

SCIENCE IN AGRICULTURE.<sup>1</sup>

IT might truly be said that only within the last two decades has the importance of the scientific investigation of the infinite number of problems arising from agricultural practice received, in some measure, general recognition. During this period it has become more and more evident to those engaged in the production of plant and animal commodities that it is sometimes merely foolish, and at others almost dangerous, from an economic point of view not to accept the help freely proffered by agricultural educational authorities. The aid given by these bodies may be



The white woolly currant scale. From "The Journal of the South-Eastern Agricultural College."

embodied in one or several schemes, such as the institution of demonstration experiments to illustrate certain manurial and cultural measures, the value of which is indisputable, facilities for consultation with experts in cases of special fungoid and insect pests, educational measures by means of in-college lectures and peripatetic work, and, lastly, the creation of a close connection between the farmer and the research worker.

The report before us provides an inspiring example

<sup>1</sup> The Journal of the South-Eastern Agricultural College, Wye, Kent. No. 28. Pp. 476. (London and Ashford: Headley Bros., 1912.) Price 7s. 6d.; Residents in Kent and Surrey, 3s. 6d.

of such agricultural activity and indicates to the general reader how much may be accomplished by efficient organisation and sound work; to the agriculturist of the south-eastern counties it would constitute what might almost be regarded as a book of reference on many matters agricultural.

The work is compiled in the form of reports from the departments of agriculture and dairying, horticulture, economic zoology, chemistry, botany, mycology, veterinary science, and concludes with general notes. Although much of the subject-matter must pass unnoticed here owing to lack of space, reference may

be made to experiments on pig-feeding and the winter feeding of dairy cows, the effect of ferrous sulphate on the quality and quantity of potatoes, the valuation of basic slag, and weeds in seed samples, the latter article being illustrated by many admirable plates. Some valuable experiments have been made on celery blight (*Septoria petroseline*, var. *Apii*) and its prevention, the results obtained showing that a vast improvement may be induced both in size and value of produce by means of spraying with Bordeaux mixture.

In his report, the economic mycologist directs attention to the disquieting fact that the compulsory measures of the "American Gooseberry Mildew Orders," as at present carried out, do not in any way check the spread of the disease to fresh plantations. At the beginning of the season there were in Kent alone about 3300 acres of mildewed plantations, and it is evident that the measures with respect to the autumn pruning of diseased bushes will have to be uniformly enforced in order to keep down further spread and to prevent the measures taken by conscientious growers being largely nullified by laxity in others.

The report on economic zoology maintains its usual high standard and outlines the various insect pests which have come under observation during the year. Of these, a bad attack by the white woolly currant scale (*Pulvinaria vitis* v. *ribesiae*) is reported, a portion of an affected plant being shown in the accompanying illustration.

A vaccine has been prepared by the veterinary department, and is being used in the "struck sheep" experiments, and we look forward with interest to the publication of the results of this work.

## THE CHANK BANGLE INDUSTRY IN INDIA.

FROM a commercial as well as an artistic point of view the chank or conch shell industry is so important that in 1910 the Government of Madras deputed Mr. J. Hornell, superintendent of the Pearl and Chank Fisheries' Department, to visit northern India and report upon the subject. The result of his inquiries is described in an interesting monograph published in vol. iii., No. 7, of the Memoirs of the Asiatic Society of Bengal.

He begins by discussing the literary evidence of the position of the industry in early times, and reviews the evidence from the large collection of prehistoric remains collected by Mr. Bruce Foote, now deposited in the Madras Museum. Mr. Foote was inclined to assign many of these chank or conch shell ornaments to the Neolithic period. But this identification is, in many cases, not supported by the investigations of Mr. Hornell, who points out that many of the speci-

mens bear marks of the use of iron saws or other metal implements.

The shells of the sacred Indian chank or conch (*Turbinella pyrum*, Linn.) are principally found in the Gulf of Manaar, whence, to the number of about two millions, they are annually exported to Calcutta. At present the industry of bangle-cutting is confined almost entirely to Bengal, but Mr. Hornell shows that in former times it was widely spread over the greater part of India, relics of bangle-workshops being discovered from Tinnevely in the extreme south to Kathiawar, and Gujarat in the north-west, through a long chain of factories located in the Deccan. The causes of this transfer of the manufacture are somewhat obscure, but Mr. Hornell largely attributes it to the upheaval resulting from the Mahomedan conquest of southern India.

Mr. Hornell describes the condition of the industry as flourishing. While there is an increasing demand for gold ornaments, the Swadeshi movement in favour of Indian-made goods has greatly stimulated the trade. He gives full details, with photographs, of the methods employed in the manufacture, and his discussion of the religious and social influences which encourage the use of this form of ornament not only in Bengal, but as far north as Tibet, from Ladakh in the west to the Kham country on the east, make this excellent account of a curious industry more than ordinarily instructive.

