

We have already directed attention to the action which the United States has taken in connection with the same subject, even before its entrance into the war. A report to his Government by Dr. C. L. Parsons, which has recently been published, contains a mass of valuable information as the result of inquiries and visits to manufacturing plants in various European countries. As regards the account of the arc process of synthesising nitric acid, there is little that is not generally known to experts in this country. Its position as a permanent industry depends largely on local conditions, which are now well understood. Of the Haber process for the production of ammonia, to which the German Chancellor referred in such exulting terms, we have as yet no very precise information concerning plant construction and operation. The method is not at present at work as a manufacturing process outside Germany, and its post-war use in other countries will probably be restricted owing to the practically prohibitive royalty demanded by the Badische Company. It is, however, known to be a difficult, and even dangerous, process to work. Its technical control requires so high a degree of training and skill that Dr. Parsons is assured that if the Badische people were to lose their present staff many months would be required to train another. There can, however, be no doubt of its success. It was first commercially installed in Germany in 1913, when it was said to have produced 20,000 tons of ammonium sulphate. In 1914 this grew to 60,000 tons, in 1915 to 150,000 tons, and in 1916 to 300,000 tons. With the new works recently completed by the Badische Company the 1917 output will be equivalent to upwards of 500,000 tons of ammonium sulphate. As regards cost, it is stated that pure anhydrous ammonia can thus be produced in liquid condition at less than 4 cents per lb. If such is the case, the Haber method is the cheapest process yet known for the production of synthetic ammonia.

The cyanamide process for producing ammonia resembles the arc process of making nitric acid in requiring cheap power for its successful development. In special circumstances it may be able to hold its own with the Haber process, as seems to be realised in Germany, where the method has been subsidised by the Government. It is said that the 1917 German production of cyanamide will be not far short of 400,000 tons. Agrarian interests are endeavouring to induce the Government to establish a nitrogen monopoly to ensure the continuance of the cyanamide industry in Germany, in view of the competition of the Haber process and of coke-oven ammonia after the war.

As regards by-product ammonia and the cyanide process, and the methods of transforming ammonia into nitric acid, there is little in Dr. Parsons's report which is not now common knowledge. Naturally his conclusions and recommendations are more particularly applicable to the circumstances of America, but there is much in his arguments and in the details of his estimates of

construction and of operating costs that will necessitate, and will doubtless receive, sympathetic attention in this country.

One fact clearly emerges from this consideration of the nitrogen problem. The combined efforts of the warring nations in seeking the means for their mutual destruction will inevitably ensure the future position of agriculture and the production of cheap food to those who come after us. Out of this evil at least this good will come.

SCIENCE AND OTHER HUMANISTIC STUDIES IN SCHOOLS.¹

THE report edited by Sir Frederic Kenyon gives evidence of progress towards that agreement among educational experts which is necessary if the construction of a scheme designed for general adoption is to meet with general acceptance. A serious obstacle to this progress is "the great mass of ill-informed public opinion, which distrusts or despises all education, or measures its value by its immediate money-earning capacity." This remark, to be found on the first page of the report, is perfectly true; but it is equally true that another serious hindrance has been the obstinate refusal of so many of the supporters of the old-established classical system to yield ground and to recognise the claims of modern subjects, especially science, to any considerable share in the time, emoluments, and honours which have so long been the portion of the older studies. "The object of the present pamphlet is to record certain attempts that have been made to give a healthier tone to the discussion; to show that a large measure of agreement is possible, . . . and to bring the weight of this agreement to bear on the solution of the outstanding problems which have been the cause of bitter controversy in the past."

The starting point of the movement here described was a letter which appeared in the *Times* of February 2, 1916, in which the educational claims of science were put forward with considerable emphasis. This was followed by the meeting at the Linnean Society on May 3, which has been completely reported in a pamphlet entitled "The Neglect of Science." A rejoinder was published in the Press of May 4, 1916, signed by Lord Bryce and a number of other eminent persons. This letter, though containing some statements which were open to criticism, was conceived in a liberal and conciliatory spirit, which could not fail to have a good effect.

A movement was then begun with the object of securing co-operation among the principal bodies representing "humanistic" studies in their educational aspect, and a conference was held on June 17, 1916, in which representatives of the Classical, English, Geographical, Historical, and Modern Language Associations took part. The result was

¹ "Education, Scientific and Humane." A Report of the Proceedings of the Council for Humanistic Studies. Edited by Sir Frederic G. Kenyon. Pp. 32. (London: John Murray, 1917.) Price 6d. net.—Committee on the Neglect of Science. Report for the Year 1916-17. (Hon. Sec. 17 Grosvenor Road, Westminster, S.W. 1.)

the passing of six resolutions, which were published in the Press at the end of August. Of these the most important are the following:—

(1) It is essential that any reorganisation of our educational system should make adequate provision for both humanistic and scientific studies.

