 3, 5, 6.

AMARYLLIDACEÆ.

Narcissus Pseudo-Narcissus L. 1, 3. Doubtfully native.

DIOSCOREACEÆ.

Tamus communis L. 1, 2, 3, 5.

LILIACEÆ.

Ruscus aculeatus L. 2, 3.
Convallaria majalis L. 4. Native in a wood at Gamlingay.
Allium vineale L. 1, 2, 3, 5, 6.
A. oleraceum L. 3.
A. ursinum L. 1, 5.
Muscari racemosum Lam. & DC. 3.
Scilla non-scripta Hoffmgg. & Link 2, 3, 4, 5.
[*Ornithogalum nutans* L. 1, 3.]
O. umbellatum L. 6.
O. pyrenaicum L. Recorded by Dent from Eversden.
Fritillaria Meleagris L. See former list.
Colchicum autumnale L. See former list.
Narthecium ossifragum Huds. See former list.
Paris quadrifolia L. 5.

JUNCACEÆ.

Juncus bufonius L. 1, 2, 4, 5, 6.
J. squarrosus L. 4. Formerly in 3 also.
J. compressus L. 1, 2. Formerly in 3 also.
J. Gerardi Lois. 1.
J. inflexus L. (= *glaucus* Ehrh.) 1, 2, 3, 4, 5, 6.
J. effusus L. 1, 2, 4, 5.

J. conglomeratus L. 1, 2, 4, 5. Some of the records need confirmation.
J. bulbosus L. (= *supinus* Mœnch.) 1, 3, 4, 5.
J. subnodulosus Schrank (= *obtusiflorus* Ehrh.) 1, 3.
J. articulatus L. 1, 2, 3, 4, 5, 6.
J. sylvaticus Reich. (= *acutiflorus* Ehrh.) 1, 2, 4, 5.
Luzula pilosa Willd. 5.
L. sylvatica Gaud. is recorded from Wood Ditton in Babington's *Flora of Cambridgeshire, q.v.*
L. campestris DC. 1, 3, 4, 5, 6.
L. multiflora DC. 1, 3, 4, 6.
(*b*) *congesta* (Lej.) 1, 4, 6.

TYPHACEÆ.

Typha latifolia L. 1, 2, 3, 4, 5.
T. angustifolia L. 1, 2, 3, 5, 6.
Sparganium erectum L. (= *ramosum* Curt.). Common.
S. simplex Huds. 1, 2, 5.
S. minimum Fr. 1, 3. 3 refers to Triplow Peat Holes.

ARACEÆ.

Arum maculatum L. 1, 2, 3, 4, 5, 6.
Acorus Calamus L. 1, 2. (Lately found at Roswell Pits by A. H. Evans.)

LEMNACEÆ.

Lemna trisulca L. 1, 2, 3, 5.
L. minor L. Common.
L. gibba L. 1, 2, 3, 5.
L. polyrrhiza L. 1, 2, 5.

ALISMACEÆ.

Alisma Plantago-aquatica L. 1, 2, 4, 5.
var. *graminifolium* Wahl. 1.
A. ranunculoides L. 1, 2, 3.
Sagittaria sagittifolia L. 1, 2, 3, 5.
var. *Bollei* 1.
Butomus umbellatus L. 1, 2, 5.

NAIADACEÆ*.

Triglochin palustre L. 1, 4.
T. maritimum L. 1. See former list.
Potamogeton natans L. 1, 3, 4, 5, 6.
× *lucens* (= *fluitans* Roth.) 1. Near Chatteris.
× *coriaceus* (= × *crassifolius* Fryer) 1. Near Chatteris.
P. polygonifolius Pourr. 1, 4. Burwell Fen (Relhan), Bottisham

* The genus *Potamogeton* has been revised for us by Mr A. Fryer.

Fen (Dalton), Gamlingay. Specimens from all these places allowed by A. Bennett.

P. coloratus Hornem. 1, 3.
× *coriaceus* (= × *Billupsii* Fryer) 1. Benwick and Burwell.
P. heterophyllus Schreb. 1, 4. (Extinct at Gamlingay?)
× *Zizii* (= × *varians* Morong) 1. Near Chatteris.
× *pusillus* (= *lanceolatus* Sm.) 1. (Burwell Fen. A. Bennett.)
× *perfoliatus* (= × *nitens* Weber) 1. Near Chatteris.
P. graminifolius (Fr.) 1. Near Chatteris.
P. Zizii Koch (= *angustifolius* Bercht. & Presl.) 1.
P. lucens L. 1.
× *perfoliatus* (= *decipiens* Nolte) 1, 3.
× *heterophyllus*? (= *coriaceus* Fryer) 1.
P. prælongus Wulf. 1.
P. perfoliatus L. 1, 2.
× *coriaceus* (= *involutus* Fryer) 1. Black Bush Drove, Whittlesey.
P. crispus L. 1, 2, 3, 4, 5, 6.
× *perfoliatus* (= *Cooperi* Fryer) 1. Benwick.
P. densus L. 1.
P. zosterifolius Schum. 1, 2. Cambridge, Baitsbite, Ely (Babington), Roswell Pits, Bottisham Fen.
P. Friesii Rupr. 1, 2, 3.
P. pusillus, L. 1, 3, 4.
P. trichoides Cham. 1. Mepal (Fryer).
P. pectinatus L. 1.
P. flabellatus Bab. 1.
(*b*) *scoparius* Fryer 1.
Ruppia rostellata Koch 1. Babington refers a record of Skrimshire's from below Wisbech to this species, with some doubt.
Zannichellia palustris L. 1.
(*c*) *repens* Boenn. 1, 2.
Zostera marina L.
(*c*) *angustifolia* Hornem. 1. Below Wisbech.

Cyperaceæ.

Eleocharis acicularis Roem. & Schult. 1, 2.
E. palustris Roem. & Schult. 1, 2.
E. multicaulis Sm. 1, 4.
Scirpus pauciflorus Lightf. 1, 3, 4.
S. cæspitosus L. 1.
S. fluitans L. 1, 4.
S. setaceus L. 1, 4.
S. lacustris L. 1, 2, 3, 5.
S. Tabernæmontani Gmel. 1, 5.
S. maritimus L. 1. Occurs as far inland as Sutton and Upware.

S. compressus Pers. 1, 3. Not seen since about 1880.
Eriophorum angustifolium Roth. 1, 3, 4.
E. latifolium Hoppe 1, 3. Needs confirmation.
Rynchospora alba Vahl. 4. See former list.
Schœnus nigricans, L. 1, 3, 4. Not now at Gamlingay?
Cladium Mariscus Br. 1, 3.
Carex dioica L. 3, 4 (extinct).
C. pulicaris L. 1, 3.
C. disticha Huds. 1, 2, 3.
C. arenaria L. 6?
C. diandra Schrank 1, 3. Not found recently.
C. paradoxa Willd. 1. Discovered in Wicken Fen by Mr A. Fryer.
C. paniculata, L. 1, 3, 4.
C. vulpina, L. 1, 2, 4, 5.
var. *nemorosa*, 5.
C. muricata L. 1, 2, 3, 4, 5, 6.
C. divulsa Stokes, 1, 2, 3, 4, 5, 6.
C. echinata Murr. 1, 3, 4, 5. Found lately only at Gamlingay and Chippenham Fen.
C. remota L. 2, 3, 5.
× *vulpina* (= *axillaris*, Good). Hall Wood, Wood Ditton (Relh.). The wood has disappeared, and the record is therefore doubtful.
C. curta Good 4. Not found since 1860.
C. leporina L. 1, 3, 4, 5.
C. elata All. 1, 3. Nearly always extremely plentiful where it occurs.
(*b*) *turfosa* (Fr.) 1. Welch's Dam (Fryer).
C. gracilis Curt. 1, 2.
var. *prolixa* (Fr.) 1, 2. The type is decidedly local, the variety very rare.
C. Goodenovii Gay. 1, 3, 4, 5.
C. flacca Schreb. 1, 2, 3, 5.
C. pilulifera, L. 3, 4, 5.
C. ericetorum Poll. 3. Gogmagog Hills and Devil's Dyke.
C. caryophyllea Latourr. 1, 3, 4, 5, 6.
C. pallescens L. 1, 3, 5. On chalk at Swaffham Prior (Evans), Sutton Dole Fen, Chippenham Fen (Fryer) and locally on the boulder clay.
C. panicea, L. 1, 2, 3, 4, 5.
C. pendula Huds. 3, 5. Probably extinct in 3.
C. strigosa, Huds. Hall Wood, Wood Ditton (Relh.) is our only record. The wood no longer exists.
C. sylvatica Huds. 1, 2, 3, 5.
C. binervis Sm. 1, 3, 4. Reported also from Croydon (Bab.).

C. distans L. 1, 2?, 3, 4, 5? The typical plant certainly grows near Waterbeach and Foul Anchor (Evans) and at Chippenham Fen (Bennett).
C. fulva Host 1, 2?, 3, 5.
C. flava L. 1, 2, 3, 4.
(*b*) *lepidocarpa* 1.
C. Œderi, Retz 1, 3, 4.
(*d*) *œdocarpa*, And. 1.
C. lasiocarpa Ehrh. 1, 4. (Extinct in 4.)
C. hirta L. 1, 2, 3, 4, 5, 6.
C. Pseudo-Cyperus, L. 1, 2, 3, 5. For 3 we have no recent records. The plant is rare.
C. acutiformis, Ehrh. 1, 3, 4, 5, 6.
(*b*) *Kochiana* (DC.). A form probably referable here has been found at Fen Ditton (1).
C. riparia Curt. 1, 2, 3, 4, 5.
C. inflata Huds. 1, 3, 4.
C. vesicaria L. 1. Observed of late years at Burwell Fen (Bennett), Snailwell Fen (Moss), Sutton and Fen Ditton (Evans), Welch's Dam and Whittlesey (Fryer).

GRAMINACEÆ.

[*Setaria viridis* Beauv. 6. Still occurs at Chippenham Gravel Pits, and has been found at Fordham (Evans).]
[*S. glauca* 1. Welch's Dam and Sutton (Fryer).]
[*Phalaris canariensis* L.]
P. arundinacea L. 1, 2, 3, 4, 5, 6.
Anthoxanthum odoratum L. 1, 2, 3, 4, 5, 6.
Alopecurus myosuroides, Huds. 1, 2.
A. æqualis Sobol. 1, 2, 3?, 5?
A. geniculatus L. 1, 2, 5.
A. pratensis L. 1, 2, 3, 4, 5.
Milium effusum L. 2, 5.
Phleum pratense L. Common.
(*b*) *nodosum* (L.) Chippenham (6), and possibly elsewhere.
P. phleoides Simonkai 3, 6. Still occurs pretty plentifully at the Furze Hills, Hildersham.
P. arenarium L. 3, 6. Newmarket Heath (Rev. J. Hemsted, *Eng. Bot.* tab. 222), Chippenham (Evans).
Agrostis canina L. 1, 4, 5.
A. alba L. Common.
(*b*) *stolonifera* (L.).
A. tenuis Sibth. 1, 2, 3, 4, 5, 6.
Calamagrostis epigeios Roth. 1, 2, 3, 4, 5.
C. canescens Druce 1, 2, 3, 5. Wicken Fen, Chippenham Fen,

Wimblington Firelots, Doddington Wood, Coveney, Witcham, and Gamlingay Wood, are the localities where this species has been recently noticed. It is as common at Wicken as the last species, but has been constantly confounded with it.

Apera Spica-venti Beauv. 4, 5. Not found recently.

A. interrupta Beauv. 3, 6. The record for 3 is that of Mr J. Stratton in 1855 from Pampisford (Babington, *Flora of Cambridgeshire*).

Aira caryophyllea L 1, 3, 4, 6.

A. præcox L. 1, 3, 4, 6.

Deschampsia cæspitosa, Beauv. 1, 2, 3, 5, 6.

D. flexuosa, Trin. 4.

Holcus mollis L. 1, 2, 4, 5. Chatteris, Doddington, Gamlingay greensand and Wood Ditton.

H. lanatus L. Common.

Trisetum flavescens, Beauv. 1, 2, 3, 4, 5, 6.

Avena pubescens Huds. 1, 3, 5, 6.

A. pratensis L. 1, 2, 3, 5?, 6.

[*A. fatua* L. 1, 2, 3.]

Arrhenatherum elatius Mert. & Koch. Common.

(*b*) *bulbosum* Presl.

Sieglingia decumbens Bernh. 1, 2?, 3, 4, 5?, 6. A record by Newbould from Toft may refer to (2) or (5). The plant is rare in the county.

Phragmites communis Trin. 1, 2, 3, 4, 5, 6.

Cynosurus cristatus L. Common.

Koeleria gracilis Pers.

(*c*) *britannica* Domin. 1, 3, 5, 6.

Molinia cærulea Mœnch. 1, 2?, 3, 4, 5? A record by Newbould from Toft may refer either to (2) or (5).

(*b*) *major* Roth. 1, 4.

(*c*) *depauperata* 1, 4.

Catabrosa aquatica Beauv. 1, 2, 3.

Melica uniflora Retz 5.

Dactylis glomerata L. Common.

Briza media L. 1, 2?, 3, 5, 6.

Poa annua L. Common.

P. nemoralis L. 1, 3, 4, 5.

P. compressa L. 1, 2?, 3, 4, 5, 6.

(*b*) *subcompressa* (Parn.). Probably all the records refer to this form. Many certainly do so.

P. pratensis L. 1, 2, 3, 4, 5, 6.

(*b*) *subcæruleu* (Sm.) 3.

P. trivialis L. Common.

Glyceria fluitans Br. Common.

× *plicata* (= *pedicillata* Towns.) 3, 5.

