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A Representative Body for Science in Great Britain.

THE invitation sent out by the National Union of Scientific Workers to all those who have made science their vocation, to assist in building up an organisation which shall be fully representative of their various interests, may appear to some to be superfluous. They may argue that the functions which it is proposed this representative body should perform come within the scope of the legitimate activities of existing bodies, the various learned societies, propagandist bodies like the British Association and the British Science Guild, and the professional institutions the members of which are engaged in the teaching and practice of science. Others, while prepared to agree with the statement that none of the existing bodies is fully representative of science and the scientific worker, may feel that this is an advantage rather than a disadvantage, in that it is conducive to the freest expression of the will of the individual. They may fear that the establishment of a code of professional ethics, for example, might result in the growth of a narrow professionalism deadly to the spirit of science.

A hundred years ago similar objections were raised to the formation of the British Medical Association. Some qualified physicians, surgeons, and apothecaries on one hand, and all the quacks on the other, regarded this body with the greatest disfavour, the former because they resented the implication that the existing bodies were not all-sufficient and wished to safeguard their right to control their respective branches of the medical profession, the latter because they were fearful of the material consequences to themselves. Yet it cannot be seriously suggested that the peculiar form of professionalism which was established mainly through the initiative and instrumentality of the British Medical Association has not been of the greatest advantage to the members of that profession and even more to the public. It must be acknowledged that the type of professionalism which insists that the results of ameliorative research should be made available to the whole world, which insists also that the discoverers themselves shall not derive any immediate and direct pecuniary benefit from them, is expressive of the highest ideals of service and calculated to attract to the profession some of the finest spirits of the age. Neither can it be said that the prestige of the Royal Society of Medicine, the Royal College of Physicians or the Royal College of

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Surgeons, or the faculties of medicine of the universities of Great Britain suffered through the activities of the democratically constituted body: actually their prestige was enhanced. The medical profession is practically a self-governing body, members of the profession predominate on the General Medical Council, and the Government puts large funds at the disposal of the Medical Research Council, most of the members of which, and the chief administrative officer, are also members of the medical profession. Moreover, they act in an executive capacity, and not merely an advisory capacity like the scientific members of the Committee of the Privy Council for Scientific and Industrial Research.

The suggestion that the proposed body for science is superfluous is disposed of by the signatories and supporters of the present appeal: among them are some who have held or are at present holding high offices in learned societies and professional institutions. In another category is the vague fear that such a body would tend to warp the spirit of the individual scientific worker or restrain his freedom of action in any way. Much would depend on the character of the restraint. It might quite reasonably recommend its members not to apply for appointments where low initial salaries were not compensated for by the prospects of a moderate competency later, or where other conditions of service were notoriously bad. But it is difficult to imagine in what other ways it would fetter the judgment of an individual. It can scarcely be imagined that it would demand a thirty-six-hour week, or that it would exhibit that peculiar vice of modern trade-unionism—the excessive demarcation of function—or even that it would proscribe certain types of research. It is obvious that it must do none of these things. On the contrary, one of its most important tasks might be the freeing of research workers in certain industrial undertakings and government departments and State-aided institutions from many of the unnecessary and irritating restraints from which they suffer to-day—conditions which are only possible because of the lack of organisation among the victims. Just as the British Medical Association broke down the narrow professionalism and exclusiveness of the older sectional organisations, so could the proposed body promote unity among the many distinct and overlapping sectional bodies in science.

It is a little unfortunate that the general newspapers, in commenting on the appeal, have unduly stressed its material aspect, and almost entirely

ignored the wider aims outlined. Naturally, a body which exists for the purpose of furthering and protecting the interests of scientific workers must do all in its power to bring about an improvement of the salaries and other conditions of service of its members. The shortage of men and women of the first rank for research has been noted in nearly every report on scientific research which has lately been published, and this shortage is attributed to the slender material attractions of a career which demands not only a rare type of mind, but also the utmost perseverance and self-training. Amateurs of the type of Cavendish and Darwin are few in number. The ranks of research workers have now to be filled by those to whom science must be a profession. "Human nature," stated the *Observer* last Sunday, "would have to be more exalted than it is to secure that the highest gifts would always be devoted to the service of knowledge for a reward much lower than accrues to mediocre grades of business ability." Clearly, it is the duty of the profession of science to ensure that the value put upon its services is sufficient to attract the highest type of recruit.

