equivalent of the Siwaliks of India. This has been covered by later alluvium, but appears, highly inclined, on the margin of the basin, and earth-movements have probably continued into Pleistocene times.

Following on Mr. Yabe's recent review of the genus Fusulina, particularly in its Asiatic bearings, which was noticed in a previous article in NATURE, Mr. H. H. Hayden adds a critical and microscopic investigation in a paper on Fusulinidæ from Afghanistan (vol. xxxviii., p. 230). He shows good reason for the view that Fusulina is perforate, but urges that the appearance of its shell, and its minutely granular character under the microscope, should place it among the porcellanea. It does not appear, however, that the fossil porcellanea selected for comparison are in their original condition, seeing how quickly a granular calcitic structure arises in shells that were once composed of aragonite. Mr. Hayden regards the shell of a modern Biloculina as also similar, and as composed of calcite (p. 233). In the face of other determinations it will be well to suspend judgment before Fusulina becomes placed in a unique position.

In Palæontologia Indica, also published by the Indian Geological Survey, Dr. A. S. Woodward (vol. iii., Memoir 3) has described fish-remains from the Lameta beds of the Central Provinces, which fix the age of these beds between Danian times and the close of the Eocene period.

The Mysore Geological Department (Bulletin No. 4) has assisted the gravity observations of the Survey of India by the determination of the densities of a large number of specimens of hornblende schists obtained from mine-shafts nearly 3000 feet in depth. The unaltered rock, where it is below the zone of saturation by water, has a density of 3·00. The effect on the superficial zone of alternate wetting and drying in a tropical atmosphere is shown by its being regarded as "weathered" down to 100 feet, the density in the first 10 feet being 1·65, inclusive of air-spaces, and rising to 2·66 at 30 feet and 2·90 at 100 feet. The determinations give what are styled "apparent specific gravities" in soil-analysis, and the method of collection of the loose material in its field-condition in a measured box might have proved simpler than that actually adopted (p. 9). In vol. viii. of the Department's Records (for July, 1906, to June, 1907, received in November, 1909), Mr. B. Jayaram makes the now customary complaint (p. 84) that his oldest rocks in Mysore are hornblende-schists, into which gneiss, and subsequently pegmatite, have intruded. He presumes below this "an hypothetical archæan basement rock, say gneiss," but this is probably suggested out of deference to the text-books. His notes on rocks and minerals express a large amount of original observation, and he claims a secondary origin for his pyroxene-hornblende granulites (p. 99), without realising that he is thereby bringing them into line with those of Saxony, the nature of which was so long misunderstood. According to Dr. Smeeth, the State geologist (p. 15), there is a good deal to be yet learned about the origin of the Mysore laterites; but Mr. H. K. Slater's report on the Sorab Taluk (p. 31) has suggestive remarks on the relation of laterite to lithomarge, and of lithomarge to an original highly felspathic granulite, elsewhere referred to as a banded felsite or rhyolite. He believes that the same granulite (p. 49) passes, by impregnation with silica and iron oxide, into a brecciated chalcedony-hæmatite rock, which has been described, somewhat misleadingly, as a quartzite. This paper needs some press-correction.

The Reports of the Mineral Survey of Ceylon for 1907 and 1908 include the last work of Mr. James Parsons, whose tragic loss is recorded in that for 1908. Considerable attention is given to thorianite, and the monazite of Ceylon has yielded 10 per cent. of thoria. "Reconstructed" rubies, as well as beautifully cut gems of a glass rich in lead and thallium, are now being sold in Ceylon markets. Western science has much to answer for in the east. The useful relations between the Survey and the Imperial Institute in London are clearly seen in these reports, and the same feature is apparent in the Geologists' Annual Report of the Federated Malay States for 1908, in which tin-deposits are naturally of foremost interest.

G. A. J. C.

EDUCATION ABROAD AND IN ENGLAND.[1]

IN education, as in other matters, each nation must solve its own problems for itself. Every system of education should be the expression of national characteristics and adapted to national idiosyncrasies. Still, lessons which we can ill afford to neglect may be learnt from the study of developments in other countries, and in some respects it is much easier to ascertain what is being done abroad than at home. Thanks to the admirable series of special reports inaugurated by Prof. Sadler, we can make ourselves more or less familiar with the details of foreign education. With regard to England, we are not so fortunately situated; the Board of Education gives little or no information as to new and successful experiments, and its reports have mainly a statistical value. This lack of information as to the progress within recent years renders a comparison between English and foreign systems difficult and misleading.