G. plicata Fr. Not uncommon, further details of localities are needed.
G. aquatica Wahlb. 1, 2, 3, 4, 5.
G. maritima. Mert. & Koch 1.
G. distans Wahlb. 1.
Festuca rigida, Kunth. 1, 2, 3, 5, 6.
F. Myuros L. 1, 3, 4.
F. bromoides L. 2, 3, 4, 6.
F. ovina L. 1, 2, 3, 4, 5, 6.
(*d*) *duriuscula* Hackel 1, 3, 4.
F. rubra L. 1, 2?, 3, 4, 5.
F. pratensis Huds. 1, 2?, 3, 5, 6.
× *Lolium perenne* (= *loliacea* Curt.) 1, 2?, 3.
F. elatior L. 1, 2, 3, 5, 6.
Bromus giganteus, L. 1, 2, 3, 5, 6.
B. ramosus Huds. 1, 2, 3, 5, 6.
B. erectus Huds. 2?, 3, 6.
(*b*) *villosus* Bab.
B. sterilis L. Common.
B. secalinus L. 1, 2?, 3, 6.
(*b*) *velutinus* (Schrad.) 1, 2?
B. racemosus L. 1, 3, 4, 5.
B. commutatus Schrad. 1, 2, 3, 4, 5.
B. hordeaceus L. (= *mollis* L.). Common.
[*B. arvensis* L. 1, 5.]
Brachypodium sylvaticum Roem. & Schult. 1, 2, 3, 5, 6.
B. pinnatum Beauv. 1, 2?, 3, 5. Nearly always on the Chalk or Boulder Clay.
Lolium perenne L. Common.
[(*c*) *multiflorum* Lam.]
[*L. temulentum* L. 1, 2?, 3, 5.]
Agropyrum caninum Beauv. 1, 2, 3, 5, 6. Local.
A. repens Beauv. Common.
A. pungens Roem. & Schult. 1.
Lepturus filiformis Trin. 1.
Nardus stricta L. 3, 4. Relhan recorded the plant from Hildersham, and it still occurs at Gamlingay.
Hordeum nodosum L. Common.
H. murinum L. Fairly common.
H. marinum Huds. 1.

II. GYMNOSPERMÆ.

Coniferæ.

ARAUCARIACEÆ.

Juniperus communis L. 3. Fleam Dyke.

TAXACEÆ.

[*Pinus sylvestris* L.]
Taxus baccata L. Perhaps native in Worts' Causeway Wood on the Gogmagog Hills. It has been dug up in the Fens.

III. PTERIDOPHYTA.

Filicineæ.

OPHIOGLOSSACEÆ.

Ophioglossum vulgatum L. 1, 2, 3, 4, 5.
Botrychium Lunaria Sw. 3, 6.

OSMUNDACEÆ.

Osmunda regalis L. Gamlingay Park (Ray). Certainly extinct.

POLYPODIACEÆ.

[*Adiantum Capillus-Veneris* L. 5. Brickwork of platform at Old North Road Station.]
Pteris aquilina L. 1, 3, 4, 5, 6. Native in 4, 5, 6.
Asplenium Adiantum-nigrum L. 1, 2, 3, 5.
A. Trichomanes L. 1, 2, 3, 5.
A. Ruta-muraria L. 1, 2, 3, 5.
Athyrium Filix-fœmina Roth. 2, 4. Not found since 1860.
Phyllitis Scolopendrium Newm. 1, 2, 3, 4, 5. Probably not native.
Polystichum aculeatum Roth. 4 (Gamlingay, T. Martyn).
Lastrea Thelypteris Bory 1. Still plentiful in Wicken Fen.
L. montana T. Moore 4. Gamlingay (Dent).
L. Filix-mas Presl. 1, 2, 3, 4, 5. Decidedly scarce.
L. spinulosa Presl. 3. Fulbourn (Wanton).
L. aristata Rendle & Britten 4, 5.
Polypodium vulgare L. 1, 2, 3, 5. Very rare.

Equisetineæ.

EQUISETACEÆ.

Equisetum maximum L. 3. Also recorded from Ely (Henslow).
E. arvense L. Common.

E. sylvaticum L. 1, 5. No records since the time of Relhan and T. Martyn.
E. palustre L. 1, 2, 3, 4, 5, 6.
E. limosum L. 1, 2?, 3, 4, 5, 6?
(*b*) *fluviatile* (L.) 1, 2, 5.
E. hyemale L. 1, 4. No records except for Stretham Ferry and Gamlingay, by Relhan.

Lycopodineæ.

Lycopodiaceæ.

Lycopodium inundatum L. 4 (Gamlingay, extinct).
L. clavatum L. 4. Not found since 1860.

CHARACEÆ *.

Chara fragilis, Desv. 1. Mepal, Sutton, Chatteris and Whittlesey (Fryer), Wicken and Burwell (Bennett), Chippenham Fen and West Fen, Ely (W. Cross), Haddenham and Roswell Pits (Bullock-Webster).

var. *Hedwigii* (Ag.), Roswell Pits and Wicken Fen (Bullock-Webster), Sutton (Fryer).

var. *capillacea* (Thuill.), Haddenham (Bullock-Webster), Welch's Dam (Fryer).

subsp. *delicatula* Braun, Wicken Fen (E. F. Linton), Downham Pymore (Bullock-Webster).

C. aspera Willd. 1. Burwell Lode and Wicken Fen (Bullock-Webster), Vermuyden's Drain, Welch's Dam, Chatteris (Fryer).

subsp. *desmacantha* H. & J. Groves. Burwell Fen (Bennett), Quy Fen (Bullock-Webster).

C. polyacantha Braun 1. Horseway, near Chatteris (Fryer), Wicken and Snailwell (Bennett), Chippenham Fen (Cross), Quy Fen (Hill), Stretham, Bottisham and Burwell Fens (Bullock-Webster).

C. contraria. Wicken Fen (H. & J. Groves).

C. hispida L. 1, 2?, 3, 5. Hinton Moor (Relhan), near Fulbourn, Teversham, Shelford, Cambridge, Kingston Wood, Waterbeach, Witcham, Witchford, Bottisham, Wicken and Doddington Fens (Babington's *Flora of Cambridgeshire*), Burwell Fen (Bennett), Chippenham Fen (Babington), Sawston (C. B. Clarke), Roswell Pits and Haddenham (Bullock-Webster), March, Sutton, Welch's Dam, Mepal and Chatteris (Fryer), Burnt Fen (W. M. Hind).

C. vulgaris L. 1, 2?, 3, 4, 5. Cambridge, Brinkley, Sawston Moor, Gamlingay, Hardwick, Toft, Haslingfield, Coton, Swaffham Bulbeck, Witcham, Wicken, Bottisham and Snailwell Fens (Babington, *op. cit.*), Burwell (Bennett), Isleham, Sutton, Mepal, Manea, Welch's Dam, Chatteris and Langwood Fen (Fryer), Roswell Pits, Thetford near Ely, Prickwillow and Chesterton (Bullock-Webster), Waterbeach (Hiern), Nine Wells and Chippenham Fen (Cross).

var. *longibracteata* Kuetz. Fulbourn (H. & J. Groves), Fen Ditton (C. B. Clarke), Ely and Prickwillow (Bullock-Webster), Upware (Bennett).

var. *crassicaulis* Kuetz. Burwell Fen (H. & J. Groves).

var. *papillata* Wallr. Upware (Bennett), Haddenham and Roswell Pits (Bullock-Webster), Soham and Burwell Fen (H. & J. Groves).

* This group has been brought up to date for us by Messrs H. and J. Groves.

Tolypella glomerata Leonh. 1, 3. Welch's Dam, Manea, Mepal and Chatteris Turf Fen (Fryer), Wicken Fen (Bennett), Bottisham Fen and Ely (H. & J. Groves), Sawston (C. B. Clarke), Fulbourn, Nine Wells near Shelford (Bennett).

T. prolifera Leonh. 1. Old West River near Stretham Ferry (Bullock-Webster), Vermuden's Drain near Chatteris, Mepal and Sutton Fen (Fryer). First County Record by A. Fryer, 1882.

T. intricata Leonh. 1. Harston (Bennett), Washes from Sutton to Witcham (Fryer).

Nitella tenuissima Kuetz. 1. Swaffham (ex herb. J. Spode) ? county, Bottisham and Burwell Fens (Babington, *op. cit.*), Wicken Lode (Bennett, plentiful).

N. mucronata Miquel 2. Roswell Pits (Bullock-Webster). First County Record.

N. flexilis Agardh. 1, 2? Lord's Bridge near Barton, Reach Lode, Bottisham Fen (Babington, *op. cit.*), Welney (Fryer).

var. *nidifica* Wallr. With some doubt we refer to this variety a curious monœcious plant occurring about Sutton and Mepal, resembling *N. opaca* in stature and habit, in the size and colour of the antheridia and in the usually somewhat mucronate ultimate rays.

N. opaca Agardh. 1, 4. Wicken (Bennett), Gamlingay (Babington).

N. capitata Agardh. 1. Sutton Gault, in the Washes, and thence in the Old Bedford River to Mepal. First British Record by A. Fryer, 1885.

IV. BRYOPHYTA.

By the Rev. P. G. M. Rhodes, M.A., Pembroke College.

The Bryophyta of Cambridgeshire were investigated as exhaustively as the knowledge of the times permitted at the end of the eighteenth century, by the Rev. R. Relhan, Chaplain of King's College, and others. We are fortunate in possessing this account of the Cambs. moss-flora, dating as it does from a time prior to the drainage of the more important fens, and we are enabled to reconstruct an ancient flora which has now almost entirely vanished. As far as Relhan's work can be tested at present, it appears remarkably reliable and, except for a few cases, chiefly where the synonymy is doubtful, his records are included in the following list. It does not seem certain that in his records from "Newmarket" and "Newmarket Heath" that he confined himself to those portions of the Heath strictly in Cambridgeshire, but it is probable that he included the small patch of Suffolk west of Newmarket, as Cambridge botanists generally have done.

Various editions of Relhan's work were brought out, during the latter part of the eighteenth and the beginning of the nineteenth century; but the account of the Cambs. mosses was but little altered in the later editions. The following list is based chiefly on Relhan's second edition (1802).

Since Relhan's time little work appears to have been done at the Cambs. moss-flora, save sporadically. Professor Henslow, in his *Catalogue of British Plants* (Cambridge, 1829), marked those species which occurred in the county of Cambridge, but it is apparent that he relied almost entirely on Relhan's works for the bryophyta, and his pamphlet has for us little independent value. Later a few isolated records from the county are known, as Mr H. N. Dixon's interesting discovery of *Tortula Vahlii* at Cherry Hinton, but no published list of Cambridgeshire Mosses has come into the writer's hands. A few years ago Mr L. J. Sedgwick and the writer started to work those parts of the county more easily accessible from Cambridge, and succeeded in rediscovering most of Relhan's species, and adding a certain number of new ones. The present list must, however, be regarded as a purely tentative one, as much of the county remains unexplored for Mosses, and there are some curious gaps in the list of species to be filled up. Many of the older records and some of the modern ones were not sufficiently closely localized to admit of their classification under the somewhat minute geological subdivisions of the county now

adopted, so that in this respect especially the following list will be found very incomplete.

Taking a general view of the county, it must be said that the moss-flora is poor. The absence of hard rocks in the county, the dryness of the soil and the close cultivation of the land all militate against the existence of mosses. The moss-flora of the fens, before their drainage, though interesting, does not appear to have been very extensive, while even this has now almost totally perished. The patches of fen now remaining, as at Quy and Chippenham, produce little except patches of *Hypnum cuspidatum*, *H. stellatum*, and forms of *H. aduncum* here and there: *Sphagna* appear to be almost extinct. At Wicken Fen the rank growth of vegetation is unsuitable to the bryophyta, though a careful search among the stems of the *Cladium* will shew stunted specimens of *Mnium affine elatum*, *Fissidens*, *Pellia*, *Lophocolea*; and probably other forms could be added. At Fulbourn there are other remnants of a fen moss-flora, *e.g. Hypnum elodes*; but nowhere in the county is there to be found a rich paludal flora, such as that at Tuddenham, just over the Suffolk border.

Much more interesting is the chalk-flora. On the bare face of every "clunch-pit" *Seligeria* occurs abundantly; on chalky earth in the pits, and on arable land in the chalk districts, most of the gypsophilous Tortulaceæ occur: and on the ancient chalk-turf still surviving on the great dykes may be found abundance of such mosses as *Thuidium abietinum*, *Hypnum chrysophyllum*, *Fissidens collinus*, etc. Botanists visiting the county will find the Cherry Hinton chalk-pits the most easily reached, and also probably the richest: for the old chalk-turf flora they may be especially recommended to visit the eastern half of the Devil's Dyke.

The woods of the county present few species of interest: the greater part are of recent origin, except perhaps those on the boulder clay, which have not been well worked, but do not appear to be rich. Further investigation of our arboreal species is much required.

The considerable patches of sand round Gamlingay and Chippenham are unique in their richness, and produce a flora quite distinct from that of the rest of the county. The bogs at Gamlingay, which afforded many plants of interest in Relhan's time, are now drained.

The following is a list of all mosses known to occur in the county on reliable authority; the records are as far as possible assigned to the correct formation, and the name of the authority for that division is appended (*Rel* = Relhan, S = L. J. Sedgwick, Rs = P. G. M. Rhodes). Old records are italicised. Where the division is not stated, it implies that the record was insufficiently localized.

New county records have been kindly verified by Mr Ingham.

Muscineæ.

Sphagnum. Sphagnum appears to have existed till lately at Burwell and Wicken, and still occurs at Chippenham, but even there it is now nearly extinct. Relhan records two varieties: *Sphagnum latifolium* at *Teversham* (1) and *Gamlingay* (4), *Sphagnum cuspidatum* at *Gamlingay* (4).

