

## Chemistry in India.

DR. M. O. FORSTER, in his address to the twelfth Indian Science Congress, has preached a sermon which is not likely to be forgotten by those who were privileged to hear it or by those who have had an opportunity of reading it. Phrased in the happy manner which came to many as a revelation on the occasion of his address to Section B of the British Association at Edinburgh, it deals with numerous fundamental and intimate questions which are exercising the minds of many thoughtful men and women at the present time. Probably no one can do this kind of thing quite so well as Dr. Forster, for he enhances his constitutional optimism by a flow of language which overwhelms the pessimist and carries the reader from the start to the finish along a smooth stream of pleasing rhetoric, past a countryside replete with all that is beautiful and satisfying, only dallying here and there to point out to the traveller some piece of Nature's handiwork more entrancing than the rest, or pausing to express a feeling of admiration for the manner in which scientific man has acquitted himself. It is only afterwards that the reader, whose mind, after his journey, will be in a pleasant condition of altruistic confusion, will wonder what it is all about. If he is an incorrigible pessimist, and wishes to retain his sanity, he will be well advised to let the first impression stand and not to examine more closely into the nature of the raw material from which Dr. Forster has woven his fascinating fabric. If, like most of us, he is a man of the world without any unhealthy bias towards extreme optimism or extreme pessimism, but, taking things much as he finds them, bestows neither premature praise nor expresses hasty condemnation, he will find much with which he can agree and a great deal to inspire thought and contemplation.

To Dr. Forster's audience the address should be of inestimable value, for India needs scientific stimulation and inspiration far more than any other country of her importance in the world. Her immense natural resources and the mental calibre of her races ought to ensure her a foremost place, both scientifically and commercially, among the nations; yet she remains chained and fettered, and probably only one in a million of her inhabitants will be in a position to take to heart the message Dr. Forster sends them. Nevertheless, conditions are changing for the better, and the past twenty years have marked a notable advance in the scientific status of the Indian Empire.

The far-sighted vision of an exceptional man led to the founding of the Indian Institute of Science at Bangalore, but it was not until eleven years after the inception of the scheme that all difficulties were removed and the vesting order was signed. Meanwhile, the first director, Dr. M. W. Travers, had been appointed and had drawn up the necessary plans for the organisation and equipment of the new Institute. It is undoubtedly due to the devotion and, indeed, self-sacrifice of Dr. Travers that the scheme assumed

definite shape, and that the buildings and laboratories were ready to receive the first students in July 1911. Slight changes in the original organisation were afterwards made, and at the present time there are three chief departments, namely, those of electrical technology, general and organic chemistry, and biochemistry; there is, moreover, a large central building in which the offices and library are housed, the excellence of the latter being due to the organising ability of Mr. C. F. H. Tacchella. After the retirement of Dr. Travers in 1914, the post of director was held by Sir Alfred Bourne until 1919 when, after Dr. Alfred Hay had acted as officiating director for two years, the present holder of the office, Dr. M. O. Forster, was appointed.

It was probably inevitable that, during its earlier years, the Institute should have devoted itself to many *ad hoc* problems arising out of the then existing conditions of Indian manufactures. The intention of the founder had been to establish a post-graduate university institution having for its particular object the promotion of advanced study and original research, with special regard to the educational and economic interests of India, but, at that time, advanced education in India was not in a condition to supply a sufficient number of properly trained post-graduate students, and, in those early days, it must have been exceedingly difficult to find the right men to carry out the fundamental research upon which to base the many important industries of the country. Still, in the efficient hands of Dr. Sudborough, Dr. Fowler, Dr. Watson, and Dr. Hay, much was done, and the early record of the Institute bears witness to the fact that, despite the obvious difficulties, the research work accomplished supplied material for the improvement of many industries which had hitherto been built on the rule-of-thumb and traditional methods so characteristic of Indian manufacturing procedure as a whole.

The appendix to the fifteenth annual report of the Council of the Institute, dated 1924, is now to hand, and it is evident, from the comprehensive list of investigations which the report shows are being carried out by the three departments already mentioned, that important research work of a fundamental character is being pursued. The lists are indeed pleasing to read and will stimulate Indian graduates to enter the Institute in order to obtain that training in research methods which not only broadens the outlook, but, without which, it is useless for any chemist to hope to achieve real success in industrial work. For knowledge derived from lectures and books cannot supply the vision, the independence of thought, and the honesty of purpose which are essential to the development of the scientific soul, and Indians would do well to learn the lesson some of their confrères in the west find difficult to assimilate, which is embodied in the address given by Dr. Forster at Benares.

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Local Natural History in Great Britain.<sup>1</sup>

LOCAL scientific societies have their distinct and special place, with its incumbent responsibilities in the scientific life of the country, and it is well that this important fact should not be overlooked, par-

ticularly by the societies themselves. These, it is to be feared, do not always appreciate their obligations to organise and carry through schemes of scientific work which obviously come within their province. Intensive investigations, both systematic and ecological, of the fauna and flora of the country are problems pre-eminently suited to the activities of local societies. In fact, it will be only by the active co-operation and organisation of such societies that

<sup>1</sup> The North Staffordshire Field Club: Transactions and Annual Report, 1923-24.

The South-Eastern Naturalist, being the Proceedings and Transactions of the South-Eastern Union of Scientific Societies for 1924.

The Liverpool Geological Society: Proceedings, vol. 14. Part I, session the sixty-fifth, 1923-24.

it will ultimately be possible to complete our knowledge of these matters.

