tor of the laboratory has acted as adviser in physics to the Ministry. He has also acted as chairman of the Instruments Committee of the Munitions Inventions Department, and has served on a number of committees of the Ministry of Munitions, the Munitions Inventions Department, and the Board of Invention and Research.

Large additions have been made during the year to the laboratory buildings owing to the growth of the work. Early in the year an urgent request was made by the Admiralty and the War Office for an extension of the aeronautics research. This required the provision of two or three additional wind-channels, with increased accommodation for model-making and similar purposes. Authorisation to proceed was immediately given by the Treasury, and the necessary building and constructional work was undertaken by the Office of Works. The new building contains two wind-channels, a 7-ft. and a 4-ft., with pattern-makers' shop, generator-room, offices, etc. An addition to the metrology building, to provide additional accommodation for the work of gauge-testing, has also recently been erected by the Office of Works, while other buildings have been provided for temporary purposes.

CHEMISTRY AT THE BRITISH ASSOCIATION.

THE work of Section B (Chemistry) at the recent meeting of the British Association at Newcastle-upon-Tyne differed somewhat from that of previous years in that it was concerned mainly with two subjects—coal and fuel economy, and the future of the British chemical industries. As the first of these important topics will be dealt with separately, the following brief account of the sectional proceedings will refer chiefly to the second of the subjects of discussion.

"The Future of the Synthetic Chemical Industry in Great Britain" was the subject of a paper by Mr. F. H. Carr, in which the question of training chemists for this branch of the industry was considered at some length. Mr. Carr does not profess to be an educationist, and that is perhaps the reason why he gave his interesting views on the education of chemists to Section B rather than adding them to the fascinations of the programme of Section L.

The essence of the educational scheme proposed by Mr. Carr is the establishment of technological colleges with a course of two years, the college itself being practically a business concern for the manufacture of fine chemicals. Students who did not qualify in successive stages would be liable to dismissal, and a daily attendance of eight hours with but short holidays would be demanded.

As the colleges would have practically the equipment of a works, the student would learn to look at chemical processes from the point of view of cost of materials, yield of finished product, and value of the time and labour, heat and power expended on any particular operation, while at the same time he would become familiar with the ordinary plant found in actual factories.

To impart this training a staff with thorough works experience would be needed, and it is unfortunately not very clear how such a staff could be got together, for such men would most likely be better off financially in works, and might perhaps have little taste for teaching. The college buildings and equipment would be provided by Government, while chemical manufacturers should supply the endowment.

This scheme might be expected to produce technically and scientifically trained men suitable as departmental managers, but the equally important trained operative must also be considered. Here Mr. Carr regrets the absence of an apprenticeship system, and feels the loss of the old mechanics' institutes. For the present, training will have to be carried out in the factory, but he suggests that there should be compulsory continuation of education until eighteen years of age, more latitude being given to schools to suit particular industries of the district, and more differentiation at the age of thirteen in the training of boys of different aptitudes and tastes.

Mr. Rintoul, in a paper on the "Preparation of Chemicals for Laboratory Use," described the work being carried on by Nobel's at Ardeer for producing pure reagents and materials hitherto chiefly obtained from Germany.

Dealing with the subject in a more general way, Mr. Rintoul was of the opinion that much of the research work for the preparation of such chemicals need not necessarily be carried out in technical laboratories, as much of it was well suited to university conditions. It would indeed afford an opportunity for bringing chemical industries and universities in contact, for instead of producing many papers of perhaps somewhat doubtful value, the university laboratories might produce authoritative statements on new or comparative methods for the preparation of compounds, information on which is at present either lacking or inaccurate. Most of the raw materials required could be obtained in the British Empire, and he deplored the fact of our dependence on Germany for supplies of pure materials the manufacture of which would be of educational value, and at the same time of importance in the industry.

A paper by Mr. C. M. Whittaker on the "British Coal-Tar Colour Industry in Peace and in War" gave a summary of the work already carried out, mainly by British Dyes, Ltd., to supply colours for all kinds of dye purposes, ranging from typewriter ribbons to khaki cloth. An immense amount of work has been done, and many colours are now made in this country in huge quantities for war purposes, and all credit is due to the firms concerned. The paper conveyed, no doubt rightly, the impression that every soldier and sailor, whether hale or wounded, was a living memorial to the industry of chemists concerned with the British coal-tar colour industry. Many people have perhaps not appreciated this aspect of the war.

Apart from the discussions on coal and fuel economy, the three papers above briefly reviewed constituted the *pièce de résistance* of the meetings of the Chemical Section, but there were also a few short papers of considerable interest which must just be mentioned.

Dr. J. E. Stead contributed three short papers on (*a*) the oxidation of nickel steel; (*b*) the reduction of solid nickel and copper oxides by solid iron; (*c*) the disruptive effect of carbon monoxide at 400° to 500° C. on wrought-iron. These papers, all of interest to metallurgists, have been the subject of a discussion at the Iron and Steel Institute.

Prof. W. M. Thornton gave an account of his stepped ignition in gases, and after reading the paper illustrated it experimentally. A short discussion on the paper showed that there was considerable divergence of opinion as to the real explanation of the phenomena observed and shown by Prof. Thornton.

Dr. J. A. Smythe contributed a note, illustrated by experiment, on a "Modified Chlorination Process." He showed how calcium chloride acted as a catalyst for the chlorination of ethylene and other hydrocarbons.

In conclusion it should be mentioned that throughout the meeting there was open an exhibition of British-made chemicals and apparatus, which showed what steps have already been made to replace goods in this line of enemy origin.