(2) Premature specialisation on any one particular group of studies, whether humanistic or scientific, to the exclusion of all others, is a serious danger, not only to education generally, but to the studies concerned.

(3) Humanistic education implies the adequate study of language and literature, geography and history, which in each case should, at the appropriate stage of education, go beyond the pupils' own language and country.

With these resolutions the Teaching Committee of the Mathematical Association and the Committee of the Association of Public-School Science Masters expressed concurrence.

The circular drawn up by the Five Associations spoke of the possible formation of "some central council which could assume a larger responsibility and speak with a wider representative authority." No doubt the formation of such a council is eminently desirable, but it has not so far been brought into existence. The British Academy has appointed a committee which has developed into the Council for Humanistic Studies, the report of which is before us. But the Conjoint Board of Scientific Societies initiated by the Royal Society, with the president, Sir J. J. Thomson, at the head, besides the "Neglect of Science" Committee, which originated in the meeting of May 3, 1916, must not be forgotten. There is also the Education Reform Council inaugurated by the Teachers' Guild, and the report of which was reviewed in NATURE of September 27 last. This body has so far not been consulted by the other associations which have been conferring together.

A step in advance was undoubtedly achieved when a meeting on January 26 last was held between the Education Committee of the Board of Scientific Societies and the Council for Humanistic Studies, with Sir E. Ray Lankester in the chair. In the result it was agreed that more time must be found for the teaching of natural science, especially in the older and more famous schools, and that this time should generally be found at the expense of the classics. All agree in deprecating early specialisation, and it should be noted that this opinion applies to the classics as well as to science and modern languages.

Fortunately, while the experts are trying to make up their minds, some definite action has already been taken by the authorities. The Regulations for Secondary Schools, issued on April 19 last, require the curriculum to provide for satisfactory instruction in the following subjects: (1) English language and literature; (2) at least one other language; (3) geography; (4) history; (5) mathematics; (6) science; and (7) drawing. The report of the committee appointed by the Treasury to produce a scheme of examination for admission to the Civil Service, Class I., was issued on

June 20 last. It affords very interesting reading and proposes new regulations of a very important character. The examination is to be divided into two parts. Section A, which must be taken by all candidates, includes the following forms of test: (1) Essay; (2) English; (3) questions on contemporary subjects, social, economic, or political; (4) general principles, methods, and applications of science; (5) translation from a foreign language; (6) a *viva voce* examination. To each of these subjects from (1) to (5) one hundred marks are assigned, and to the *viva voce*, to which the committee attaches great importance, three hundred marks. This is followed by Section B, which includes a great variety of optional subjects generally marked at the same maximum, except mathematics and engineering, which receive twice the number of marks assigned to the other subjects. The report of the Civil Service Committee concludes with a number of specimen examination questions, which are intended to illustrate the views put forward by the committee.

Then there is the Education Bill now before Parliament, according to which elementary education is to be compulsory up to the age of fourteen years. It provides for the establishment of continuation schools and for compulsory attendance at the same. Another clause introduces the interesting and novel proposal to give power to local authorities to afford aid to *research*.

Sir Frederic Kenyon's report contains much that deserves attention, and seems to invite comment, and we cannot do better than advise our readers interested in educational questions to obtain a copy. But they should also read carefully the report of the "Neglect of Science" Committee, which brings out more clearly the claims of the advocates of natural science.

NOTES.

A VERY remarkable statement was made to the Paris Academy of Sciences on October 1 by Prof. H. Vincent, who is director of the great Army Laboratory at Val-de-Grâce, one of the most beneficent institutions of France. He was responsible, in the early months of 1915 and afterwards, for the arrangements in the French Army for the protective treatment against typhoid. He gives the results in a short note with a graphic diagram. He contrasts the terrible havoc wrought in previous wars with the almost negligible death-rate from typhoid in the present war. A heavy incidence of typhoid began in November, 1914; it became much less during March–April, 1915. During this period, November, 1914–April, 1915, the protective treatment could not be effectively carried out at the front, because of the necessities of the war. From April, 1915, onward—except for one very small rise in the summer of 1915, due mostly to paratyphoid fever—the death-rate has been kept almost at *nil*. The line runs steadily along the bottom of the diagram, as one loves to see it. From August, 1915, onward the French Army has received protective treatment, not only against typhoid fever, but also against those two forms of paratyphoid fever which at present are called paratyphoid A and paratyphoid B. The results are magnificent. As Prof. Vincent says:—"For more than two years the French Army at the front has