It is, therefore, with particular pleasure that we direct attention to Mr. L. A. Carr's paper on "The Ichneumonidæ of the Lichfield District, Staffordshire," in the first of the three volumes of annual reports and transactions here noticed, as an admirable example of the kind of work which can and should be attempted by all local societies.

In the course of only eight years' intensive and constant work, Mr. Carr has collected and identified no fewer than 1255 species of this difficult and much neglected group of insects. We do not overlook the work of Mr. Claude Morley and other isolated workers in this field, but obviously the few experts available in Great Britain cannot be expected to cover the whole ground unaided, even if the exigencies of time and expenses for travel could be met. Responsible local workers, like Mr. Carr, are required for all branches of zoology and botany, who, by their own enthusiasm, or aided by the organisation of their local societies, will make themselves responsible for one small part of the field of natural history in the immediate neighbourhood in which they live, and by care, patience, and steady work gradually get together the necessary data from which a true and accurate knowledge of the British flora and fauna can be obtained. Mr. Carr's paper is abundant evidence of the need for such work. No fewer than 335 species in his list are recorded from the British Isles for the first time, and sixteen of the species are new to science. Mr. Carr has had his identifications confirmed and his material examined not only by Mr. Morley but also by Profs. Habermehl and Schmiedeknecht and other leading authorities on the continent. His list is thus authoritative and forms a very valuable contribution to British zoology. Research of this kind is being done widely throughout Great Britain, but we would especially plead for more co-ordination and co-operation in such work by the local societies and urge upon them the example of Mr. Carr's work.

The smaller and less wealthy local societies have received much encouragement and stimulation by their affiliation to form larger bodies, of which the Yorkshire Naturalists' Union is so splendid an example. This and other similar bodies, like the recently formed Union of South-Western Societies, the South-Eastern Union of Scientific Societies, the Lancashire and Cheshire Fauna Committee, and the Faunal Survey of Glamorgan, are attempting to systematise research among affiliated societies and to carry it out on the broad lines suggested above. We should like to see this principle of larger unions extended to embrace the whole country, so that with the local societies affiliated to their proper union, and the unions in turn affiliated to one or other of the scientific societies in London, or,

as now, to the British Association, a complete organisation would be brought into being for the thorough co-ordination of the work of local societies.

The unions perform another and perhaps equally important function in bringing the results of scientific research before the general public of the areas they represent, by holding annual congresses at which leading men of science deliver addresses on the special subjects of their own work. The annual volume issued by the South-Eastern Union of Scientific Societies for 1924 gives an account of its annual congress held at Guildford last year, at which Sir Richard Gregory presided and delivered an inspiring address on "Science in Civilisation," in which he sought to revive the belief in the power of science to promote spiritual and material progress and to plead for the fuller recognition of what it has done for the benefit of man. Among the sectional addresses delivered at this congress may be mentioned "Evolution and Eugenics," by Dr. A. F. Tredgold; "The Educational Value of Regional Survey," by Sir F. G. Ogilvie; "Some Remarks on Adaptation," by Dr. A. B. Rendle; and "Modes of Protection in the Pupal Stages of Butterflies and Moths," by Prof. E. B. Poulton.

It is impossible to estimate the value or to over-emphasise the importance of the work which the larger unions are doing by this means. A direct link is established between the local societies and scientific workers of the first rank, and the stimulus which the former receive as the result of this contact must largely influence their members and encourage them in the work they are seeking to do.

From the same report we learn of another branch of work which the South-Eastern Union is endeavouring to do, namely, the compilation of a card catalogue of all faunal records for the area, with full notes of all localities. Such bibliographical work is important and useful, and we are glad that the Union, as well as other similar bodies, is alive to the necessity of doing it.

An admirable example of the work done by a local society in one special field is provided by the first part of vol. 14 of the Proceedings of the Liverpool Geological Society here noticed. The seven papers which go to make up this volume include the results of original research by members of the Society, and four of them deal exclusively with aspects of local geology, to the elucidation of which they form a most valuable contribution.

The three publications under notice give ample evidence of the importance and real value of the work of the societies publishing them. They are representative of the work carried on by kindred societies all over Great Britain, and they provide a splendid example to others of the results which can be obtained by organised research, and the scope of the research which local societies can profitably and creditably pursue.

### Artificial Incubation.

TWO articles on "The Scientific Principles of Artificial Incubation," by Mr. Llewelyn B. Atkinson, which are of interest to biologists and physicists and of considerable importance to the poultry farmer, have appeared in the *Journal of the Royal Society of Arts*, November 28 and December 5, 1924.

In Egypt, China and Malay, natural methods of hatching have been replaced successfully by artificial for thousands of years, but among Western peoples the problem of artificial incubation was only solved so late as 1882, when Hearson produced his incubator with a capsule temperature regulator. The Chinese plan is described in "Farmers of Forty Centuries" by Prof. King of the University of Wisconsin, and it

is claimed that with this apparently crude method 95 to 98 per cent. of the fertile eggs are hatched. By the Egyptian method described by Capt. Cadman at the Harper Adams Poultry Conference, 1923, 85 to 90 per cent. of the fertile eggs are hatched. Using modern European and American incubators, there is an all-round hatching efficiency not greatly exceeding 55 per cent. of the fertile eggs, though there are plenty of hatches up to 85 to 90 per cent. It is accepted that incubator-hatched chicks compare very unfavourably with those reared by the mother hen, and that the troubles attendant on artificial incubation do not end with the hatching.

Mr. Atkinson sets himself the task of finding why it is