

C. Kewensis Mass., in Journ. Bot. 34, 1896, p. 470. = *C. stricta*.

C. Krombholzii Fr., Epicr. p. 572. The figures of Krombholz on which this species was founded may have been forms of either *C. Kunzei* or *C. rugosa*, possibly both. No species distinct from either that would answer to *C. Krombholzii* has been seen by the authors.

C. pyxidata Pers., Comment. p. 47, tab. 1, fig. 1. Possibly an abnormal form of *C. stricta*, since it occurred on wood.

C. rufa Pers., Comment. p. 71. = *C. inaequalis*. (See these Trans. iii. p. 33.)

C. rufescens Schaeff., Icon. Fung. tab. 288. = *C. botrytis*.

C. spinulosa Pers., Obs. Myc. 2, p. 59, tab. 8, fig. 1. Indeterminable.

C. striata Pers.; Persoon's figure suggests a discoloured *C. vermicularis*.

C. tuberosa Sow., Col. Fig. tab. 199. The figure suggests an abnormal form of *C. fistulosa*, but was referred by Fries and Quélet to the genus *Calocera*. Probably not determinable.

C. uncialis Grev. = *Pistillaria*.

THE OCCURRENCE OF OAK MILDEW ON BEECH IN BRITAIN.

By A. D. Cotton, F.L.S.

The fungus which now so generally occurs on coppiced oak in this country was first noticed in Europe in 1907 and was probably introduced from America. Its spread in Europe was remarkably rapid and by 1909 it was known from almost every European country and had moreover spread through Turkey into Asia Minor.

The fungus for a time remained unnamed since, owing to the absence of perithecia, it was impossible to determine its generic position. In 1910 Griffon and Maublanc named the conidial stage *Oidium alphitoides*, and the following year Arnaud and Foëx recorded the occurrence of occasional perithecia production from which it was apparent that the fungus was a *Microsphaera*, and was regarded by them as a form of *M. Alni*. This view has in the main received acceptance and is endorsed

by Mr. E. S. Salmon, the author of the monograph of the Erysiphaceae. Some difference of opinion, however, exists as to whether the fungus should be regarded as species, variety, or biologic form, and a number of papers bearing on this subject, especially in French journals, have been published. Griffon and Maublanc regard it as a distinct species and have published the name *Microsphaera alphitoides*.

The method of over-wintering of the Oak Mildew fungus is the same as that which occurs in the fungi causing Apple Mildew and Hawthorn Mildew, namely by the hibernation of mycelium. The latter penetrates the buds in autumn, remains dormant during winter, and develops again in spring with the unfolding of the leaves. It would seem that only a very few buds are infected in this way but it is obvious that a sufficient number occur to provide a copious supply of conidiospores and general infection each season. The production of perithecia is therefore not required.

A considerable amount of work on the biology of the fungus has been carried out on the Continent and one of the fullest accounts of such work is that by Neger (Naturwiss. Zeitschrift. für Land- und Forstwirtschaft. xiii). With regard to its occurrence on Beech, several workers have recorded this phenomenon, e.g. Griffon and Maublanc 1908, Ferraris 1909, Forneti 1910, Müller 1911, Hauck and Kölpin Ravn 1913, and Neger 1915, but apparently the last-named alone clinched the matter by means of artificial cultures. The occurrence of the mildew on Beech is therefore not new but a record of its occasional appearance in this country is none the less of interest.

The mildew was observed on this host by the writer near Sevenoaks, Kent, on several occasions in July 1918. It occurred on shoots springing from the stumps of old trees which had been cut down and in some instances it was quite clear that the Beech was being infected directly from spores produced on the Oak. In one case some half-dozen stumps in the immediate neighbourhood of badly mildewed oak shoots possessed young shoots most of which were more or less mildewed, whilst the shoots of other stumps not in close proximity to mildewed oak were clean. Closer inspection showed that young beech shoots growing immediately under infected oak were developing a slight growth of mildew, whereas the other shoots of the same age not beneath the oak shoots were free from attack. The affected shoots were so close to the oak that a copious supply of spores must have fallen upon them, and the young leaves must have received a constant new supply of spores during the whole period of their development. When infected directly from

the oak it would appear that only very young leaves are susceptible, but it is possible that conidia produced by the beech might give a higher percentage of successful infections. It should perhaps be added that these observations were confirmed by microscopic examination, and that at the time Neger's experiments were unknown to the writer.

One of the most interesting features connected with the above phenomenon is its comparative infrequency. The occurrence of Oak Mildew on Beech was recorded ten years ago by Griffon and Maublanc, yet the Beech remains as generally immune from attack to-day as it did then. On the Oak the mildew is found specially on closely cut hedges, coppiced plants, and on the young summer growth on the lower parts of trees. Although the Beech is not coppiced and makes little secondary growth, closely trimmed Beech hedges are general throughout the country but in no case have these been observed attacked by the mildew.

ENTOMOGENOUS FUNGI NEW TO BRITAIN.

By A. D. Cotton, F.L.S.

Very few observations have been made in this country on entomogenous fungi and the occurrence of any species not hitherto recorded is worthy of a special note. Of the following species the three on Aphides were discovered by Miss D. J. Jackson in the course of research carried on by her on the distribution of these insects in Scotland. They were forwarded to the Pathological Laboratory at Kew for determination and I am indebted to her for permission to publish the records. The fourth species *Empusa sphaerosperma* was collected by Mr. W. Watson and determined by Miss E. M. Wakefield. The three species of Empusae appear to be new records for Britain, but it is probable that they are not uncommon.

Since the descriptions of these three fungi are not readily accessible to all workers, the diagnoses as given in Thaxter's excellent monograph "The Entomophthorae of the United States" are added to each.