QUOTATIONS

THE ORGANIZATION OF SCIENCE

I WONDER whether other readers of *Nature* besides myself caught the interference fringes from three facets of this glittering subject in the issue of December 2? The first was the Royal Society's advertisement for applications for grants for scientific investigations from the government fund; the second, the editorial contrast between the rates of pay for legal and for scientific services; and the third, the anniversary address of the president of the Royal Society, containing the suggestion that science does not take its place in the national organization because the general public looks upon scientific investigations as a hobby.

What else can the general public do while men of science, in dealing with one another, generally act upon the principle that scientific investigation is a hobby for which facilities are required, not payment? The demonstration afforded by the Government Grant Committee and the Committee of Recommendations of the British Association is conclusive. The normal practise is for these committees to be asked to supply a portion—rarely the whole—of the expenses of some scientific investigation. The applicants in reply to the advertisement will think it meritorious to offer their brains and the time required to use them without asking for any payment. That is the true criterion of a hobby. So great is the power of science to transform serious occupations into hobbies that even lawyers sometimes find themselves astride and ambling with the rest.

In justification of the scientific societies, it may fairly be said that they were intended for the riding of hobbies, and everything in their constitution and practise conforms with that eminently useful ideal. Scientific societies rely very largely upon unpaid work, and long may they continue to do so. One of their chief attractions is that within their precincts there is a respite from the wearing obligations of debit and credit. One can not find the like about a law court or a house of business, where as a rule those who are paid most are treated with the highest respect.

It is the difference between hobby and business that brings us to the parting of the ways. If the national scientific effort is organized through the agency of societies where all the best work, even by the officers, is done without any regard to payment, we can not expect the public to look upon science as a business into which pecuniary considerations enter. It is, and must remain, a hobby. If, on the other hand, there should be created a Privy Council for Science, as Sir William Crookes suggests, there would be at least a permanent staff to whom the idea of paying for brains and time would not be fundamentally repugnant as it must be to the officers of a society.

The idea of scientific investigation as a hobby does not necessarily originate with the general public; it is indigenous in the older universities, where there are a large number of college officials intellectually competent to undertake researches, some of whom do and some do not. At Cambridge in my time scientific investigation was the occupation of the leisure of men whose maintenance was provided by the fees and emoluments of teaching. It was as much a hobby as chess or photography. There was no sense of collective responsibility for providing the nation with answers to its scientific questions. Scientific researches had become an element of competition for rewards of various kinds, and some "research students" were paid; but the idea of "making a living" by scientific investigation never reached the surface, though the merit acquired by research might weigh in the appointment to a post for teaching or administration. On the contrary, the early agitation for the endowment of research was regarded as finally disposed of by calling it the research of endowment, as though the wish to be paid were conclusive evidence of insincerity.

The suggested council will have some difficulty in organizing adequately paid research. The endowed researcher in the national interest must expect an occasional audit of an imperious character, and his employers must see their way to act upon it. With teaching the difficulty is less. If the students of one year do not respond, the next year may be more successful. It takes just about a lifetime to

satisfy ourselves about our own weaknesses. The responsibility is nicely divided; it is just as much the duty of the students to learn as of the lecturer to teach, and neither student nor teacher has the material for a considered judgment upon the matter. That is why the "hobby" system, with occasional rewards for exceptional success, is so popular. It can be worked best by letting things go their own way.

The present state of things, which all agree in deploring, can be altered by drawing a clear distinction between a society's hobbies and the nation's purposes, and entrusting them to separate administrative management. Mr. Carnegie has made it clear that the financial detachment of a voluntary society is not essential to the successful organization of scientific research.—F. R. S. in *Nature*.

SCIENTIFIC BOOKS

Studies in Edrioasteroidea. I.–IX. By F. A. Bather. Published by author at "Tabo," Marryat Road, Wimbledon, England, October, 1915. Pp. 136, 13 plates. Price 10s.

This book by the well-known authority on echinoderms contains a series of articles that were published from 1898 to date in the *Geological Magazine,* but of which no separata were distributed because the plates were lost while in store. In consequence of this unfortunate circumstance several authors, the present writer among them, have become guilty of ignoring important results of Dr. Bather's studies.

The earlier papers contain elaborate descriptions of all known Edrioasteroidea based on so careful preparation of specimens that months were spent in several cases in cleaning a single specimen. By this method the finest details, notably in our North American *Edrioaster bigsbyi,* were brought out, such as the hydropore and the small plates of the periproct. Three new genera are distinguished, but most important are the three concluding articles, published in 1915, which contain the morphology and bionomics of the Edrioasteroidea, a comparison of their structure with that of the Asterozoa, and a discussion of the genetic relations to other Echinoderms. In these chapters Dr. Bather not only succeeds in demonstrating much closer resemblances between these early pelmatozoans and the Asteroidea than were hitherto suspected, but also in tracing the probable course of derivation of the Asteroids from the Edrioasteroidea. These conclusions give the work a distinctive value for all students of phylogeny.

The book is finely illustrated with diagrams and a dozen plates of good photographs and very lucid drawings. Rudolf Ruedemann

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SPECIAL ARTICLES

ADAPTABILITY OF A SEA GRASS

While dredging during July, 1915, in the Gulf of Mexico near the Dry Tortugas on the Carnegie Institution's yacht, *Anton Dohrn,* the writer's attention was attracted to two comparatively rare plants. These plants, which are species found only in the western hemisphere, were remarkable not only for their curious and interesting morphology, but rather for the unusual conditions under which they were found growing. Although spermatophytes, these plants came up in the dredges with marine algæ from a depth of sixteen to eighteen fathoms, *i. e.,* ninety-six to a hundred and eight feet. The algæ associated with them were the usual species found in those waters, viz., *Caulerpa, Halimeda, Penicillus, Codium, Udotea, Acetabularia,* etc. Bottom samples taken with a clasper on the sounding instrument showed the Gulf floor here to consist of a fine white mud composed of calcareous débris such as broken corals, molluscan shells and echinoderm tests.

All the plants were carefully picked out of the miscellaneous material which came up in the dredges and preserved. These on being later brought north were identified by the writer as two species of *Halophila* du Petit Thouars, and the only members of the genus, as remarked above, to be found in North or South America, and belonging in the order Hydrocharitales. A brief description of these two species is given as they have a limited range in the tropical waters of the western