Attention is commonly concentrated upon Germany and the United States. This is natural, having regard to their extraordinary industrial development during the past generation and the extent to which it may be attributable to their systems of education. With regard to Germany, it would be remarkable if a nation forced to repair the ravages of war by intellectual effort—you remember Humboldt's famous expression in 1807, "Der Staat mus durch geistige kräfte ersetzen was er an physischen verloren hat"—had not in the course of a century become pre-eminent in one or more departments; but when you test the value of the system you will find, I think, that the general balance is in our favour. The facilities for technical and scientific instruction are as great here as there, but where the German has the advantage is in the better quality of the pupils who attend those colleges and schools. This is entirely due to the excellence of their secondary education, and until we can make the Board of Education and the public realise that prolonged and sound general education is the essential antecedent to successful technical and scientific training, the quality of the material supplied to our technical and scientific institutions will remain inferior. By their regulations, the Board of Education seem hardly to appreciate the supreme importance of this. A course of four years compares most unfavourably with the courses at the Gymnasia and Realschulen, and it is a fatal mistake to allow that course to be shortened in any circumstances, or to permit individual pupils or special classes to follow a curriculum varying from the curriculum approved for the rest of the school. To remedy the glaring defects in our system of secondary education, and to place our pupils upon terms of equality with those in Germany, it is imperative to fix a higher standard and strictly to adhere to it.

Of the United States as a whole it is difficult to speak. Each State has its own system, and the only common characteristic is the lavish expenditure upon buildings and equipment. No one is more conscious than the American himself that the results are far from satisfactory.

In spite of this, however, valuable lessons may be learnt from America. We are indebted to them for the promotion of international congresses, which will be of universal benefit if they only succeed in the standardising of university education, which at present leads to endless misapprehension and confusion. We might, too, with advantage imitate their custom of holding frequent local inquiries with a view to the re-adjustment of existing methods so as to satisfy modern requirements. At the same time, they have done much to solve the problem of the connection between instruction and apprenticeship, the workshop and the school. The fundamental principle there is based upon the rational assumption that the proper and only way for a young man to learn the practical side of his profession, together with business details, is by working as a regular employee, and that the only place where he can learn properly the scientific and the cultural subjects is at a school under trained teachers. We need also a bureau of education as well organised and endowed as that at Washington to act as an imperial centre for information and advice.

[1] From a paper read at the North of England Education Conference, Leeds, on January 8, by John C. Medd.

For purposes of effective comparison, it may be well briefly to indicate the acknowledged gaps and apparent defects in our system, and the possibility of remedying them by the adoption of particular types of school and methods of instruction from other countries. It is by such an eclectic process that the Japanese are transforming themselves, and have gradually built up a system of education which, upon paper at least, leaves little to be desired. Notwithstanding the constant criticism levelled against the ancient universities and great public schools, I do not consider that they fail to realise their respective functions.

It is with reference to the ordinary secondary schools that the position is so unsatisfactory, and for their improvement we must, as I have already intimated, learn from Germany, or Holland, the burgher schools of which furnished the Germans with their models. Simultaneously, the facilities for promoting the easy passage of suitable pupils of all ranks from one type of school to another ought to be increased.

In elementary education as a whole we stand unrivalled, with the possible exception of Holland, where the methods of instruction are still as Cuvier described them, "au-dessus de tout éloge." It would be folly to expect the same standard of excellence in all schools, having regard to the infinite variety of conditions under which each school is conducted. The great need, commonly, is for more practical instruction, some relaxation of the regulations as to building and equipment for manual instruction and domestic science, and the introduction of a system of supplementary courses. We require, as Prof. Sadler has pointed out, a new type of school in which less attention is paid to purely literary subjects and more to the practical side.

The teacher is the most important factor. Upon his character, capacity, and sympathy the quality of each school depends far more than upon the public spirit of the local authorities and managers. His training is still too limited and hampered by the exigencies of the certificate examination. The normal schools of both France and Holland are conducted on far more enlightened principles. It is recognised that there are certain subjects, such as the theoretical and practical study of natural and physical science, which every teacher, whether destined for an urban or a rural district, ought to know. We do not want to create two distinct classes of teachers or to establish separate institutions for those who will have charge of country schools, but we do want the student during his period of training to become qualified to discharge all those duties which are involved in the modern conception of an elementary school. In Holland, for instance, every student has a systematic course of instruction in horticulture and the elementary principles of agriculture. In woodwork every student makes a complete set of the models of the Swedish Slöyd system and of objects required for other lessons, such as chisels, rulers, levers, and scales; models of tools or engines to assist in explaining different trades and industries; implements for the manufacture of linen and lace, &c. In addition, each student constructs an aquarium, terrarium, and a case for insects to be collected and attended to by himself. Beyond acquiring a mass of information invaluable to him in his profession, he learns how to make the apparatus necessary for object-lessons in the primary school.