Tetraphis pellucida Hedw.	1 *Rel.*
Catharinea undulata W. & M.	*Rel.*, S.
Polytrichum nanum Neck	3 *Rel.*
P. piliferum Schreb.	4 *Rel.*
P. juniperinum Willd.	3 *Rel.*, 4 *Rel.*, Rs.
P. attenuatum Menz (= formosum Hedw.)	4 *Rel.*
P. commune L.	3, 4 *Rel.*
Archidium alternifolium Schp.	4 *Gamlingay Bog*, *Rel.*
Pleuridium subulatum Rabenh.	*Rel.*
Seligeria calcarea B. & S.	3 common *Rel.*, Rs.
Ceratodon purpureus B. & S.	*Rel.*, 6 Rs., etc.
Dicranella heteromalla Schp.	3 *Rel.*, Rs.
D. varia Schp.	3 frequent *Rel.*, Rs.
Dicranum scoparium Hedw.	3 *Rel.*, Rs.; 6 Rs.
Fissidens bryoïdes Hedw.	*Rel.*; Ely, etc., S. Scarce.
F. adiantoïdes Hedw.	1 *Rel.*; Wicken Fen Rs.
	3 *Rel.*, extinct through drainage.
β collinus (Mitt.)	3 Fleam Dyke, etc. Rs., ident. Wm Ingham.
F. taxifolius Hedw.	*Rel.*, 2, 3, 5 Rs.; common.
Grimmia apocarpa Hedw.	*Rel.*, 1 Rs.
G. pulvinata Smith	*Rel.*, 1, 6 Rs., etc.; common.
Rhacomitrium canescens Brid.	4 *Rel.*
Phascum cuspidatum Schreb.	*Rel.*, 2, 3 Rs.
γ Schreberianum Brid.	4 *Gamlingay*, *Rel.*
P. Flœrkeanum Brid.	3 Seven Springs, Shelford, H. N. Dixon.
P. curvicolle Ehrh.	3 *Babraham*, *Rel.*
Pottia recta Mitt.	3 *Rel.*
P. bryoides Mitt.	*Rel.*
P. truncatula Lindb.	*Rel.*; I think common.
P. minutula Lindb.	3 S.
P. lanceolata C. M.	3 common, Rs.
Tortula pusilla Mitt.	3 Rs.
T. ambigua Ångstr.	3 Rs.
T. aloïdes De Not	3 Rs.
T. Vahliana Wils.	3 Cherry Hinton. First found here by Mr H. N. Dixon. Abundant in 1911 Rs. In several spots near the pit, on calcareous road-scrapings thrown under hedge. It is a form closely

	approximating to "*var. subflaccida.*"
T. muralis Hedw.	*Rel.*, 1, 2, 3, 4, 5, 6 Rs.
T. subulata Hedw.	*Rel.*, 2 Rs.
T. mutica Lindb.	1 Grantchester Rs.
T. laevipila Schwaeg.	1, 2, 3 Rs.; frequent, often approaches v. *laevipilaeformis* Limp.
T. intermedia Perb.	1 Rs., S.
T. ruralis Ehrh.	*Rel.*, 3, 5 Rs., etc.
Barbula rubella Mitt.	Recorded for county in the Census Moss Catalogue.
B. fallax Mitt.	2, 3 Rs.
B. rigidula Mitt.	Impington S. Common at St Ives, just in Hunts.
B. convoluta Hedw.	3 *Rel.*, Rs.
B. unguiculata Hedw.	*Rel.*, 1, 3 Rs.
Weissia viridula Hedw.	*Rel.*
W. crispa Mitt.	3 Rs., etc.
Trichostomum flavovirens Bruch.	3 Devil's Dyke Rs. Ident. Wm Ingham.
Eucalypta vulgaris Hedw.	3 S.
Zygodon viridissimus R. Br.	Census Moss Catalogue.
Ulota crispa Brid.	Wood Ditton *Rel.*, 5 *Rel.*
Orthotrichum anomalum Hedw. v. saxatile Milde	1 *Rel.*, Rs. Still occurs on Trumpington and Granchester Churches, where it was noticed by Rel. a century or more ago.
O. Lyellii Hook & Tayl.	5 Rs.
O. affine Schrad.	1 Rs., S.
O. diaphanum Schrad.	1, 3, 6 Rs.
Splachnum ampullaceum L.	1 *Sawston and Teversham Moors Rel.* 3 *Hinton Moor Rel.* 4 *Gamlingay Bogs Rel.* Extinct in all these places. May survive at Wicken.
[Ephemerum serratum Hanpe	3 *Newmarket Rel.*
Uncertain if in county.	Needs confirmation.]
Physcomitrium pyriforme Brid.	1, 3 *Rel.*
Funaria hygrometrica Sibth.	1, 3 Rs.
Aulacomnium palustre Schwaeg. = Mnium palustre of *Rel.*	1 *Shelford Moor Rel.* 4 *Gamlingay Bog Rel.*

Henslow took this for *A. androgynum*, and so some confusion has been caused. No reliable record for *A. androgynum* from the county, though it might occur at Gamlingay.

Bartramia pomiformis Hedw.	4 *Rel.*
Philonotis fontana Brid.	1, 3, 4 *Rel.* Extinct in all known localities. May occur at Wicken.
[Leptobryum pyriforme Wils.	*Hothouse, Botanical Garden, Rel.*
Needs confirmation as a native plant.]	
Webera carnea Sch.	1 *Rel.*, Rs.; 3 *Rel.*
W. nutans Hedw.	4 Rs. Ident. W. Ingham.
Bryum pseudotriquetrum Schwaeg.	1 *Rel.*
	1 *Rel.*
B. bimum Schreb.	1 *Rel.*
B. caespiticium L.	*Rel.*
B. capillare L.	*Rel.*, 1, 3 Rs., etc.
[B. atropurpureum W. & M.	? Ely, S.]
B. argenteum L.	*Rel.*, 1, 4 Rs., etc.
B. roseum Schreb.	3 *Gogs, Rel.*; Hildersham Furze Hills, S.
Mnium affine Bland v. elatum B. & S.	1 Wicken Fen Rs. Ident. Wm. Ingham.
M. cuspidatum Hedw.	*Rel.* Must be scarce.
M. rostratum Schrad.	Madingley *Rel.*
M. undulatum L	1, 3, 6 Rs.; 5 *Rel.*, A. H. Evans.
M. hornum L.	3, 4 *Rel.*, 5 Rs.
[M. punctatum L.	"*Gogs*" *Rel.* An error?]
Fontinalis antipyretica L.	1 *Rel.*, Rs.; 2 *Rel.*
Cryphaea heteromalla Mohr.	4, 5 *Rel.*
Neckera complanata Hübn.	*Rel.*, 2, 5 Rs.
Homalia trichomanoïdes B. & S.	4 *Rel.*
Leucodon sciuroïdes Schwaeg.	*Rel.*, 3 Rs.; 4 on specimen in Larbalestier's Lichen Herb.
Porotrichum alopecurum Mitt.	*Rel.*, 3 Rs
Leskea polycarpa Ehrh.	1 S., Rs.
Anomodon viticulosus H. & T.	*Rel.*, Boxworth S., 6 Rs.
Thuidium abietinum B. & S.	3 *Rel.*, Rs.
T. tamariscinum B. & S.	4, 5 Rs.
Climacium dendroïdes W. & M.	4 *Rel.* and *Madingley Rel.*
Camptothecium sericeum Kindb.	*Rel.*, 1, 2, 3, 6 Rs.
C. lutescens B. & S.	2 Rs.; 3 *Rel.*, Rs.
Brachythecium albicans B. & S.	3, 4, 6 Rs.
B. rutabulum B. & S.	*Rel.*, 1, 2, 3, 4, 5, 6 Rs.
B. velutinum B. & S.	*Rel.*, 3 S., 4 Rs.
B. plumosum B. & S.	2 *Rel.*
B. purum Dixon	*Rel.*, 2, 3, 4, 6 Rs.
Eurhynchium prælongum Hobk.	*Rel.*, 3, 4, 5, 6 Rs.
E. swartzii Schp.	2, 3 Rs.
E. striatum B. & S.	*Rel.*; must be scarce.
[E. tenellum Milde	Henslow Catalogue.
Needs confirmation.]	

E. myosuroïdes Schp.	*Rel.*, 5 Rs.
E. rusciforme Milde.	1, etc. *Rel.*
E. confertum Milde.	1, 3 S. Common in woods on Gogs.
Amblystegium serpens B. & S.	*Rel.*, 1 S., 2, 3, 5, 6 Rs.
A. filicinum De Not.	1, 3 *Rel.*, 1, 2 Rs.
β Vallisclausæ Dix.	1 Fulbourn Rs. Ident. Wm Ingham.
Hypnum riparium L.	*Rel.*
H. elodes Spruce	1 Fulbourn S. Ident. Wm Ingham.
H. stellatum Schreb.	1 *Rel.*, Rs.; 2 Rs.; 3 *Rel.*
H. chrysophyllum Brid.	3 frequent Rs.
H. aduncum Hedw. type, small form	1 Fulbourn S., 2 Rifle Range Rs.

[β gracilescens Schp., in the Moss Exchange Club Catalogue, was an error for the preceding.]

η paternum Sanio, type of var. form gracilis	1 Quy Rs. 1 Durnford Fen S.; 2 Rifle Range Rs.

Plants from all the above stations for forms of *H. aduncum* have been submitted to Mr Wm Ingham.

H. fluitans L.	1, 4 *Rel.*
H. cupressiforme, L. type.	*Rel.*, 2, 3, 4, 5, 6 Rs.
β resupinatum Schp.	5 Rs.
θ elatum B. & S.	3 Rs.
H. molluscum Hedw.	3 *Rel.*, Rs.
H. scorpioïdes L.	1 *Sawston Moor*, *Fowlmere*, *Rel.*; 3 *Hinton Moor Rel.*
Extinct in above localities.	May survive at Wicken.
H. cuspidatum L.	*Rel.*, 1, 2, 3 Rs.
H. schreberi Willd.	5 *Rel.*
Hylocomium splendens B. & S.	5 *Rel.*
H. squarrosum B. & S.	3 *Rel.*, Rs.; 4, 6 Rs.
H. triquetrum B. & S.	S., 3 *Rel.*, 6 Rs.

Hepaticae.

The Hepatics of the county are neither abundant nor interesting, and have consequently been much neglected by botanists. A number of common hepatics were recorded by Relhan, and are incorporated in the present list, though a certain amount of doubt must attach to records of such ancient date. A few other Hepaticae are marked in Henslow's *Catalogue* as occurring in Cambs., but on unknown authority. Two localities for Cambs. Ricciaceae are given in the *Moss Exchange Club Report* for 1905. Otherwise no records are to hand save for a few species noticed incidentally

by the writer round Cambridge. It is plain, however, that the county is destitute in the extreme with regard to hepatics; even the commonest species, as *Frullania dilatata*, and *Metzgeria furcata*, only occurring at wide intervals and in small quantity. The drained fens produce no species, and vegetation at Wicken is too rank to produce much, though here a careful search would extend the list a little.

The same abbreviations are used as in the case of mosses.

Riccia glauca L.	1 *Cornfield by road to Histon Rel., Barnwell gravel-pit Rel.*
R. fluitans L.	Henslow Cat.; 1 Chippenham Fen, C. H. Waddell in Moss Exchange Club Report, 1905; Waterbeach, A. Shrubbs.
Ricciocarpus natans Corda.	1 *Sawston and Shelford Moors Rel.*; Chippenham Fen, C. H. Waddell, *ut supra.*
	5 *Pond in Hall Wood, Wood Ditton, Rel.*
Reboulia hemisphærica Raddi.	1 *Fulbourn and Sawston Moors Rel.*
Conocephalum conicum Dum.	1 *Shelford Moor Rel.*, 3 Thriplow Rs.
Lunularia cruciata Dum.	1 *Sawston Moor Rel.*
Marchantia polymorpha L.	1 *Cambridge Rel.* In the Backs?
Sphærocarpus Michelii Bell	1 *Barnwell pit Rel.*
Aneura pinguis Dum.	3 *Hinton Moor Rel.*
	4 *Gamlingay Bogs Rel.* etc.
Metzgeria furcata Lindb.	5? *Wood Ditton, Madingley Rel.*
	4 *Rel.*, 5 Madingley, 6 Rs.
Pellia epiphylla Dum.	1 Trumpington, Wicken, Rs.; 4 *Rel.*
Lophozia turbinata Steph.	3 Cherry Hinton Rs.
Plagiochila asplenioïdes Dum.	*Wood Ditton Rel.*
Lophocolea bidentata Dum.	1 *Rel.*, 1, 4 Rs.
L. heterophylla Dum.	3 or 5, 4, 5 Rs.
Saccogyna viticulosa Dum.	5 *Rel.*
Odontoschisma Sphagni Dum.	4 *Gamlingay Bog Rel.*
Radula complanata Dum.	*Rel.*
Madotheca platyphylla Dum.	3 *Rel.*, 6 Rs.
Frullania Tamarisci Dum.	*Rel.*
F. dilatata Dum.	*Rel.*, 2, 5 Rs.
[Anthocerus punctatus L.	Henslow Cat. Needs confirmation.]

Of the localities mentioned above it may be noted that Sawston, Shelford, Hinton and Gamlingay bogs are entirely or nearly drained, and not likely now to support all the species given.

V. THALLOPHYTA.

ALGÆ.

By G. S. West, M.A., D.Sc., F.L.S., St John's College.

The alga-flora of the east of England has not been so thoroughly investigated as that of the other parts of the country, but all that has been done in this direction tends to shew that two of the large groups of the algæ—the Chlorophyceæ and Myxophyceæ—are very poorly represented in the freshwaters of this part of England. As the members of these large groups give some of the most distinctive features to the alga-flora of any district, much that would be of interest is lacking from the alga-flora of the eastern counties.

Of all the eastern counties which have been partially examined for freshwater algæ, Cambridgeshire has yielded the poorest results. "The Alga-flora of Cambridgeshire," which appeared in six instalments in the *Journal of Botany* from Feb. to July, 1899, incorporated the results of four years' collection and examination of material from various parts of the county. It was doubted in this paper "whether any other county in England, of equal area, possesses so poor an alga-flora," and since that time scarcely any other records have been added.

The geological formations of the county, factors which play such an important part in determining the alga-flora of a district, are particularly unsuitable for the existence of an extensive and varied collection of algæ, although it is highly probable that many good things existed on Gamlingay Heath (situated on the Lower Greensand) prior to the time it was drained. The topography of the county is not sufficiently diversified, and, owing to the general low level, none of the peculiar upland collections can be made, few Myxophyceæ being found, and, comparatively, still fewer Desmids. The scarcity of the latter is remarkable, only ten out of twenty-four British genera being represented, and these but scantily.