#### BOTANY AT THE BRITISH ASSOCIATION.

THE Birmingham meeting of the British Association was, from the point of view of the Botanical Section, as from others, highly successful. There was a very large attendance of botanists, particularly of the younger ones. The meeting of the section this year was noteworthy in being presided over by Miss Ethel Sargent, the first woman president of any section of the association. It is scarcely necessary to state that the section suffered in no way as a result of the innovation. The president's address having been previously reported in full in these columns, it is unnecessary here to attempt to summarise it. It dealt with the progress of vegetable embryology in recent years, the subject being treated from the morphological side. The great difficulty in all such work, as the president herself pointed out, is to distinguish between adaptive characters of comparatively recent origin and the characters inherited from remote ancestors. However, the study has already thrown much light on embryological problems, and is likely to throw more as time goes on.

#### Fossil Botany.

Dr. D. H. Scott contributed an important paper on some fossil plants from Devonian strata. The specimens described were collected by Prof. C. R. Eastman near Junction City, Boyle County, Kentucky, from the nodule-bearing layer at the base of the Waverley shale, in the lower part of Upper Devonian strata. They are thus (at present), among the oldest known land-plants showing internal structure. The communication was made in the joint names of Prof. E. C. Jeffrey, of Harvard, and Dr. Scott. The following fossil-plants were described:—(1) *Calamopitys americana* (sp. nov.), Jeffrey and Scott. This has mixed pith, containing tracheides, and paired leaf-trace bundles in the wood. (2) *Kalymma* petioles. This no doubt belongs to a species of *Calamopitys*. (3) *Calamopteris Hippocrepis* (sp. nov.), Jeffrey and Scott. This is a petiole of the *Kalymma* group, but with the bundles arranged in a horse-shoe form, and

largely fused. These three fossils are members of the group Pteridospermeæ. (4) *Archaeopitys Eastmanii* (gen. et sp. nov.), Jeffrey and Scott. This is a stem with dense secondary wood and numerous small mesarch strands of xylem scattered in the pith. It is probably a member of the group Cordaitales. (5) *Periastron perforatum* (sp. nov.), Jeffrey and Scott. This is a curious petiole with a median row of separate vascular bundles and large lacunæ in the ground tissue. It is allied to *P. reticulatum*, Unger; but it is not known whether it is a pteridosperm or a fern. (6) *Stereopteris annularis* (gen. et sp. nov.), Jeffrey and Scott. This is probably a fern, with a petiole possessing a single large vascular bundle, with solid wood, external protoxylem, and cortex differentiated into several distinct zones. (7) *Lepidostrobus devonicus* (sp. nov.), Jeffrey and Scott. This has an axis of an ordinary *Lepidostrobus* type. The sporangia have the usual columnar wall, and the spores are in tetrads. It is the oldest known fructification with structure of any plant. The most remarkable matter concerning these very ancient land-plants is their high structural organisation.

Mr. H. H. Thomas followed with an account of a new type of Ginkgoalian leaf, found in the Jurassic plant-bed at Cayton Bay, near Scarborough. The leaves are beautifully preserved, linear or oblanceolate in outline, with rounded or slightly bifurcated apices, short petioles, and dichotomising venation. The form of the stomata and subsidiary cells is very like that of other Ginkgoalian leaves, while they possess the secretory tracts between the veins as seen in the modern form. The epidermal cells possess very characteristic papillæ. The leaves form the type of a new genus, *Eretmophyllum*, with two species, the second one occurring at Whitby. The specimens provide a further illustration of the importance of the Ginkgoales in the Mesozoic vegetation.

Dr. Ethel de Fraine described a new species of *Medullosa* from the Lower Coal Measures.

#### Anatomy.

Dr. M. J. le Goc gave an account of the transition of centrifugal xylem to centripetal xylem at the base of the petiole of Cycads. The centrifugal system at the base is in great part a secondary growth, and the centripetal system a primary structure; both are consequently independent morphologically. The two kinds of xylem overlap at their ends, and are connected for a physiological function. Their reduced extremities point to a time when possibly they ran parallel throughout their entire length.

Mr. R. C. Davie spoke on the pinna-trace in the Filicales. The "marginal" type of vascular supply in the Filicales occurs generally in leaf-traces which have no hooks at their ends; the "extramarginal" type appears regularly in connection with leaf-traces possessing incurved hooks. Variations from these types were described.

#### Histology.

Miss M. Hume gave the results of her researches on the histology of the leptoids in the moss *Polytrichum*. These leptoids do not deserve the name of sieve-tubes. Their contents differ from those of the other lining cells in never including starch-grains or large drops of oil; but each leptoid has a nucleus. They are rich in connecting protoplasmic threads. The conducting function of the leptoids seems to be confined to albuminous materials, and not to be concerned with carbohydrates.

#### Physiology.

Last year, at Dundee, Prof. W. B. Bottomley directed attention to the effect of soluble humates on plant growth. This year he further maintained that