More is, however, demanded. Scientific workers must be valued not only for their achievements in harnessing the forces of Nature to the service of man, for giving him a greater measure of control over his environment by their successes in the combat against the diseases which afflict human beings, animals, and plants; for the material blessings they bestow on communities, or for the potency of the lethal weapons they have devised. They must be valued for their greatest achievement, the habit of mind which their patient and persevering observations and inquiry has engendered. They can bring to the examination of world problems an outlook which cannot rest content with partial and incomplete solutions. Hitherto, they have been denied the opportunity of directing or sharing the control of the affairs of a civilisation for which they are mainly responsible. Again, the remedy lies with scientific workers themselves. They could, if they were united in a great resolve, make the nation understand the contributions they have to offer to its problems, social problems, industrial problems, problems of finance. It is essentially their function, and not primarily that of a government department, to state the aims and the needs of science, and how best those needs can be met. It is their paramount duty to insist that science should be adequately represented in the councils of the nation, and they could best accomplish that end if they presented

the appearance of a disciplined force instead of unorganised or inchoate and impotent factions.

It may be thought that unity in science will be best accomplished by the formation of a federal council upon which the various learned societies and professional institutions can be represented, rather than by a body aiming at becoming representative of these varied interests on the basis of individual membership. Scientific workers must realise, however, that to be effective, a federal council must have executive authority. It must be in a position, should the necessity arise, to take action involving each and all of the constituent bodies without direct reference to them: in other words, the constituent bodies must delegate large powers to their representatives. The breakdown of the Conjoint Board of Scientific Societies was largely due to the reluctance of the various societies to grant their representatives any such authority; and, in the end, to the Royal Society deciding not to support an appeal to Government for increased aid for the publication of scientific papers. Other attempts to obtain concerted action by the various societies have been equally unfortunate. On the other hand, if scientific workers are of opinion that a representative body able to speak with the authority of the majority of men and women professionally qualified for scientific service by their university degrees or other qualifications, is desirable for the advance of science and civilisation, they should make their wishes known.

Modern Geophysics.

Lehrbuch der Geophysik. Herausgegeben von Dr. B. Gutenberg. Lieferung 1. Pp. 176. 9·75 gold marks. Lieferung 2. Pp. 177-400. 13·80 gold marks. (Berlin: Gebrüder Borntraeger, 1926.)

GEOPHYSICS has now its 'Lehrbuch'; at any rate, it has two-fifths of one at the moment of writing, and the remaining instalments are promised for an early date. The difficulty that no single author can cover the whole subject has been met by obtaining the collaboration of a number of authors, and the whole is under the editorship of Prof. B. Gutenberg, whose distinguished work has already led to great advances in seismology and the study of the propagation of sound. The first two parts are by Profs. A. Born, E. A. Ansel, A. Sieberg, J. Bartels, and Gutenberg himself.

The opening chapter consists of three pages on cosmogony by Born, and gives short summaries of the nebular and planetesimal hypotheses of the origin of the solar system. It is rather unfortunate in mentioning work of mine in support of the planetesimal hypothesis; though the hypothesis I favour starts with the same initial assumptions as the planetesimal hypothesis, to the authors of which I have often expressed my indebtedness, it happens that the principal modification I have found necessary consists in dispensing with the planetesimals, and consequently a different name is needed for the theory I have advocated. The author decides that the primitive earth was fluid; this agrees with my own views, but not with the original form of the planetesimal hypothesis.

Prof. Born then gives a condensed account of the classification of rocks, with much useful information about their composition, mechanical properties, and thermal conductivity. Such information in an accessible form has long been needed; most analysts seem to think that it is much less important to know the density of a rock than whether it contains 0·3 or 0·5 per cent. of titanium. On p. 8 aluminium has somehow escaped mention as a constituent of felspars.

The composition and radioactivity of meteorites are then described, and Prof. Born goes on to the abundance of the chemical elements in the crust. The greater density and basicity of suboceanic rocks in comparison with continental ones are brought out. Data concerning radioactivity are given, but thorium contents are given only for basalts. A very good account of methods of determining geological time follows; De Geer's method for post-glacial time is included. The main geographical features of the earth are described in the next chapter.

There is a remark on p. 52 that the melting-point of basaltic rocks at atmospheric pressure is about 200°-300° C. lower than that of granite ones, which is given as 1100°. F. W. Clarke gives 1240° for granite, and values from 1060° to 1250° for basalt ("Data of Geochemistry," 1924, 298-301). J. H. L. Vogt gives 1250° for the crystallization point of gabbro, which is chemically similar to basalt, and 1000° for granite ("Economic Geology," 1926, 207-233). The latter estimates refer explicitly to dry material, but it seems to be generally believed by geologists that in natural conditions the melting-point of granite is more affected by water than that of basic rocks. A reconsideration of the data on this question is overdue; such a conflict of opinion on some of the most important