The two most fruitful localities for Desmids are undoubtedly the fens at Wicken and Chippenham, each being a small remnant of almost primæval fen; but even these are far from prolific. The small pools on the latter, containing *Chara hispida* and a

reduced form of *Utricularia vulgaris*, yielded some rather striking species, as also did the pools and peaty ditches on Wicken Fen containing *Utricularia vulgaris* and *Castalia alba*. The strange appearance of *Cosmarium anceps*, *C. Pokornyanum*, and *C. Holmiense* at Chippenham is worthy of mention, these species being as a rule entirely confined to upland or subalpine districts, being a marked feature of the dripping carboniferous grits and shales of the Pennine Chain and of similar situations among the older rocks of the Lake District, North Wales, etc. They are notably absent from the south-eastern counties of England, and to them may be added *C. speciosum*, which may be placed in the same category, although it is found in Epping Forest, Essex. Roswell Pits, Ely, was found to be a locality productive beyond the average, and not a few uncommon species were obtained from Dernford Fen, about one mile south of Shelford. The chalk districts of the south-east of the county yield practically no algæ, and the numerous ditches and drains of the northern and central parts—many of the larger of which have been in existence since the seventeenth century—exhibit a monotony which could only be found in a low-lying level country. The entire absence of submerged *Sphagnum* and *Sphagnum* bogs causes a corresponding absence of many forms of algæ, and especially certain Desmids, which are more or less exclusively found in such localities. Some of these, such as *Cylindrocystis Brebissonii*, *Closterium striolatum*, *Tetmemorus granulatus*, *Micrasterias truncata*, *Euastrum binale*, *Staurastrum margaritaceum*, etc., are really common and widely distributed species throughout the British Isles, and their absence from Cambridgeshire is therefore all the more noteworthy.

On the whole the Diatoms may be considered as moderately representative, although most of the upland forms are naturally lacking, and there is a marked absence of species belonging to the genera *Eunotia* and *Melosira*. A few of the upland species occur at Wicken and Chippenham Fens, such as *Achnanthidium flexellum*, *Epithemia Argus* var. *alpestris*, and *Eunotia biceps*. These are analogous in their distribution to those Desmids (*Cosmarium anceps*, *C. Pokornyanum*, and *C. Holmiense*) previously mentioned, and the presence of these species in the marshes of a flat country only about ten feet (or less) above the sea-level is very curious, as their natural home is amongst the mosses and algæ of the rocky ghylls and glens of the mountainous portions of the British Isles and other parts of Europe. A parallel to this is found in the occurrence of *Cetraria islandica* (Iceland Moss) on some of the Lincolnshire heaths.

The smaller ditches and ponds of the county yield a fair assortment of Zygnemaceæ and Œdogoniaceæ, but the boggy ditches and peaty pools of the fens are mostly disappointing.

They contain for the most part a mixture of the commoner pond species with a very few bog species. Some of the small boggy pools in Chippenham Fen were a little more productive, especially those containing small quantities of a *Utricularia* which appeared to be an unusual form of *U. minor*.

The only characteristic algal associations were those in the large lodes and drains. In these situations, among tangled and floating masses of *Potamogetons* and other aquatic macrophytes, certain algæ occur in more or less profusion, chiefly in the summer and early autumn. These are mostly unicellular Chlorophyceæ and Diatoms. The most abundant and important species were *Cosmarium biretum, C. Turpinii, C. Botrytis, C. impressulum, C. humile, C. subprotumidum* var. *Gregorii, Closterium moniliferum, Cœlastrum sphæricum, C. pulchrum, Pediastrum Boryanum, Scenedesmus obliquus, Cocconeis Placentula, C. Pediculus,* and *Cymatopleura Solea.*

There is a great scarcity of the subaerial species from the alga-flora of Cambridgeshire, and especially of the algal associations so characteristic of wet and dripping rocks, the combined algæ and bryophytes of which so often give a character not only to the flora but to the scenery.

Notwithstanding the poorness of the general alga-flora, there are some very good things found in Cambridgeshire in the way of algæ. The Œdogoniaceæ are fairly well represented, and no doubt there are two or three times as many species yet remaining to be identified when they can be obtained in the proper fruiting condition.

In the Ulotrichaceæ special mention should be made of *Radiofilum flavescens,* which is the only known species of the genus in the British Islands, and as yet has not been found outside Cambridgeshire. *Gongrosira stagnalis* is an interesting member of the Trentepohliaceæ which occurred at Sutton on the shells of *Limnæa peregra.* Of the Zygnemaceæ *Mougeotia paludosa, M. elegantula,* and *Spirogyra pellucida* are the pick, and of the Desmidiaceæ *Mesotœnium Kramstai, Closterium laterale, C. peracerosum, Cosmarium costatum, C. basilicum,* and *Staurastrum paxilliferum* are worthy of special mention. *Nephrocytium obesum* and *Characiopsis turgida* are also noteworthy species. Among the blue-green algæ *Oscillatoria proboscidea, O. acuminata, O. decolorata,* and *Glœochœte Wittrockiana* are the choice species, while among the Diatoms a curious variety of *Synedra Acus* and a much crinkled species of *Eunotia* require further investigation.

The total number of algæ known to occur in Cambridgeshire is about 400 species and 45 varieties.

The localities where mentioned are arranged under the eight areas into which the county is divided by Babington in his *Flora*

*of Cambridgeshire**. These areas are certainly convenient, but hardly natural, and have little or no significance with regard to the distribution of the algæ; they are as follows: 1. Cambridge; 2. Royston; 3. Wimpole; 4. Cottenham; 5. Burwell; 6. Ely; 7. Chatteris; 8. Wisbech. The first two are the least productive, the Cambridge area being a particularly barren one.

The county is by no means well investigated; those Œdogoniaceæ and Zygnemaceæ which have not been obtained in proper fruiting condition (and there are many of them) are not recorded, and there are whole districts, such as Wisbech and Whittlesey, from which no collections have been made.

Class **FLORIDEÆ.**

Order NEMALIONACEÆ.

BATRACHOSPERMUM MONILIFORME (Roth) Ag. 3. Cherryhinton (in ditch), and Seven Springs, Shelford (*Dixon*). 5. Brook at Fulbourn (near the Fleam Dyke) (*Dixon*).

CHANTRANSIA CHALYBEA (Lyngb.) Fries. 3. Sheep's Green, Cambridge: June, 1898; growing on *Amblystegium riparium* at the mill-race.

Class **CHLOROPHYCEÆ.**

Order ŒDOGONIALES.

BULBOCHÆTE SESSILIS Wittr. Forms with large oogonia. 5. Wicken Fen: Aug. 1898.

B. CRASSIUSCULA Nordst. [Inclus. *B. ellipsospora* G. S. West, "Alga-fl. Cambs." 1899, p. 55, t. 394, f. 1, 2.] 6. Roswell Pits, Ely; among *Utricularia vulgaris*, July, 1898.

B. SUBSIMPLEX Wittr. 7. Ponds near March.

B. RECTANGULARIS Wittr. 5. Wicken Fen; Chippenham Fen.

ŒDOGONIUM CURVUM Pringsh. 3. Wimpole Park.

Œ. FRAGILE Wittr. 7. Ponds S. of March.

Œ. PYRULUM Wittr. var. OBESUM Wittr. 2. Dernford Fen, 1 mile S. of Shelford.

Œ. VERNALE (Hass.) Wittr. 2. Dernford Fen, 1 mile S. of Shelford.

Œ. VAUCHERII (Le Cl.) A. Br. 3. Wimpole Park.

Œ. OBLONGUM Wittr. Sheep's Green, Cambridge.

Œ. ROTHII (Le Cl.) Pringsh. 2. Dernford Fen, 1 mile S. of Shelford.

Œ. UNDULATUM (Bréb.) A. Br. var. MOEBIUSII Schmidle. 5. Chippenham Fen.

Œ. CRASSIUSCULUM Wittr. var. IDIOANDROSPORUM Nordst. & Wittr. [= *Œ. crassipellitum* G. S. West, "Alga-fl. Cambs." 1899, p. 55, t. 394, f. 3—5.] 8. Twenty-foot River, between March and Guyhirn; July, 1898.

* As in Dr West's original paper, cited on p. 259.

Œ. Boscii (Le Cl.) Bréb. 3. Sheep's Green, Cambridge.

Œ. Landsboroughii (Hass.) Kütz. 2. Dernford Fen, 1 mile S. of Shelford.

Order Chætophorales.

Coleochæte scutata Bréb. Generally epiphytic on aquatic phanerogamous plants, and probably abundant, though easily overlooked. 3. Hardwick; Wimpole Park. 6. Roswell Pits, Ely. 7. In ponds near March. 8. In ponds, Guyhirn, attached to *Vaucheria dichotoma*.

C. irregularis Pringsh. Rare. 5. Pools, Chippenham Fen, attached to the submerged stems of *Phragmites communis*. 8. In ponds, Guyhirn, attached to *Myriophyllum*.

Herposteiron confervicola Näg. [= *Aphanochæte repens* A. Br.] 2. Dernford Fen. 3. Sheep's Green, Cambridge; Lord's Bridge; Wimpole Park. 5. Fordham. 6. Roswell Pits, Ely; and ponds near Ely.

Very fine specimens were observed on *Elodea canadensis*, thickly covering both faces of the leaves, the procumbent branches of the alga in some cases closely following the contours of the cells of the *Elodea*, and for this reason exhibiting a marked reticular character. In some of the examples hypnospores were present.

H. pilosissima (Schmidle) G. S. West. [= *Alphanochæte pilosissima* Schmidle.] 3. Wimpole Park, attached to *Œdogonium* sp.

Ulothrix subtilis Kütz. 5. Chippenham Fen.

Var. variabilis (Kütz.) Kirchn. 1. Cambridge. 3. Coton; Wimpole Park.

U. tenuis Kütz. 3. Wimpole Park.

U. moniliformis Kütz. 5. Chippenham Fen.

Radiofilum flavescens G. S. West. 5. Wicken Fen; Aug. 1898. Length of cells 5·5—8·5 μ; breadth of cells 7·5—10·5 μ.

This plant is the only recorded British species of the genus, and has not been seen since its original discovery in 1898. It is distinguished from the only other species of the genus—*R. conjunctivum* Schmidle—by its more elongated and flexuose filaments, its larger elliptical cells which are not apiculate, and by the colour of the older plants.

Stichococcus bacillaris Näg. 1 and 3. On old wood and damp ground, not uncommon about Cambridge; Orwell, on damp stones and wood.

Cylindrocapsa geminella Wolle, var. minor Hansg. Very scarce. 3. Sheep's Green, Cambridge. 6. Roswell Pits, Ely. Crass. cell. veget. 15 μ. *Distrib.*—Bohemia and United States.

Chætophora pisiformis (Roth) Ag. 1. In ditch, Trumpington. 3. Sheep's Green, Cambridge; Hardwick. 7. Near March.

C. incrassata (Huds.) Hazen. [= *C. Cornu Damæ* (Roth) Ag.; *C. endivæfolia* auct.] 3. Sheep's Green, Cambridge; Hardwick.

C. elegans (Roth) Ag. 6. Near Ely.

Draparnaudia plumosa (Vauch.) Ag. 6. Roswell Pits, Ely.

Myxonema tenue (Ag.) Rabenh. [= *Stigoclonium tenue*.] 3. Sheep's Green, Cambridge.

M. FASTIGIATUM (Kütz.) ——. 3. Wimpole Park.

MICROTHAMNION KÜTZINGIANUM Näg. 5. Wicken Fen: Aug. 1898, amongst *Chara hispida*.

GONGROSIRA STAGNALIS (G. S. West) Schmidle. [= *Pilinia stagnalis* G. S. West, "Alga-fl. Cambs." 1899, p. 107, t. 394, f. 6—9.] 7. The Washes, Sutton, forming a tough dull green stratum on the shells of *Limnæa peregra*.

This is the largest species of the genus, and so far has not been recorded from any other part of the British Islands.

Order ULVALES.

ENTEROMORPHA INTESTINALIS (L.) Link. This plant appears to be generally distributed in the rivers and drain-dykes throughout the county. 3. R. Cam, Sheep's Green. 4. R. Cam at Baitsbite. 5. Burwell Lode. 6. R. Ouse, Ely; Sutton and Mepal, in ponds. 7. The Washes, Sutton; Old River Nene, March. 8. Guyhirn.

Order SCHIZOGONIALES.

PRASIOLA CRISPA (Lightf.) Ag. 1. Trumpington Street, Cambridge.

P. PARIETINA (Vauch.) Wille. [= *Hormidium parietinum* Kütz.] 1. Frequent about Cambridge. 5. Burwell. 7. March.

Order MICROSPORALES.

MICROSPORA FLOCCOSA (Vauch.) Thur. 3. Sheep's Green, Cambridge.

Order CLADOPHORALES.

CLADOPHORA CRISPATA (Roth) Kütz. 2. Dernford Fen, 1 mile S. of Shelford. 3. Comberton; Wimpole Park. 4. Pond near Girton. 6. Roswell Pits, Ely. 7. Near March.

C. GLOMERATA (L.) Kütz. 3. R. Cam at Cambridge; Coton. 6. Near Ely.

C. FLAVESCENS Ag. 2. Octagon Pond, Wimpole Park. 8. Sheep's Green, Cambridge. 7. Sutton West Fen.

RHIZOCLONIUM HIEROGLYPHICUM Kütz. 2 Dernford Fen, 1 mile S. of Shelford; Octagon Pond, Wimpole Park. 3. Sheep's Green, Cambridge. 6. In ponds near Ely. 7. Sutton West Fen. 8. In ditches near Guyhirn. Frequent, May to Aug.

Order SIPHONEÆ.

VAUCHERIA SESSILIS (Vauch.) DC. 3. Sheep's Green, Cambridge; Orwell; Wimpole Park. 5. Chippenham Fen. 8. Guyhirn. In a gathering of this species from Sheep's Green, Cambridge, in July, 1898, some curious globular swellings were noticed at intervals in many of the filaments, frequently situated quite close to the oogonia, and generally giving rise to one or more branches of varying length. They were most probably "galls" produced by one of the Rotifera.

V. DICHOTOMA (L.) Ag. 4. River Cam, between the "Pike and Eel" and Baitsbite. 5. Burwell Lode. 8. In ponds, Guyhirn.

V. TERRESTRIS Lyngb. 2. Great Shelford, by the roadside. 6. Near Ely, on damp ground.

Order CONJUGATÆ.

MOUGEOTIA SCALARIS Hass. 6. Roswell Pits, Ely: July, 1898.

M. PARVULA Hass. 6. Roswell Pits, Ely. 7. In ditches near March. This species is somewhat scarce in the county. Conjugating examples but without ripe spores, from Chippenham Fen.

M. GENUFLEXA (Dillw.) Ag. [*Mesocarpus pleurocarpus* De Bary; *Mougeotia mirabilis* (A. Br.) Wittr.] 2. Dernford Fen, 1 mile S. of Shelford. 3. Sheep's Green, Cambridge; Hardwick. 6. Roswell Pits, Ely. 7. Sutton West Fen; in ditches about March. 8. Guyhirn. Frequently met with in a possible state of conjugation, but not with mature spores.

