

Mr. Reynolds has reminded us that it was in 1869 that Scott Russell wrote "Systematic Technical Education for the English People" in order to "move the minds of English statesmen." Since that date we have nationalised elementary education, and the process of nationalising secondary education proceeds apace. Signs of further realisation of that national organisation of which Sir Norman Lockyer has long been an advocate are to be seen in the Minority Report of the Poor Law Commission and in the recent transfer to the Board of Education of the control of Exchequer grants to universities. The Continued Education Bill introduced by Mr. Runciman fails as a practical measure by reason of the absence of financial provision and of the too-early age for leaving school; but its introduction is welcome as evidence that educated public opinion calls for Governmental action. The London University Commission can scarcely fail to throw light on many of the difficulties which beset the subject. The proposed Teachers' Council will bring together in one national organisation teachers in universities, technical institutions, secondary and elementary schools. All these phenomena afford evidence of an awakening national spirit in matters educational, and the main purpose of this article is to urge all interested to bend their backs to the work of nationalising technical education. By so doing we may advance an important step towards the realisation of Scott Russell's ideal, viz. "to show how to form a nation of well-educated Englishmen, where each workman shall thoroughly know his work; where each foreman shall thoroughly understand the right principles and best methods of executing that work; and where each master of a manufactory, and each member of a profession, shall have received the highest education in the philosophical principles and modern methods of his art, science, or profession."

G. F. DANIELL.

#### ATOMIC WEIGHTS.

THE issue of the Proceedings of the Chemical Society for October 30, vol. xxvii., No. 390, contains the report of the International Committee on Atomic Weights for 1912. At the request of the society the committee wisely acceded to the suggestion that the annual report should be published prior to the beginning of the academic year in order that teachers and students during any given session may not be exposed to the possible inconvenience of having to deal with two sets of numerical values during their lecture or laboratory courses.

There is no doubt that the annual review of the state of contemporary knowledge respecting the values of the fundamental constants known as the atomic weights of the elements acts as a constant stimulus in securing the attention of workers to the importance of the subject; and the critical examination to which the various contributions to the more accurate ascertainment of these values is yearly subjected by the members of the committee tends to raise the standard of what should now be demanded as regards precision and validity of method. The consequence is that all the atomic weights of the commoner elements are now known to a degree of accuracy which stamps these values as among the best determined of all physical constants. They have been ascertained by a great variety of methods and by the use of a great variety of combinations in order to eliminate so far as possible the influence of constant errors. This is especially so in the case of elements such as oxygen, hydrogen, the halogens, nitrogen, carbon, sodium, potassium, silver, &c., which are themselves the bases upon

which the determinations of the atomic weights of the other elements ultimately depend.

There is, however, still much to be done before the whole of the atomic weights of the eighty or so elementary bodies are known to this degree of accuracy. In a large number of cases, methods of obtaining suitable combinations of the elements have still to be worked out. It is not always easy to be sure of the purity, individuality, or constancy of composition of such combinations. Methods, too, of quantitative determination may be faulty, or may rest upon a doubtful basis. The efforts of chemists are therefore at the present time mainly directed to attempts to remove these conditions of uncertainty, since they constitute by far the chief sources of error—far greater, indeed, than any uncertainty due to the operation of weighing, for, thanks to the combined efforts of mechanicians and instrument makers, the modern chemical balance, intelligently and skilfully used, is fully equal to the demands which modern atomic weights work, at least in its present stage of development, demands of it.

#### M. J. B. EDOUARD BORNET.

BOTANISTS will learn with regret that the death of the eminent phycologist, M. Edouard Bornet, occurred at Paris on December 18, 1911. Born at Guérigny in 1828, Bornet began by studying medicine, but early in his career turned his attention to cryptogamic botany, and under the direction of Tulasne and Léveillé devoted his energies to the study of algæ and lichens. On this subject, which he continued to pursue throughout his life, he published important papers and memoirs, whilst the garden at Antibes became during his supervision celebrated as a centre of phycological research.

Bornet's work was specially characterised by the care with which he unravelled the life-history of cellular plants, and in his numerous systematic papers the value of this fact is always apparent. His investigations in conjunction with Thuret on the fertilisation of algæ (especially of the *Florideæ*) were most valuable, and the two large volumes, "Notes Algologiques" and "Études Phycologiques" have been the admiration of all subsequent workers. Bornet also tackled the lichen problem, and the strong support which he gave to Schwendener's views as to the dual nature of these plants led to the early recognition of the accuracy of Schwendener's position. He isolated and specifically determined the algæ which enter into the composition of a large number of lichens, and described the method by which the hyphæ envelop the algæ, as well as the mutual benefit derived from the intimate association of the algæ and fungi. He came to the conclusion that every gonidium of a lichen can be referred to a species of algæ, and that the connection of the hypha with the gonidia is of such a nature that it excludes the possibility of one organism being produced by the other. Amongst his systematic works the account of Schousboe's Mediterranean algæ and the joint revision with Flahault of the *Nostocaceæ* are the most important.

Bornet was "Officier" of the Legion of Honour, and was awarded the gold medal of the Linnean Society in 1891. In 1910 he was elected a foreign member of the Royal Society. British algologists often appealed to Bornet for aid in taxonomic questions, and always found correspondence with him a pleasure, not only on account of his characteristic thoroughness, but by reason of his appreciative interest and unflinching courtesy.

A. D. C.