

familiar to all. But the war has profoundly affected both the circumstances and the minds of men, and has gravely accentuated the complexities of the situation and the peril in which our industries stand. It is strongly urged, since industry as a whole is inextricably interwoven with the social and political life of the nation, that we cannot too soon bring to bear upon the various intricate questions involved the best intelligence and experience at our command with the object of formulating a policy based upon a comprehensive survey of all aspects of industrial conditions.

A further article appears in the *Review* dealing with British trade and manufactures and the necessity for better organisation and more efficient methods of production if we are to succeed in maintaining not only our position in the markets of the world, but also our ability to meet the vast expenditure which the war has entailed. We have failed, says the writer, as compared with America and Germany, in our methods of production, transport, and marketing, in the neglect of co-operative effort, in fertility of design and invention and in adaptability to the needs of the foreign consumer, in our provision for commercial education, and, finally, in the support of the Government in aid of trade. Before the war German goods were extensively sold in this country, and the foreign trade of Germany, whilst not so large as our own, was extending much more rapidly. It is stated that there is not the slightest doubt that we have fallen behind Germany in efficiency of manufacture of certain products in respect of both design and price, and that in order to achieve success we must produce better and cheaper goods. So far as our home trade is concerned we may exclude German goods by high tariffs, but that will not help us in foreign markets, nor is it the true remedy, which can be found only in better provision for education and a higher standard of efficiency. A strong plea is put forward for the establishment of a Ministry of Commerce, the duty of which it shall be to foster and assist British trade both at home and abroad.

BOTANY AT THE BRITISH ASSOCIATION.

THE president in his address struck the economic note, which was sustained throughout the meeting, probably the most notable contributions being the discussions on plant disease; on the utilisation of waste lands; on the botanical aspects of coal; and on the medicinal plant industry.

The discussion on plant disease was opened by Prof. Potter, of Newcastle, who laid stress on the enormous importance of the subject in relation to the world's food supply and to many other commercial products. He stated that, on an average, about one-third of these crops are lost by disease, and that a loss of two and a half millions sterling occurred in Australia one year through "rust" of wheat alone. The destruction of timber, as of many Colonial products, such as sugar, rubber, coffee, etc., is very serious. He showed how manifold are the problems underlying the treatment of plant disease, and dwelt upon the importance of various aspects demanding investigation, not alone in mycology, but in the associated physiological and pathological relations of host and parasite, and host and soil. Prof. Potter suggested two desiderata: (1) the improvement of the training of the investigator; (2) the establishment of a British Central Institute for the supply of pure cultures, which, with aniline dyes and optical glass, ceased at the outbreak of war.

Mr. Brierley, in a separate contribution, elaborated a suggestion for the formation of an Imperial Bureau of Mycology comparable with that recently established

in entomology, but providing, in addition, facilities for research and supply of pure cultures.

Mr. Ramsbottom alluded to the backward condition of British phytopathology, and spoke strongly of the lack of adequate training and subsequent support given to our investigators. He advocated a central station for research and advice.

Mr. Salmon and Dr. Eyre struck a hopeful note with regard to the readiness of farmers to make use of scientific results, which it therefore behoves us to produce. They referred to the necessity for co-operation between botanist, mycologist, and chemist for the elucidation of the very complex problem of plant disease and its treatment.

The discussion of the botanical aspects of coal was opened by Dr. Marie Stopes, who urged the importance of co-operation between palæobotanist, chemist, and ecologist for the discovery and right application of our coal resources. While Prof. Seward, who spoke later, was a little doubtful as to the great utilitarian value of botanical examination, the opener suggested that researches already indicated the possibility of association between the parts of plants making up the bulk of the coal and the particular by-product which it yielded. She pointed out the danger of confining investigation to Carboniferous fossils in view of the fact that the coal of India, for example, is for the most part Tertiary.

Prof. Weiss spoke of the correlation which had been demonstrated between the presence of spores and the chemical nature of the seams.

An interesting series of papers on utilisation of waste land was introduced by Prof. Oliver, who also gave a paper on the possibilities inherent in maritime waste land. He illustrated his remarks by special reference to sand dunes and to salt marshes, and showed that in both cases there are two modes of utilisation available: (1) to take advantage of the natural product; (2) to convert or reclaim, so that the land is available for more general purposes. In both habitats the natural product may be a grass capable of being cultivated at a profit for paper-making. But if capital and labour be spent on their reclamation, sand dunes add profitably to our timber area, and salt marshes are known to give very fertile soil. It might well be that in the time immediately following the war this would afford excellent transitional labour for our soldiers.

Mr. Martineau, of the Reafforesting Association, demonstrated by means of lantern-slides the success of the society's planting on pit mounds in the Black Country, and gave every reason to suppose that it would prove a sound financial undertaking.

Dr. W. E. Smith developed in some detail the complexity of the problem of improvement in utilisation of mountain and heath land. He showed, however, that improvement could be effected by more frequent burning, as recommended by the Grouse Committee, by inclusion of more cattle with sheep grazing, as well as by the more drastic measure of restriction of deer forest and grouse moor to the more inaccessible uplands.

The possibility of converting moorland into food-bearing soil by means of the application of bacterised peat was brought forward by Prof. Bottomley, who quoted successful laboratory and field experiments in support. He stated that at Entwistle, in Lancashire, the yield of oats and mangolds had been doubled by its application.