M. PALUDOSA G. S. West. 5. Burwell Lode, abundant: Aug. 1898. This species is as yet only known to occur in Cambridgeshire.

M. CALCAREA Wittr. 5. Wicken Fen: Aug. 1900.

M. VIRIDIS (Kütz.) Wittr. 3. Hardwick. 5. Chippenham Fen.

M. GRACILLIMA (Hass.) Wittr. 3. Sheep's Green, Cambridge. 5. Wicken Fen.

M. ELEGANTULA Wittr. Diam. veg. cells 4 μ. 5. Chippenham Fen; Wicken Fen. This species was not observed in the conjugating state; but the extreme slenderness of the sterile cells, which were thirty to thirty-five times longer than their diameter, does not admit of its being any other species. Moreover, the chromatophores were restricted to the median portion of the cells exactly in the manner figured by Wittrock. *Distrib.*—Westmoreland, West Ireland, and Sweden.

DEBARYA CRUCIATA Price. 3. Coe Fen. The description of this species requires revision as the original is very erroneous and misleading.

ZYGNEMA CRUCIATUM (Vauch.) Ag. 3. Wimpole Park: June, 1898. Sterile examples of a *Zygnema*, which was probably this species, were observed from the ditch by the Botanical Gardens, and from Sheep's Green, Cambridge.

Z. ERICETORUM (Kütz.) Hansg. [*Zygogonium ericetorum* Kütz.] 5. Chippenham Fen, the aquatic form [forma *fluitans* (Kütz.) Rabenh.], abundant, Aug. 1898.

Z. RALFSII (Hass.) De Bary. 3. Chippenham Fen. The zygospores were rather larger than the average size for this species.

SPIROGYRA ARCTA (Ag.) Kütz. var. CATÆNIFORMIS (Hass.) Kirchn. [*S. catæniformis* (Hass.) Kütz.] 6. Roswell Pits, Ely.

S. VARIANS (Hass.) Kütz. 2. Dernford Fen, 1 mile S. of Shelford. 5. Chippenham Fen. 6. In ponds near Ely.

S. COMMUNIS (Hass.) Kütz. 6. Ditches near Ely.

S. NITIDA (Dillw.) Link. 6. Ditches near Ely.

S. MAJUSCULA Kütz. [*S. orthospira* Näg.] 5. Chippenham Fen: very fine, Aug. 1898.

S. MAXIMA (Hass.) Wittr. Syn. *S. orbicularis* (Hass.) Kütz. 6. Roswell Pits, Ely: July, 1898. The ripe zygospores are of the

same rich brown colour as those of *S. majuscula*, and, although they are of considerably greater diameter, the spore-wall is comparatively thinner. The proportion of the thickness of the spore-wall to the diameter of the ripe spore is as 1 : 17·44 ; in the case of *S. majuscula* it is as 1 : 12·5.

S. GRACILIS (Hass.) Kütz. 3. Sheep's Green, Cambridge ; Wimpole Park.

S. PELLUCIDA (Hass.) Kütz. [*Zygnema pellucida* Hass.] 1. Ditch by the Botanical Gardens, Cambridge : June, 1897, intermingled with *S. bellis*. 3. Sheep's Green, Cambridge : Aug. 1898. *Distrib.*— England (Herefordshire ; Yorkshire !).

S. BELLIS (Hass.) Cleve. 1. In the ditch by the Botanical Gardens, Cambridge : June, 1897, intermingled with *S. pellucida* (Hass.) Kütz.

S. GREVILLEANA (Hass.) Kütz. 3. Sheep's Green, Cambridge ; Hardwick, in ponds.

GONATOZYGON RALFSII De Bary. 5. Chippenham Fen, amongst *Utricularia vulgaris* ; Wicken Fen, amongst *Myriophyllum spicatum*. 6. Roswell Pits, Ely.

G. BRÉBISSONII De Bary. 6. Roswell Pits, Ely.

G. KINAHANI (Arch.) Rabenh. 3. Sheep's Green, Cambridge : in pond amongst *Spirogyra* sp., July, 1898.

MESOTÆNIUM KRAMSTAI Lemmerm. 5. Chippenham Fen, in small pools amongst *Utricularia vulgaris* : Aug. 1898. This species, the most elongate of the genus, was discovered by Lemmermann in Aug. 1895, in small pools on the "Riesengebirge," between Bohemia and Prussian Silesia. The Cambridgeshire specimens were of variable length, and all had the poles truncately rounded ; certainly more truncate than figured by Lemmermann. All the examples observed were packed with a reserve of fatty oil, as is so often the case in species of this genus.

PENIUM DIGITUS (Ehrenb.) Bréb. 7. Ponds S. of March.

P. sp. Only one specimen of this species was observed ; the cell was oblong-elliptical, with semicircular poles, and in the middle there was a faint constriction. 8. Guyhirn.

P. CRUCIFERUM (De Bary) Wittr. [*Cosmarium cruciferum* De Bary.] 5. Chippenham Fen.

CLOSTERIUM ACEROSUM (Schrank) Ehrenb. 2. Dernford Fen, 1 mile S. of Shelford. 3. Hardwick ; Lord's Bridge. 5. Wicken Fen.

Var. ANGOLENSE West & G. S. West, *l. c.* 6. Roswell Pits, Ely. Long. 773 μ ; lat. 30 μ.

C. LATERALE Nordst. 2. Dernford Fen, 1 mile S. of Shelford. Since the original discovery of this rare species of *Closterium* at Pasto de Olaria, Pirassununga, Brazil, in Jan. 1880, it has not been placed on record for any other locality, and its extraordinary occurrence in Cambridgeshire is deserving of particular mention.

The other species of *Closterium* known to occur in Cambridgeshire are the following :—*Cl. lanceolatum* Kütz., *Cl. lunula* Nitzsch, *Cl. prælongum* forma *brevior* West, *Cl. gracile* Bréb., *Cl. peracerosum* var. *elegans* G. S. West, *Cl. Pritchardianum* Arch , *Cl. lineatum* Ehrenb.,

Cl. rostratum Ehrenb., *Cl. Kützingii* Bréb., *Cl. pronum* Bréb., *Cl. aciculare* var. *subpronum* W. & G. S. West, *Cl. acutum* (Lyngb.) Bréb., *Cl. Ehrenbergii* Menegh., *Cl. Malinvernianum* De Not., *Cl. moniliferum* (Bory) Ehrenb., *Cl. Leibleinii* Kütz., *Cl. Dianæ* Ehrenb., *Cl. parvulum* Näg., *Cl. Venus* Kütz., *Cl. Jenneri* var. *robustum* G. S. West, and *Cl. idiosporum* W. & G. S. West (Wicken Fen).

PLEUROTÆNIUM CORONATUM (Bréb.) Rabenh. var. NODULOSUM (Bréb.) West. 5. Chippenham Fen.

Pl. Trabecula (Ehrenb.) Näg., and forma *granulata*; also various forms of *Pl. Ehrenbergii*.

EUASTRUM INSULARE (Wittr.) Roy. 5. Wicken Fen.

COSMARIUM COSTATUM Nordst. 5. Chippenham Fen. This rare species has up to the present only been recorded for the British Isles from several localities in Scotland, Yorkshire, and North Wales; and its occurrence in the fens of the east of England is most unaccountable, being strictly comparable to those cases of *C. anceps*, *C. Holmiense*, &c., already mentioned.

C. BASILICUM G. S. West. 5. Chippenham Fen: Aug. 1898. This species is not known to occur elsewhere in the British Islands.

C. SUBPROTUMIDUM Nordst. var. GREGORII (Roy & Biss.) W. & G. S. West. 7. The Washes, Sutton, and Sutton West Fen. 8. Twenty-foot River, between March and Guyhirn.

C. SUBCOSTATUM Nordst. 6. Roswell Pits, Ely.

Var. BECKII (Gutw.) W. & G. S. West. 8. Guyhirn, in ponds.

C. ANCEPS Lund. 5. Chippenham Fen, abundant in a ditch: Aug. 1898.

C. POKORNYANUM (Grun.) W. & G. S. West. [= *C. angustatum* (Wittr.) Nordst.] 5. Chippenham Fen.

The occurrence of this species and the preceding one in the fens of the east of England is very remarkable.

C. PROTUBERANS Lund. forma PADULOSA W. & G. S. West. [= *C. protuberans* forma G. S. West, "Alga-fl. Cambs." p. 116, t. 394, f. 12.] 5. Chippenham Fen, in ditches.

The following species of *Cosmarium* also occur in Cambridgeshire:—*C. quadratum* Ralfs, *C. Holmiense* Lund. var. *integrum* Lund., *C. granatum* Bréb. and var. *subgranatum* Nordst., *C. subtumidum* Nordst. var. *Klebsii* (Gutw.) W. & G. S. West, *C. bioculatum* Bréb., *C. abbreviatum* Racib., *C. Regnellii* Wille, *C. impressulum* Elfr., *C. læve* Rabenh. var. *septentrionale* Wille and var. *octangulare* (Wille) W. & G. S. West, *C. Meneghinii* Bréb., *C. angulosum* Bréb., *C. difficile* Lütkem., *C. exiguum* Arch., *C. humile* (Gay) Nordst. and var. *substriatum* (Nordst.) Schimdle, *C. tetraopthalmum* Menegh., *C. margaritatum* (Lund.) Roy & Biss., *C. margaritiferum* (Turp.) Menegh., *C. reniforme* (Ralfs) Arch. and var. *compressum* Nordst., *C. punctulatum* Bréb., *C. formosulum* Hoff, *C. quinarium* Lund., *C. præmorsum* Bréb., *C. Botrytis* (Bory) Menegh. and var. *mediolæve* West, *C. Turpinii* Bréb., *C. biretum* Bréb., *C. ochthodes* Nordst. and var. *subcirculare* Wille, and *C. speciosum* Lund.

STAURASTRUM APICULATUM Bréb. 5. Wicken Fen.

S. PAXILLIFERUM G. S. West. 5. Wicken Fen: Aug. 1898. A rare British species only known to occur elsewhere in N. Yorkshire.

S. AVICULA Bréb. Most of the forms observed were finely granulate, and the spines at the angles were reduced. 6. Roswell Pits, Ely.

S. ORBICULARE (Ehrenb.) Ralfs var. DEPRESSUM Roy & Biss. 2. Dernford Fen, 1 mile S. of Shelford. 5. Wicken Fen.

S. PUNCTULATUM Bréb. 5. Wicken Fen. A form with the lateral angles in the front view slightly produced. 2. Dernford Fen, 1 mile S. of Shelford.

S. HEXACERUM (Ehrenb.) Wittr. [*S. tricorne* Ralfs.] 6. Roswell Pits, Ely.

S. INFLEXUM Bréb. 2. Dernford Fen, 1 mile S. of Shelford. 5. Wicken Fen; Chippenham Fen.

S. CRENULATUM (Näg.) Arch. 2. Dernford Fen, 1 mile S. of Shelford.

HYALOTHECA DISSILIENS (Sm.) Bréb. 5. Wicken Fen; Chippenham Fen.

Order PROTOCOCCOIDEÆ.

GONIUM PECTORALE Müller. 3. In ditch, St John's College "backs," Cambridge; Sheep's Green, Cambridge. 5. Burwell Lode.

PANDORINA MORUM (Müll.) Bory. 3. Sheep's Green, Cambridge; Hardwick. 6. Roswell Pits, Ely. 7. The Washes, Sutton; ditches and pools about March, in immense quantity: Aug. 1898.

CHLAMYDOMONAS PULVISCULUS (Müll.) Ehrenb. 5. Chippenham Fen. 6. In ponds near Ely. 7. Near March; Sutton West Fen.

SPHÆRELLA LACUSTRIS (Girod.) Wittr. [= *Hæmatococcus lacustris* (Girod.) Rostaf.; *Chlamydococcus pluvialis* (Flot.) A. Br.] 5. Wicken Fen. 6. Roswell Pits, Ely.

CŒLASTRUM CUBICUM Näg., *C. sphæricum* Näg., *C. cambricum* Arch. [= *C. pulchrum* Schmidle.]

Pediastrum Boryanum (Turp.) Menegh. and var. *granulatum* (Kütz.) A. Br., *P. constrictum* Hass., *P. duplex* Meyen, *P. Tetras* (Ehrenb.) Ralfs, *P. integrum* Näg.

CRUCIGENIA RECTANGULARIS (Näg.) A. Br. 5. Wicken Fen, very fine, 1896 and 1898. 6. Roswell Pits, Ely.

C. QUADRATA Morren. 5. Chippenham Fen: families of sixteen cells. 7. The Washes, Sutton.

CHÆTOSPHÆRIDIUM GLOBOSUM (Nordst.) Klebahn. [= *Nordstedtia globosa* Borzi.] 3. Hardwick.

Scenedesmus bijugatus (Turp.) Kütz., *S. quadricauda* (Turp.) Bréb. and var. *abundans* Kirchn., *S. alternans* Reinsch, *S. obliquus* (Turp.) Kütz. [and *Dactylococcus infusionum* Näg.], *S. antennatus*, *S. denticulatus* Lagerh. var. *linearis* Hansg., and *S. acutiformis* Schröder.

Ankistrodesmus falcatus (Corda) Ralfs and var. *aciculare* (A. Br.) G. S. West, and *A. convolutus* (Rabenh.) G. S. West.

Tetraëdron minimum (A. Br.) Hansg., *T. trigonum* (Näg.) Hansg., *T. muticum* (A. Br.) Hansg., *T. caudatum* (Corda) Hansg., *T. regulare* Kütz., and

T. TETRAGONUM (Näg.) Hansg. var. INERME Wille. Small forms: diam. 13·5—18·5 μ; thickness 9·5 μ. 5. Chippenham Fen.

CERASTERIAS LONGISPINA (Perty) Reinsch. [*Polyedrium longispinum* Perty.] 3. Ditch, St John's College "backs," Cambridge.

CHARACIUM SUBULATUM A. Br. 3. Wimpole Park.