The outstanding blot upon English education is the absence of any adequate provision for those who have completed the elementary-school course but do not proceed to a secondary school. To expend millions upon these children until the age of thirteen or fourteen, and then to turn them over to the education of the streets, is disastrous from every point of view. It is during the period of adolescence that the habits are formed which will determine the boy's or girl's whole future career. Cast adrift as they are in the vast majority of cases to rely upon their own resources, they constitute a grave social danger, swell the ranks of the unemployed, and gravitate to the workhouse or the gaol. It is computed that only one in six between the ages of fourteen and twenty-one are receiving any systematic instruction. Taking those between fourteen and eighteen, 2,000,000 out of 2,800,000 have done with education altogether. Minister after Minister of Education deplores this, but no practical steps have ever yet been taken by any Minister to remedy the evil.

Continuation schools, however, are not alone sufficient. A few trade schools have been established, but they should be the rule, and not the exception. The Ambachts or trade schools of Holland furnish a good example. Those admirable institutions owed their origin to private or local initiative, but are subsidised and inspected by the Government. The course usually lasts for three years, and the instruction is continuous throughout the year. The subjects naturally depend to some extent upon local circumstances, but generally include drawing, geometrical drawing, physics, mathematics, mechanics, wood and metal work, all taught technically and with the view of particular industries. In some cases instruction is also given in masonry, furniture and instrument making, painting and house decoration. The results are undoubtedly excellent. For some time artisans were a little jealous of this trade instruction, but now there is an increasing demand by them for lads who have completed the school course. It is intended that pupils should proceed direct from the primary school at the age of twelve or thirteen, and this is the usual custom. A few boys occasionally attend after leaving the intermediate schools or the gymnasia.

Now that the Board of Education has substantiated its claim to be the responsible authority for agricultural education, it would be wrong to ignore that question altogether. We are as far behind other nations in that respect as in the training and instruction of children when they leave the elementary school. In proportion to the agricultural population we have a greater number of advanced colleges than are to be found in any country, but for the rank and file of young farmers and smallholders facilities for acquiring that knowledge which today is essential to the successful cultivation of the soil can hardly be said to exist. We are constantly reminded of the agricultural prosperity of Denmark, but it is generally forgotten that that prosperity is due to the excellence of the people's high schools, which impart a sound secondary education, and which are free from any agricultural bias. The attempt to combine agricultural teaching with general education was quickly discarded by the Danes. What we require are winter schools and classes corresponding to those in Ireland and Holland, a few practical schools of agriculture of the type of those in France, and farm institutes of the character recommended by Lord Reay's Departmental Committee.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—Dr. Robert Simon has been elected to the chair of therapeutics rendered vacant by the death of Prof. Foxwell.

Prof. J. W. Taylor has resigned the chair of gynæcology.

Mr. E. E. Fournier d'Albe has been appointed assistant lecturer and demonstrator in experimental physics to fill the vacancy caused by the resignation of Mr. F. W. Aston, who has accepted a post as assistant to Sir J. J. Thomson at the Cavendish Laboratory.

Mr. George Heaton has been appointed lecturer in operative surgery, and Dr. Edgar P. Hedley has been elected to a demonstratorship in chemistry.

Prof. Bostock Hill has been asked to act as a delegate to represent the University at the Congress of the Royal Sanitary Institute to be held in Brighton in September, and also at the International Congress on School Hygiene which meets in Paris in March next.

Prof. F. W. Gamble, F.R.S., has been appointed to represent the University at the eighth International Zoological Congress at Graz (Austria) in August.

CAMBRIDGE.—The Public Orator, Dr. Sandys, spoke as follows in presenting Dr. Mark Aurel Stein for the degree of Doctor of Science *honoris causa* on January 20:—

Adest vir scientiarum non minus quam litterarum de finibus proferendis bene meritus, qui Hungariae in urbe maxima natus, et inter Tubingenses Oxoniensesque linguis orientalibus eruditus, in imperio nostro inter Indos iam per annos plurimos scholis et collegiis nostris admini-