The discussion on the collection and cultivation of medicinal plants was opened by Prof. H. E. Greenish, of the Pharmaceutical Society of Great Britain, who outlined the steps that had been taken during the last two years to make good the shortage of drugs consequent upon the war, and to establish a permanent

British industry. At the present moment a scheme which had every chance of success was being put forward by a Federation of the Central Committee of National Patriotic Organisations, the Herb Growing Association, and the Agricultural Organisation Society. Mr. Holmes, also of the Pharmaceutical Society, brought forward some interesting suggestions for the scientific improvement of medicinal plants.

Sir Sydney Olivier, the secretary of the Board of Agriculture and Fisheries, pointed out how essential it was to success that the industry should be established on such lines that it took its place in the commercial world as a specialised market-garden crop, with the prospect of reasonable remuneration.

Dr. E. N. Thomas raised the question of the relative merit in certain cases of the extraction from fresh and from dried leaves.

Among the other contributions to the section was a very interesting paper by Sir John S. Stirling-Maxwell on afforestation after the war. He advocated that the British Empire, as a whole, should aim at becoming self-supporting in the matter of timber. Dr. Borthwick, in the subsequent discussion, laid stress on the necessity for the training of those engaged in forestry in adequately staffed and equipped institutions.

Miss E. R. Saunders presented a report on means of bringing into closer contact those engaged in scientific breeding experiments and those commercially interested in the results. She suggested that the trades concerned should be encouraged to organise research departments, while the scientific workers might well unite to form a genetics association. She further advocated the issue of a new and readily accessible vehicle for the publication of literature on genetics and the establishment of a sub-section of genetics to the British Association.

The first of these proposals was warmly supported by Prof. Bateson, who saw difficulties, however, with regard to a new publication, which he did not consider was needed.

As the result of these discussions a committee was appointed from Section K to consider provision for plant pathology, and a joint committee from the Sections of Botany, Zoology, and Agriculture to consider provision for the application of genetics.

The meetings of Section K were terminated by a very pleasant and instructive expedition on Saturday, September 9, to the salt marshes at Alnmouth.

E. N. THOMAS.

THE BRITISH ASSOCIATION AT NEWCASTLE.

SECTION L.

EDUCATIONAL SCIENCE.

OPENING ADDRESS (ABRIDGED) BY THE REV. W.
TEMPLE, M.A., PRESIDENT OF THE SECTION.

The spiritual side of human nature, the capacity for fellowship and for devotion, is best trained by the life of membership in a society. No instruction or study can take the place of this. This is the great inheritance that comes down to us, in England at any rate, from the Middle Ages. The side on which those great private institutions which are called public schools, and the older universities, are particularly strong is the social life which is their most leading characteristic. As the personality begins to develop it requires some society of which it may be a member other than the home on one side and the nation on the other. The nation is clearly far too big for the child to realise, or indeed to possess any effective membership in it;

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and the home, though not too small, is yet unsuitable in one respect, namely, that it is bound to be too much under the direction of the parents. Where life in a school-room is possible, and where there is a large family to share that life, some of the conditions which we require are present, but what is needed is a society which shall indeed be under general supervision, but of which the members actually determine the character and life, so that each feels that he is a member of this community in the fullest sense, that its welfare depends upon his loyalty, while his welfare depends upon its general character. I confess that I doubt the possibility of securing this fully realised membership otherwise than in a boarding school, but here I speak with great ignorance; at any rate I am sure that for the spiritual development of the rising generation we urgently need that corporate life in schools which the so-called public schools possess in so large a measure. Every member of one of these schools, or of one of our older universities, knows quite well that what has been most valuable to him in his training has been the whole life of the place, and not the specific teaching of the class-room or laboratory. It is probably true that the educational institutions which have especially cherished this ideal have tended to be slack, as they have certainly been amateurish, with regard to the intellectual or scientific life; but they have maintained this fundamental principle, that the spiritual nature is best developed through life as a member of a society, and that a society of such a kind that the membership can be real and effective.

Now, one main activity of a society composed of children or adolescents will necessarily be found in games. This is partly because physical growth is one of the main businesses of life at that stage, and it is right that the growing boy or girl should delight in developing and exercising the physical faculties. But it is also because a game is felt to be more communal than school work. With work arranged as it now is, it inevitably follows that school work is regarded as being done for one's own sake, while the boy who plays hard is regarded as serving the community; he does it for his house or the school as much as for himself. I shall suggest in a moment that experience shows that by changes, which are otherwise desirable, with regard to school work itself a good deal of this difficulty may be overcome, but it will still remain true, at any rate with boys, that games are the dominant interest, and athletic heroes more admired than boys of intellectual promise; and I desire to insist that this is a perfectly right thing provided only that the elders, whether parents or teachers, do not themselves adopt the boy's standard, and so fix it in the boy's mind, but while sympathising with the boyish interests, yet constantly lead the mind forward to a truer perspective.

We give too exclusive a place to books in school education. Many boys, not at all really stupid, are failures at school because they are bad at books. If manual work is given a larger place, it can be so arranged that the great moral difficulty about school work is removed—namely, its individualistic and competitive character. Co-operation cannot be carried far in book work. Learning from books must be done by each for himself. But manual work can be done in teams, so that a large co-operative element comes in, which is of great value as a training for citizenship.

It is possible to do something of this sort with regard to book work. At Repton a challenge-shield is at this time being presented, to be held by the house whose members together gain most marks according to a scheme which allots so many marks to a form prize, so many to a school prize, and so forth. This in so