C. MINUTUM A. Br. 2. Dernford Fen, 1 mile S. of Shelford.

C. AMBIGUUM Herm. 5. Wicken Fen. 6. Near Ely.

C. HETEROMORPHUM Reinsch. [*Hydrianum heteromorphum* Reinsch.] 3. Sheep's Green, Cambridge; Hardwick. 5. Wicken Fen.

C. LONGIPES Rabenh. 3. Sheep's Green, Cambridge.

C. ORNITHOCEPHALUM A. Br. 5. Wicken Fen.

CHLOROCHYTRIUM LEMNÆ Cohn. 6. Near Sutton, on *Lemna trisulca.*

SCHIZOCHLAMYS DELICATULA West. 5. Sheep's Green, Cambridge: June, 1895. 5. Chippenham Fen: Aug. 1898.

APIOCYSTIS BRAUNIANA Näg. 2. Dernford Fen, 1 mile S. of Shelford: Aug. 1898, very fine. 3. Hardwick. 5. Wicken Fen. 6. Roswell Pits, Ely.

TETRASPORA GELATINOSA (Vauch.) Desv. 1. In the ditch by the Botanical Gardens, Trumpington Road, Cambridge: June, 1897.

BOTRYOCOCCUS BRAUNII Kütz. [Inclus. *Ineffigiata neglecta* W. & G. S. West.] 2. Dernford Fen (very abundant in Aug. 1898). 3. Sheep's Green, Cambridge; Wimpole Park. 5. Wicken Fen. 6. Roswell Pits, Ely. 7. Ponds S. of March; The Washes, Sutton, and Sutton West Fen. 8. Twenty-foot River between March and Guyhirn.

NEPHROCYTIUM LUNATUM West. 2. Dernford Fen, 1 mile S. of Shelford. 6. Roswell Pits, Ely: fairly abundant, Aug. 1895, and July, 1898. *Distrib.*—Westmoreland! Yorkshire! Surrey! N. Ireland! Paraguay.

N. NAGELII Grun. 5. Chippenham Fen; Wicken Fen. 6. Roswell Pits, Ely. 7. Ponds S. of March.

N. OBESUM West. 5. Chippenham Fen. *Distrib.*—Cumberland! Brazil. Paraguay.

Two forms of this species were noticed in addition to the type. One had somewhat narrower cells with the cell-membrane slightly thickened at the sides. The other was a large form with a very thick integument.

OOCYSTIS SOLITARIA Wittr. 5. Chippenham Fen; Wicken Fen. 8. Guyhirn, in ponds; Twenty-foot River, between March and Guyhirn.

O. PARVA West & G. S. West. 8. Guyhirn.

GLŒOCYSTIS GIGAS (Kütz.) Lagerh. [*Chlorococcum gigas* (Kütz.) Grun.; *Glœocystis ampla* (Kütz.) Rabenh.] 5. Wicken Fen; Chippenham Fen. 6. Roswell Pits, Ely. 7. Ponds S. of March.

G. VESICULOSA Näg. 2. Dernford Fen, 1 mile S. of Shelford 8. Guyhirn, in ditches.

ASTEROCOCCUS SUPERBUS (Cienk.) Scherffel. [= *Glœocystis infusiona* (Schrank) W. & G. S. West.] 5. In ditches, Burwell Lode; Wicken Fen.

PLEUROCOCCUS VULGARIS Menegh. Abundant in most localities, and very finely developed on some of the hedges.

P. RUFESCENS (Kütz.) Bréb. 1. Very fine on a wet spout, Cambridge: June, 1898.

P. NIMBATUS De Wildem. 2. Dernford Fen, 1 mile S. of Shelford, attached to leaves of *Nuphar luteum*. 5. Wicken Fen, attached to leaves of *Nymphœa alba*.

TROCHISCIA HIRTA (Reinsch) Hansg. 1. Forming dark green masses on damp ground at the bases of trees, Cambridge, along with *Stichococcus bacillaris* Näg.

T. RETICULARIS (Reinsch) Hansg. 5. Chippenham Fen.

PROTODERMA VIRIDE Kütz. 2. Dernford Fen, 1 mile S. of Shelford, on *Cladophora crispata*. 3. Sheep's Green, Cambridge, on *Elodea canadensis*. 5. Burwell Lode, on *Glyceria fluitans*. 7. The Washes, Sutton, on *Glyceria fluitans*.

This alga occurs as an epiphyte on the leaves of many aquatic phanerogams, forming a closely adherent subparenchymatous stratum, which is generally fringed by filamentous outgrowths of unequal extent.

Class **HETEROKONTÆ.**

Order CONFERVALES.

CHARACIOPSIS TURGIDA W. & G. S. West. [= *Characium* sp. G. S. West, "Alga-fl. Cambs." 1899, p. 222, t. 395, f. 7.] A large stout species found on several occasions in the ponds on Sheep's Green, Cambridge.

MISCHOCOCCUS CONFERVICOLA Näg. 3. Sheep's Green, Cambridge: June, 1898.

CHLOROBOTRYS REGULARIS (West) Bohlin. [= *Glœocystis regularis* W. & G. S. West.] 5. Wicken Fen, in peaty pools.

OPHIOCYTIUM COCHLEARE (Eichw.) A. Br. 3. Sheep's Green, Cambridge; Harlton; Hardwick. 5. Burwell; Wicken Fen. 6. Roswell Pits, Ely. 7. Near March.

O. PARVULUM (Perty) A. Br. 3. Wimpole Park. 5. Chippenham Fen. 8. Guyhirn.

O. ARBUSCULA (A. Br.) Rabenh. [*Sciadium Arbuscula* A. Br.] 3. Sheep's Green, Cambridge. 6. Roswell Pits, Ely.

TRIBONEMA BOMBYCINA (Ag.) Derb. & Sol. [= *Conferva bombycina* Ag.] 3. Sheep's Green, Cambridge; Harlton; Wimpole Park. 5. Burwell; Chippenham Fen. 6. Roswell Pits, Ely; Sutton. 8. Guyhirn.

Forma MINOR (Wille.) G. S. West. 3. Harlton. 5. Burwell; Wicken Fen.

T. AFFINIS (Kütz.) G. S. West. 3. Sheep's Green, Cambridge: July, 1898.

BOTRYDIUM GRANULATUM (L.) Grev. 4. Abundant on mud in a drying ditch by the side of the Madingley Road, about 1 mile from Cambridge: Oct. 1898. 5. Between Swaffham Prior and the Beacon

Course, Newmarket Heath, on drying-up chalk mud: July, 1895; *W. West, Jun.*

Class **MYXOPHYCEÆ.**

Order HORMOGONEÆ.

CALOTHRIX FUSCA (Kütz.) Born. & Flah. 3. Sheep's Green, Cambridge; Wimpole Park. In both instances the plants occurred either as solitary filaments or slightly gregarious, attached to *Vaucheria sessilis*. This is the first instance of this alga having been found in Britain, and its occurrence as an epiphyte on *Vaucheria* is rather remarkable, as it is usually found on such algæ as *Batrachospermum*, *Chætophora*, etc., which possess a more gelatinous thallus.

C. EPIPHYTICA West & G. S. West. 8. Guyhirn, on *Vaucheria dichotoma*. A much smaller species than the preceding, and only previously observed from West Africa.

RIVULARIA DURA Roth. 5. Wicken Fen: very abundant in pools and peaty ditches, Aug. 1898. Forming olive- or dark-green hemispherical masses of small size, attached to *Myriophyllum spicatum* and *Chara hispida*.

R. MINUTULA (Kütz.) Born. & Flah. 5. Chippenham Fen. This species was attached to the submerged portions of *Phragmites communis*, forming little pulvinate masses of a bright blue-green colour. Although this interesting species has not been previously recorded for England, it has a wide distribution on the continent, and may probably have been overlooked in this country.

GLŒOTRICHIA PISUM (Ag.) Thur. 8. Twenty-foot River, between March and Guyhirn: very scarce, July, 1898.

Fam. SIROSIPHONIACEÆ.

STIGONEMA OCELLATUM (Dillw.) Thur. 5. Chippenham Fen, among *Utricularia vulgaris*.

Fam. SCYTONEMACEÆ.

TOLYPOTHRIX LANATA (Desv.) Wartm. [*T. coactilis* Kütz.; *T. ægagropila* (Kütz.) Rabenh.] 5. Wicken Fen, on the leaves of *Nymphæa alba*. 7. In large quantity in a pond about two miles S. of March. 8. Twenty-foot River, between March and Guyhirn.

T. TENUIS Kütz. [*T. pygmæa* Kütz.] 5. Chippenham Fen, forming thick, felted, gelatinous masses among *Utricularia vulgaris*.

NOSTOC MICROSCOPICUM Carm. 3. Sheep's Green, Cambridge. 5. Chippenham Fen.

ANABÆNA VARIABILIS Kütz. 3. Sheep's Green, Cambridge.

A. INÆQUALIS (Kütz.) Born. & Flah. 6. Sutton, in ponds. 6. Guyhirn, in ponds.

NODULARIA SPHÆROCARPA Born. & Flah. 6. In ditches near Ely: July, 1898. The filaments possessed an excessively thin hyaline sheath, and the spores were noticed 3—11-seriate. *Distrib.*—France, Belgium, Italy.

CYLINDROSPERMUM STAGNALE (Kütz.) Born. & Flah. 5. Chippenham Fen, in peaty pools; Wicken Fen, in peaty ditches. 7. March, in ponds.

Lyngbya major Menegh., *L. ærugineo-cærulea* (Kütz.) Gom., and *L. ochracea* (Kütz.) Thur.

Phormidium molle (Kg.) Gom., *P. luridum* (Kg.) Gom., *P. valderianum* (Delp.) Gom., *P. laminosum* (Ag.) Gom., *P. tenue* (Menegh.) Gom., *P. angustissimum* W. & G. S. West, *P. inundatum* Kutz., *P. Retzii* (Ag.) Gom., and *P. autumnale* (Ag.) Gom. (inclus. *P. uncinatum*).

Oscillatoria princeps Vauch., *O. limosa* Ag., *O. ornata* Kütz., *O. irrigua* Kütz., *O. simplicissima* Gom., *O. tenuis* Ag., *O. amphibia* Ag., and *O. splendida* Grev.

O. DECOLORATA G. S. West. 5. In ditch parallel to Burwell Lode: Aug. 1898. A curious and apparently saprophytic species of *Oscillatoria*.

O. PROBOSCIDEA Gomont. 5. In a ditch parallel to Burwell Lode. Not previously recorded from Europe.

O. ACUMINATA Gomont. 3. Sheep's Green, Cambridge. This striking species was obtained only once, in July, 1898. It has previously been seen only from Italy.

SPIRULINA MAJOR Kütz. [*S. oscillarioides* Kütz.] Crass. trich. 1·8 μ. 5. Wicken Fen.

Order COCCOGONEÆ.

CHAMÆSIPHON INCRUSTANS Grun. [*Sphærogonium incrustans* (Grun.) Rostaf.] 3. Sheep's Green, Cambridge, on *Vaucheria* sp. and *Œdogonium* sp. 8. Twenty-foot River, between March and Guyhirn, on *Œdogonium crassiusculum* and var. *idioandrosporum*.

GLŒOCHÆTE WITTROCKIANA Lagerh. [*Schrammia barbata* Dangeard 1889.] 2. Dernford Fen, 1 mile S. of Shelford. 3. Sheep's Green, Cambridge.

The cell-contents of this plant are most brilliant blue-green in colour, and very granulose; they are the contents of a typical Chroococcaceous alga. The bristles are excessively thin, 190—260 μ in length, and are attenuated to a very fine apex, near which minute branches or spurs are occasionally developed.

GLŒOTHECE CONFLUENS Näg. 2. Dernford Fen, 1 mile S. of Shelford. 5. Chippenham Fen.

APHANOTHECE MICROSCOPICA Näg. 5. Chippenham Fen.

SYNECHOCOCCUS MAJOR Schröter. [*S. crassus* Arch.] 5. Chippenham Fen; Wicken Fen.

S. ROSEO-PURPUREUS G. S. West. 5. Wicken Fen, in ditches, among *Mougeotia* sp.

This occurred in immense numbers in several ditches at the margins of Wicken Fen; it has characteristically short cells, is rarely much longer than broad, and is of a marked rose-purple colour, the few large granules in each cell being dark and conspicuous.

GLAUCOCYSTIS NOSTOCHINEARUM Itzigsh. 6. Roswell Pits, Ely.

MERISMOPEDIA HYALINA Kütz. 6. Roswell Pits, Ely.

M. VIOLACEA (Bréb.) Kütz. 5. Wicken Fen.

M. GLAUCA (Ehrenb.) Näg. 3. Trumpington; Lord's Bridge; Wimpole Park. 5. Wicken Fen. 7. Ponds S. of March. 8. Twenty-foot River, between March and Guyhirn.

M. PUNCTATA Meyen. 8. Guyhirn, in ponds.

M. ELEGANS A. Braun. 5. Wicken Fen. Diam. cell. 6·5—9·5 μ. This fine species, much the largest of the genus, has only previously been met with from a few localities in Germany. The cells are somewhat angular by compression, and are of a brilliant blue-green colour. The families attain a very large size, and contain more numerous cells than those of any other species of *Merismopedia*; those observed were composed of 544—1856 cells, and reached a diameter of over 220 μ.

TETRAPEDIA GLAUCESCENS (Wittr.) Boldt. 2. Dernford Fen, 1 mile S. of Shelford. 6. Roswell Pits, Ely. Sutton West Fen.

GOMPHOSPHÆRIA APONINA Kütz. 5. Chippenham Fen; Wicken Fen.

MICROCYSTIS ROSEO-PERSICINUS (Kütz.) ——. [= *Clathrocystis roseo-persicinus* (Kütz.) Cohn.]

M. MARGINATA (Menegh.). 3. Sheep's Green, Cambridge.

M. ELABENS Bréb. 5. Wicken Fen. 7. In ditches, March.

PORPHYRIDIUM CRUENTUM (Ag.) Näg. 1. Wall of the Senate House, and by the Leys School, Cambridge. 3. Newnham Mill, Cambridge.

CHROOCOCCUS TURGIDUS (Kütz.) Näg. 5. Wicken Fen; Chippenham Fen.

CHROOCOCCUS MACROCOCCUS Rabenh. [= *Urococcus insignis* (Hass.) Kütz.] 5. Chippenham Fen.

C. PALLIDUS Näg. 5. Chippenham Fen.

C. RUFESCENS (Bréb.) Näg. 5. Chippenham Fen. 7. Ponds S. of March.

C. MINOR (Kütz.) Näg. 5. Wicken Fen. 6. Roswell Pits, Ely.

Class **BACILLARIEÆ.**

Order CENTRICÆ.

Melosira varians Ag.

Cyclotella Kützingiana Chauvin, *C. Meneghiniana* Kütz., and *C. operculata* Kütz.

COSCINODISCUS LACUSTRIS W. Sm. 8. Wisbech [*W. Smith*].

Order PENNATÆ.

Amphora ovalis Kutz. and var. *Pediculus* Kütz.

Cocconema Ehrenbergii (Kütz.), *C. cuspidatum* (Kütz.), *C. affine* (Kütz.), *C. delicatulum* (Kütz.), *C. lœve* (Näg.), *C. gastroides* (Kütz.), *C. lanceolatum* Ehrenb., *C. cymbiforme* (Kütz) Ehrenb. and var. *parva* (W. Sm.), *C. Cistula* Hempr., *C. turgidum* (Greg.), and *C. cæspitosum* (Kütz.).

Mastogloia lanceolata Thw., *M. exigua* Lewis, and *M. Dansei* Thw.

Stauroneis Phœnicenteron (Nitzsch) Ehrenb., *S. anceps* Ehrenb. and var. *amphicephala* (Kütz.) V. H., and *S. Legumen* Ehrenb.

Navicula nobilis (Ehrenb.) Kütz., *N. major* Kütz., *N. viridis* Kütz., *N. borealis* Ehrenb., *N. divergens* (W. Sm.) Ralfs, *N. Brébissonii* Kütz., *N. subcapitata* Greg., *N. appendiculata* Kütz., *N. mesolepta* Ehrenb., *N. oblonga* Kütz., *N. peregrina* (Ehrenb.) Kütz. and var. *Menisculus* Schum., *N. gracilis* Kütz. and var. *neglectum* (Thwaites) G. S. West, *N. viridula* Kütz., *N. radiosa* Kütz. and var. *acuta* (W. Sm.) V. H., *N. cryptocephala* Kütz. and var. *veneta* (Kütz.) V. H., *N. rhynchocephala* Kütz. and var. *amphiceros* V. H., *N. Humilis* Donk., *N. lanceolata* Kütz., *N. Gastrum* (Ehrenb.) Donk., *N. tumida* W. Sm., *N. dicephala* Ehrenb., *N. elliptica* Kütz., *N. Tuscula* Ehrenb., *N. pusilla* W. Sm., *N. cuspidata* Kütz., *N. ambigua* Ehrenb., *N. sphærophora* Kütz., *N. exilis* Kütz., *N. Amphisbæna* Bory, *N. limosa* Kutz. and var. *gibberula* (Kütz.) V. H., *N. Iridis* Ehrenb. and vars. *amphigomphus*, *amphirhyncus*, and *affinis*, *N. Pupula* Kütz., *N. atomoides* Grun., and *N. Gallica* (W. Sm.) V. H.

Vanheurckia rhomboides (Ehrenb.) Bréb. var. *saxonica* (Rabenh.) G. S. West.

Amphipleura pellucida Kütz.

Gyrosigma attenuatum (Kütz.), *G. acuminatum* (Kütz.), *G. Spencerii* (Quekett), *G. Parkerii* (Harrison).

Amphiprora paludosa W. Sm. and *A. ornata* Bailey.

Gomphonema constrictum Ehrenb. and var. *capitatum* (Ehrenb.) V. H., *G. acuminatum* Ehrenb., *G. Augur* Ehrenb., *G. tenellum* Kütz., *G. parvulum* Kütz. and var. *subcapitata* V. H., *G. intricatum* Kütz. and var. *Vibrio* (Ehrenb.) V. H., *G. angustatum* Kütz., *G. gracile* Ehrenb. and var. *dichotomum* (Kg.) V. H. and *G. olivaceum* (Lyngb.) Kütz.

Rhoicosphenia curvata (Kg.) Grun.

Achnanthidium flexellum (Kütz.) Bréb.

Achnanthes Hungarica Grun.; *A. microcephala* (Kg.) Grun., *A. exilis* Kütz., *A. linearis* (W. Sm.) Grun., and *A. lanceolata* (Bréb.) Grun.

Cocconeis Pediculus Ehrenb. and *C. Placentula* Ehrenb.

Epithemia turgida (Ehrenb.) Kütz., *E. Sorex* Kütz., *E. gibba* Kg. and var. *ventricosa* (Kg.) V. H., *E. argus* (Ehr.) Kg. and var. *alpestris* (W. Sm.) Rabenh., and *E. gibberula* Kg.

Eunotia pectinalis (Dillw.) Rabenh., *E. lunaris* (Ehrenb.) Grun. and var. *bilunaris* (Ehr.) Grun., *E. biceps* (W. Sm.), and *E.* sp. Valve slightly arcuate, sides subparallel and minutely undulate, apices rounded, slightly subcapitate; striæ 10 in 10 μ; length 106—111 μ. 5. Wicken Fen, frequent. Figured in the "Alga-fl. Cambs." 1899, t. 396, f. 12, 13.

Synedra pulchella Kütz. and var. *minutissima* (W. Sm.), *S. Vaucheriæ* Kg., *S. Ulna* (Nitzsch) Ehrenb. and vars. *splendens* and *oxyrhynchus*, *S. Acus* (Kg.) Grun. and vars. *delicatissima* and *angustissima*, *S. capitata* Ehrenb., *S. radians* (Kg.) Grun., and *S. famelica* Kg.

Asterionella formosa Hass.

Fragilaria virescens Ralfs, *F. capucina* Desmaz., *F. construens*

(Ehr.) Grun. and var. *Venter* V. H., and *F. mutabilis* (W. Sm.) Grun.

Meridion circulare (Grev.) Ag. and var. *constrictum* (Ralfs) V. H.

Diatoma vulgare Bory, *D. elongatum* Ag., and *D. hiemale* (Lyngb.) Heib.

Denticula tenuis Kg.

Cymatopleura elliptica (Bréb.) W. Sm. and *C. Solea* (Bréb.) W. Sm.

Surirella biseriata Bréb., *S. linearis* W. Sm., *S. robusta* Ehrenb., and *S. ovalis* Bréb. and vars. *angusta*, *pinnata*, *minuta*, and *ovata*.

Campylodiscus hibernicus Ehrenb.

Hantzschia Amphioxys (Ehrenb.) Grun.

Nitzschia Tryblionella (Ehr.) Grun., *N. constricta* (Kg.) Ralfs, *N. acuminata* (W. Sm.) Grun., *N. circumsuta* (Bréb.) Grun., *N. commutata* Grun., *N. Denticula* Grun., *N. sinuata* (W. Sm.) Grun., *N. dissipata* (Kg.) Grun. and var. *media* V. H., *N. parvula* W. Sm., *N. sigmoidea* (Ehr.) W. Sm., *N. vermicularis* (Kg.) Grun., *N. curvula* (Ehrenb.) W. Sm., *N. obtusa* W. Sm. var. *nana* Grun., *N. linearis* (Ag.) W. Sm. and var. *tenuis* (W. Sm.) Grun., *N. subtilis* Grun. and var. *paleacea* Grun., *N. Palea* (Kg.) W. Sm. and var. *debilis* V. H., *N. amphibia* Grun., and *N. acicularis* (Kg.) W. Sm.

FUNGI.

By F. T. Brooks, M.A., Gonville and Caius College.

The Fungus flora of the county as at present known cannot be described as a rich one. This is due partly to the fact that few persons in recent years have systematically collected Fungi in the district. The paucity of woodland in the county has also an unfavourable influence upon the extent of the fungus flora; for, according to recent agricultural returns, Cambridgeshire, excluding London, is the most badly wooded county in England, only about one per cent. of its area being covered by woodland.

With the advance of that branch of Botany known as Ecology it is becoming clear that the distribution of many saprophytic fungi is limited to places where certain special food materials are available. As investigation proceeds it will probably be found that each type of wood and heath has its own characteristic fungus flora. The habitats of many fungi are already known to be sharply defined, e.g. *Amanita muscaria* is found only under Birch trees, *Russula emetica* only under Beech. The following types of wood are met with in the county: (1) the Ash-Oak-Hazel association situated on calcareous glacial clay as at Madingley, (2) the Oak-Birch wood with a "heathy" ground flora such as is found on the Lower Greensand near Gamlingay, (3) the Oak wood with a ground flora of *Pteris aquilina* and *Holcus mollis* also found on the Lower Greensand near Gamlingay, and (4) the Beech wood on Chalk. Of these types the one richest to the mycologist is that of the Oak-Birch wood with a "heathy" ground flora, while the poorest on the other hand is that of the Oak wood whose ground flora is principally Bracken (*Pteris aquilina*).

Of plant diseases caused by parasitic fungi one may mention as occurring in the county the Larch Canker (*Dasyscypha calycina* or *Peziza Willkommii*) and the American Gooseberry Mildew (*Sphaerotheca mors-uvae*) of which some ninety cases were recorded during the summer of 1908. Black Scab of potatoes (*Chrysophlyctis endobiotica*) has not yet been recorded*.

The literature in regard to the mycology of the county is

* One case of this disease has since been found in the county.

extremely sparse. Ray in his *Methodus Plantarum circa Cantabrigiam nascentium* published in 1620 mentions *Amanita, Boletus, Agaricus* and *Lycoperdon*, but of course these "genera" are not synonymous with those of the present day. Martyn in the *Plantæ Cantabrigienses* of 1763 gives a list of 6 genera and 16 species of fungi. Relhan in the *Flora Cantabrigiensis* of 1820 makes a fairly complete survey of the mycology of the district. He records 23 genera and 255 species including the lower fungi and the organisms now known as Myxomycetes.

The following is a list of the higher fungi which have been recently found in the county, the majority having been recorded during 1908. When the district has been searched more thoroughly this list will doubtless be very much extended. The nomenclature of Massee's *British Fungus Flora* has been followed for all groups except the Uredineæ, for which Plowright's monograph has been used.

BASIDIOMYCETES.

Gasteromycetes.

Scleroderma vulgare Fr.
—— bovista Fr.
Lycoperdon pyriforme Schœff.
—— bovista Linn.
Geaster fimbriatus Fr.
Ithyphallus impudicus Fisch.

Hymenomycetes.

Hirneola auricula-judæ Berk.
Exidia glandulosa Fr.
Dacryomyces stillatus Nees.
Calocera viscosa Fr.
Clavaria abietina Schum.
—— crocea Pers.
Thelephora laciniata Pers.
Peniophora quercina Cooke.
Stereum hirsutum Fr.
—— sanguinolentum Fr.
—— rugosum Fr.
—— purpureum Pers.
Solenia anomala Fr.
Hydnum auriscalpium Linn.
Phlebia merismoides Fr.
Merulius lacrymans Fr.
Dædalea quercina Pers.
Poria vaporaria Fr.
Polystictus versicolor Fr.
Fomes ulmarius Fr.
—— igniarius Fr.
Fomes vegetus Fr.
—— annosus Fr.
—— ribis Fr.
Polyporus squamosus Fr.
—— giganteus Fr.
—— sulphureus Fr.
—— hispidus Fr.
—— betulinus Fr.
—— adustus Fr.
Boletus chrysenteron Fr.
—— subtomentosus Linn.
—— æstivalis Fr.
—— badius Linn.
—— granulatus Linn.
—— edulis Bull.
—— rubinus W. G. Smith.
—— rubiginosus Fr.
—— viscidus Linn.
—— scaber Fr.
Coprinus comatus Fr.
—— micaceus Fr.
—— domesticus Fr.
Psathyrella disseminata Pers.
Hypholoma fascicularis Huds.
Stropharia albo-cyanea Desm.
Agaricus campestris Linn.
—— arvensis Schæff.
Paxillus involutus Fr.
Cortinarius armeniacus Fr.

Cortinarius jubarinus Fr.
—— rigidus Fr.
Crepidotus epigæus Pers.
Inocybe obscura Pers.
—— perbrevis Weinm.
Pholiota squarrosa Müll.
Hygrophorus miniatus Fr.
—— conicus Fr.
—— ovinus Bull.
Clitocybe infundibuliformis Schæff.
—— geotropa Bull.
—— inversus Scop.
—— brumalis Fr.
Laccaria laccata Scop.
Lactarius turpis Fr.
—— blennius Fr.
—— quietus Fr.
—— glyciosmus Fr.
—— subdulcis Fr.
Russula cyanoxantha Schæff.
—— rubra Fr.
—— fœtens Fr.
—— emetica Fr.
—— Queletii Fr.
Mycena capillaris Fr.
—— rugosa Fr.
—— galericulata Scop.
Collybia radicata Relh.
—— velutipes Fr.
—— tenucella Pers.
—— muscigena Schum.
Marasmius oreades Fr.
Tricholoma gambosum Fr.
—— personatum Fr.
Amanita muscaria Fr.
—— strobiliformis Vitt.
—— nitida Fr.

Uredineæ.

Uromyces fabæ Pers.
—— geranii DC.
—— betæ Pers.
—— poæ Rabh.
—— alchemillæ Pers.
—— ficariæ Schum.
—— scillarum Grev.
Puccinia asparagi DC.
—— thesii Desv.
—— pulverulenta Grev.
—— violæ Schum.
—— menthæ Pers.
—— primulæ DC.
—— vincæ Del.
—— graminis Pers.
—— glumarum Schmidt.
—— coronata Corda.
—— rubigo-vera DC.
—— poarum Nielsen.
—— caricis Schum.
—— schœleriana Plow.
—— moliniæ Tul.
—— suavolens Mart.
—— taraxaci Plow.
—— polygoni Pers.
—— pruni Pers.
—— tragopogi Pers.
—— smyrnii Corda.
—— adoxæ DC.
—— malvacearum Mont.
Triphragmium ulmariæ Schum.
Phragmidium violaceum Schultz.
—— rubi Pers.
—— subcorticatum Schrank.
—— rubi-idæi Pers.
Gymnosporangium sabinæ Dicks.
Melampsora helioscopiæ Pers.
—— lini Pers.
—— populina Jacq.
Coleosporium senecionis Pers.
—— sonchi Pers.
—— euphrasiæ Schum.
—— campanulæ Pers.
Cronartium ribicolum Dietr.
Uredo symphyti DC.
Cæoma euonymi Gmelin.
—— mercurialis Pers.
Aecidium grossulariæ Gmelin.
—— bunii DC.
—— punctatum Pers.

Ustilagineæ.

Ustilago longissima Sow.
—— hypodytes Schlecht.
—— segetum Bull.
—— olivacea DC.
—— violacea Pers.
Tilletia tritici Bjerk.
Urocystis anemones Pers.
—— violæ Sow.
Doassansia sagittariæ Fckl.

Ascomycetes.

Ascomyces pruni B. & Br.
—— deformans Berk.
—— aureus Magnus.
—— turgidus Phil.
Gymnoascus Reesii Baran.
Rhytisma acerinum Fr.
Bulgaria polymorpha Wettstein.
Ascobolus furfuraceus Pers.
Helotium virgultorum Karst.
Sclerotinia Fuckeliana.
—— fructigena Rehm.
Lachnea scutellata Gillet.
Dasyscypha calycina Fckl.
—— Stevensoni Sacc.
Geopyxis coccinea Mass.
Humaria granulata Sacc.
Peziza vesiculosa Bull.
—— venosa Pers.
Otidea leporina Fuckel.
—— aurantia Mass.
Helvella crispa Fr.
Mitrophora semilibera Lév.
Morchella esculenta Pers.
Geoglossum glabrum Pers.
Erysiphe graminis DC.
Erysiphe Martii Lev.
—— communis Wallr.
—— lamprocarpa Wallr.
—— Umbelliferarum Lév.
Phyllactinia suffulta Reb.
Sphærotheca pannosa Wallr.
—— mors-uvae Schwein.
Podosphæra Oxyacanthæ DC.
Microsphæra Grossulariæ Lév.
Nectria cinnabarina Fr.
—— ditissima Fr.
Hypomyces rosellus Tul.
Polystigma rubrum Pers.
Epichloe typhina Pers.
Claviceps purpurea Tul.
Phyllachora Graminis Pers.
Chætomium globosum Kze.
Pleospora herbarum Pers.
Gnomonia erythrostoma Pers.
Hypoxylon fuscum Fr.
Daldinia concentrica Bolt.
Xylaria polymorpha Grev.
—— hypoxylon Grev.
Eutypella Prunastri Pers.

LICHENES.

By the Rev. P. G. M. Rhodes, M.A., Pembroke College.

A good deal of work has been done at the lichens of Cambridgeshire, although the only systematic lists available are those in the various editions of Relhan's *Flora Cantabrigiensis*, especially that of the fourth and most complete edition, date 1820. He appears to have worked the county carefully, and though the advance of science has rendered many of his records doubtful, yet the synonymy of others is clear; and they form an important part of the list below. The writer is greatly indebted to Mr A. R. Horwood, of the Corporation Museum, Leicester, for working out the synonymy of Relhan.

There are a considerable number of records from Cambridgeshire quoted in Leighton's *British Lichen Flora* (3rd ed., 1879), chiefly however on the authority of "Relhan." It is not clear whether Leighton had examined specimens of Relhan's collecting in these cases, or whether he was merely quoting Relhan's work: if the latter, he appears to have quoted him in a somewhat haphazard manner. There are also a few important new records in Leighton.

From about this time onwards the county lichen-flora was worked by Mr Larbalestier, of St John's College, who included many Cambridgeshire species in the *exsiccata* he produced. Many new and rare species are thus recorded for the county, though the commoner species are but scantily represented. The *exsiccata* quoted are Larbalestier's *Lichen Herbarium* and *Lichenes rariores circa Cantabrigiam lecti*, ed. Larbalestier. Of this latter only one fascicle (the first) is available at Cambridge, and may be seen in the Town Library.

A number of important records are obtained from Crombie's *Monograph of British Lichens* (1894), in which a list is given of all the specimens in the British Museum. The collectors and dates of the specimens are not given; but they appear to have come chiefly from Larbalestier.

As records for the commoner species were only to be found in Relhan, the writer during 1908—9 collected a number of specimens with a view to establishing the present occurrence of these lichens

in the county. The Rev. H. P. Reader has most kindly identified these specimens, with the result that many of Relhan's records have been confirmed, and some new species added. It is plain that there is still plenty of room for work at these plants, and it is probable that many available records have been overlooked.

The old chalk turf produces an interesting growth of Cladoniei and Collemacei, and the trees of the county produce most of the common, and a few rare, species. Saxicolous lichens are poorly represented in the following list, as owing to the total absence of hard rocks they are necessarily confined to such habitats as church-walls and gravestones, whence they cannot easily be detached for examination. Probably a few of Relhan's species are extinct; e.g. *Lecanora lentigera.*

Abbreviations used below are:

Rel. = Relham's Flora Cantabrigiensis, various edd.
Le. = Leighton's British Lichen-Flora.
Cr. = Crombie's British Lichens (vol. I.).
LLH. = Larbalestier, Lichen Herbarium.
LRC. = Larbalestier, Lichenes Rariores circa Cantabrigiam lecti.
Rs. = P. G. M. Rhodes.

Records apparently of more than 50 years' standing are italicised. Records of Relhan's given by Leighton are simply quoted as *Rel.* Records in Crombie, whatever their apparent origin, are considered as modern: when obviously from Larbalestier, they are given under the latter's name only.

Collema pulposum Ach.	*Rel.*
C. nigrescens Ach.	*Rel.*
C. fasciculare Ach.	*Rel.*
Collema cristatum Hoffm.	3 Rs.
Collemodium microphyllum Nyl.	LLH.
C. Schraderi Nyl.	3 Fleam Dyke Rs.
Leptogium lacerum Gray	Cr.
Calicium *curtiusculum Nyl.	Oakington LLH.
C. trachelium Ach.	*Rel.*
Coniocybe furfuracea Ach.	5 *Rel.*
Trachylia tympanella Fr.	*Rel.*
Bæomyces rufus DC.	*Rel.*
B. roseus Per.	4 *Rel.*
Cladonia alcicornis Flörke	3 *Gogs Rel.*
C. pyxidata Fr.	*Rel.*, 3, 4, 6 Rs.
v. chlorophæa Flörk. f. lepidophora Flörke	3 Devil's Dyke Rs.
C. fimbriata Fr.	*Rel.*, 3 Cr., 4, 6 Rs.
C. furcata Hoffm.	3 *Rel.*
v. spinosa Hook.	3 *Gogs Rel.*, Cr.; Fleam Dyke, etc. Rs.

C. pungens Flörke	3, 6 Rs.
f. foliosa Flörke	3 Hildersham Rs.
C. coccifera Schaer.	*Rel.*
Cladina uncialis Nyl.	3 *Gogs Rel.*
Ramalina farinacea Ach.	*Rel.*, Cr., 1, 5, 6 Rs.
R. fraxinea Ach.	*Rel.*, 5 LRC., 6 Rs.
R. fastigiata Ach.	*Rel.*, 5 Cr., LRC., 3, 5, 6 Rs.
R. pollinaria Ach.?	1 Rs.
Usnea florida Ach.	*Rel.*
U. ceratina Ach. (= "plicata")	*Rel.*
Alectoria jubata Nyl.	*Rel.*, 4 Cr.
Cetraria aculeata Fr.	3 *Rel.*
Evernia prunastri Ach.	*Rel.*, Cr., 3, 5 Rs.; common.
Parmelia perlata Ach.	*Rel.*
P. saxatilis Ach.	*Rel.*, 3 Rs.?
P. sulcata Tayl.	2, 3, 4 Rs.
P. Borreri Tayl.	1, 3 Rs.
P. caperata Ach.	*Rel.*, 4? Cr., 5 Rs.
P. acetabulum Dub.	2 Rs.
P. exasperata Nyl.	1, 2, 3, 5 Rs.
P. subaurifera Nyl.	Wimpole Park LLH.
P. fuliginosa Nyl.	3?, 5 Rs.
P. physodes Ach. (f. labrosa)	*Rel.*, Cr., 4 Rs.
Stictina limbata Nyl.	G. Bentham, ap. Le.
Lobaria pulmonaria Hoffm.	4 *Rel.*
Solorina saccata Ach.	*Rel.*, ap. Le.
Peltigera canina Hoffm.?	*Rel.*, Cr., 6 Rs.
P. spuria Leight.	3 Cr.
P. polydactyla Hoffm.	*Rel.*, 3 Cr.
Physcia parietina De Not.	*Rel.*, LLH., LRC., 1, 2, 3, 6 Rs.
f. cinerascens Leight.	2, 3, 6 Rs.; frequent.
P. polycarpa Nyl.	3 LRC., LLH., Rs.
P. lychnea Nyl.	1 Trumpington Rs.
P. ciliaris DC.	*Rel.*, LLH.
P. pulverulenta Nyl.	*Rel.*, LRC., 1, 2 Rs., 5 Cr.
v. subvenusta Nyl.	Cr.
P. *pityrea Nyl.	*Rel.*, LLH., 2 Rs.
P. *tenella Nyl.	*Rel.*, 1, 3 Rs.
P. aipolia Nyl. v. cercidia Nyl.	LLH., LRC., 3 Rs.
P. cæsia Nyl.	1 Coe Fen Rs.
P. obscura Nyl.	In Cambridge LLH. [Near Newmarket LRC.]
P. ulothrix Nyl. **y.** virella Cr.	1 Rs., 3 LRC., Cr.

In Coe Fen (1) associated with *P. parietina*, and gives the purplish reaction with K.

P. adglutinata Nyl.	3 Rs., 4 LLH.
Lecanora hypnorum Ach.	3 *Rel.*
L. lentigera Ach.	3 *Gogs Rel.*, Cr.

L. saxicola Ach.	1 *Rel.*
L. murorum Ach.	1 Rs.
v. corticola Nyl.	Gt Wilbraham LLH.
L. *decipiens Nyl.	1 LLH.
L. callopisma Ach.	3 Quy Church LLH.
L. teicholyta Ach.	1 LLH., Cr.; frequent, Le.
L. laciniosa Nyl.	3 LLH., 6 ? LRC.
L. vitellina Ach.	*Rel.*, 2, 3 Rs.
L. medians Nyl.	1 LLH.
L. citrina Ach. f. corticola	Wimpole Park LLH.
L. aurantiaca Nyl.	*Rel.*
L. *hæmatites Nyl.	3 Cherry Hinton LRC. (and Le.). Bottisham LRC.
L. cerinella Nyl.	Near Cambridge Cr.
L. pyracea Nyl.	LLH.
L. luteoalba Nyl.	LLH., LRC.
L. phlogina Nyl.	LLH., LRC.
L. *calva Nyl.	3, 4 *Rel.*
L. colobina Ach.	Cr.
L. circinata Ach.	*Clare Bridge* etc. *Rel.*, Cr.
L. galactina Ach.	1 LRC., 1, 2 Rs.
L. subfusca Nyl.	*Rel.* ?, LLH., 1, 3 Rs.
v. campestris Nyl.	1 Rs.
L. allophana Nyl.	2, 3, 5 Rs.
L. Parisiensis Nyl.	3 LLH., LRC.
L. rugosa Nyl.	3 Rs.
L. *chlarona Nyl.	LLH., LRC., 1, 3 Rs.
L. albella Ach.	LLR., 2 Rs.
L. angulosa Ach.	3 Rs.
L. crenulata Nyl.	1, 3 *Rel.*
L. Hageni Ach.	LLH., LRC.
L. sulphurea Ach.	*Rel.*, LLH.; 1 *Rel.*
L. varia Ach.	1, 3 Rs., 4 LLH.
L. symmictera Nyl.	4 LLH. (named L. symmicta).
var. aitema Nyl.	4 LLH.
L. atra Ach.	*Rel.*, LLH., Cr., 3 Rs. (corticolous).
L. calcarea Somn. var. Hoffmanni Som. ?	Gogs *Rel.* (Lichen Hoffmanni).
L. parella Ach. v. Turneri Nyl.	5 *Rel.*
Pertusaria globulifera Nyl.	Cr.
P. amara Nyl.	*Rel.*, 3, 5 Rs.
P. communis DC.	*Rel.*, 5 Rs.
Urceolaria scruposa Ach.	*Sir J. E. Smith* ap. Le., LLH.; 3 *Rel.*, Cr.
U. *bryophila Nyl.	6 Rs.
Lecidea decipiens Ehrb.	3 *Rel.*
L. ostreata Hoffm.	*Rel.*
L. flexuosa Fries, var. æruginosa Boor.	1 or 3 LLH.

L. quernea Dicks.	5 *Rel.*
L. sanguinaria L.	*Rel.*
L. parasema Ach.	*Rel.*, 3 Rs.
L. coarctata Sm.	*Rel.*
L. fuscoatra Ach.	*Rel.*
L. canescens Dicks.	*Rel.*, 1, 2, 3, 4, 6 Rs., 5 LLH.
L. myriocarpa DC.	1, 2, 3, 6 Rs.
f. chloropolia Fr.	1 LLH., 1 LRC.
f. saprophila Ach.	3 ?, 4 LLH.
L. vesicularis (= cœruleonigricans) Lightf.	3 *Rel.*, Le. etc.; Rs.
L. Ehrhartiana Sch.	*Rel.*
[L. diluta Pers.	Near Newmarket. Qy in county?]
L. incompta Bor.	LLH.
L. alboatra Hoffm. var. epipolia Ach.	1 *Rel.*, 3 *Rel.*, LLH.
L. sabuletorum Flk.	LRC.
[f. minor Larbal.	Near Newmarket LLH.]
L. premnea Ach. corticola	Cheveley Park LLH.
L. rubella Ehrh.	Near Cambridge LLH.
L. muscorum Sw.	LRC.; 3 *Rel.*, 6 Rs.
L. truncigena Ach.	LLH.
Opegrapha atra Pers.	3 Rs.
O. Turneri Leight.	LLH.
O. vulgata Ach.	*Rel.*, LLH.
O. herpetica	Teversham Rs.
Anthonia Swartziana Ach.	3 Rs.
A. astroidea Ach.	LLH.
A. pruinosa Ach.	*Rel.*
Graphis scripta Ach.	*Rel.*
Endocarpon hepaticum Ach.	3 Rs., *Salwey.*
Verrucaria rupestris Schrad.	3 Rs.
V. nigrescens Pers.	6 Rs.
V. calciseda DC.	3 Rs.
V. gemmata Ach.	LLH.
V. nitida Weig.	*Rel.*
V. hymenogonia Nyl.	Newmarket Heath LLH.
V. Mortarii Arn.	3 Quy Churchyard, Larb. ap. Le.
Strigula Babingtonii Berk.	Cambridge, Bab. ap. Le.

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