

pressions, language material must be worked over repeatedly in various ways, thereby insuring permanence of the impressions. The natural association of name and object must be made use of. That is, the learner shall not be taught to think from the foreign symbol to the symbol of the mother tongue, and from that to the object, but he shall be taught to think in the foreign language from the thing to the name and *vice versa*, just as he does in the mother tongue.

6. The ideal of persistence must be enforced by accomplishing set tasks, tasks sufficiently difficult, and including not merely memory work but reasoning as well, as, for instance, translation and "free composition," in which he compares and discriminates, chooses and rejects.

The imagination, the esthetic and the moral feelings must be fed by reading literature of high moral and esthetic standard, and by laying emphasis on the qualities which are to be inculcated.

CHARLES HART HANDSCHIN

ACADEMIC FREEDOM

TO THE EDITOR OF SCIENCE: In the current issue of SCIENCE is a letter on the subject of academic freedom, in which is given a quotation from an address delivered some years ago by President Schurman. Your correspondent regards the statements in the address as highly commendable, but it seems to me that the address contains within itself the "enzym" of its decomposition.

Academic freedom is like friendship "but a name that lures the soul to sleep." Freedom of teaching is permitted only so long as no serious attack is made on widely received opinions. As the "Professor" says, in Mallock's "New Paul and Virginia," "Opinions can only be tolerated when they lead to no possible consequences." Let us suppose, for instance, that when Professor Schurman's address was published, a subordinate instructor in the university had spoken as follows: "When President Schurman speaks of 'God's truth' he speaks of something about which he knows no more than a gibbering idiot in

the nearest asylum. God, if he exists, has apparently not declared himself to anybody. All such allusions are either mere catering to popular superstitions, or are on the same plane as the beliefs of the lowest savages." How long would this instructor retain his place in the university? I would be pleased to hear what your correspondent would advocate concerning a person who should so express himself. A hundred other examples can be selected. What would become of a subordinate instructor who should at a Washington's birthday address say that Washington was a traitor and should have been hanged by the British, if they had caught him.

HENRY LEFFMANN

WHEN the necessity of freedom for university teachers and investigators is emphasized, it is never assumed that this freedom carries with it a license to do or say anything and everything. University teachers do not claim that they constitute a class with special privileges. But as a body of men with serious and important work to do, they claim the freedom that is necessary to enable them to perform this work and to fulfill their obligations to society. Freedom in this field, as everywhere, is a reasonable freedom, involving law, responsibility and due regard for others. Academic freedom has its roots and its justification in the duty which the teacher owes to his students and to the community. It may well be that at times it is just as important to emphasize this duty and responsibility as to call attention to the necessity of freedom. But one side is the counterpart and complement of the other: where there is no freedom there can be no responsibility, and where there is no feeling of responsibility there can be no genuine freedom. If this is true, it would seem to follow that the limits of a reasonable freedom can not be fixed by any abstract definition. What are the reasonable limits in any particular case must be decided by the whole set of circumstances, as judged by reasonable men living in a reason-

able society. Of course this involves a circle; but there is no way of escaping it.

J. E. CREIGHTON

SCIENTIFIC BOOKS

An Introduction to the Study of the Protozoa.

With Special Reference to the Parasitic Forms. By E. A. MINCHIN, Ph.D., F.R.S., Professor of Protozoology in the University of London. London, Edward Arnold; New York, Longmans, Green & Co. Pp. x + 517. Price \$6.00 net.

When an "Introduction" to the study of a special group covers over 500 pages of which perhaps a third are in fine print, a reader might infer that the main text would require a lifetime to prepare and digest. Of the many students of the group described in this book not a few have given an entire lifetime and others are now devoting all of their energies to the main text. Amongst these Professor Minchin is one of the most conspicuous and best informed. We think, however, that he is a trifle too modest in calling this splendid presentation of a difficult field an "Introduction," for the great variety of subjects discussed, the judicial attitude assumed, and the wealth of references used, are more characteristic of a treatise than of a primer.

Like the majority of general works on Protozoa, this one consists of two main sections, one devoted to general problems, the other to special groups. Such treatment involves more or less repetition and requires many cross references, but is most useful in picturing the nature and extent of problems in general biology, as illustrated by the Protozoa. In the general section four chapters are devoted to the distinctive characters, modes of life, general physiology and reproduction; five chapters to the general organization and life cycles, and one chapter to fertilization and sexual phenomena of the Protozoa. In the more special part, one chapter is given to the Sarcodina, two to the Mastigophora, three to the Sporozoa and one to the Infusoria, while a concluding chapter deals with the general phylogeny of the Protozoa and with two doubtful groups, the Spirochaetida and the

Chlamydozoa. The sub-title of the book disarms criticism of the disproportionate treatment of the four special groups, the Infusoria receiving the least attention, but such treatment may go a long way in overcoming the too-common generalization that ciliates are the Protozoa, and may help to a broader comprehension of the biological value of representatives of the other and larger groups of unicellular animals.

The problem of karyokinesis, especially the evolution from simple to complex mitotic structures, is well treated; a more critical discussion of the so-called chromosomes in Protozoa and the evolution of chromosomes would have been a welcome addition, since there is the greatest confusion at the present time over this apparently simple matter. The terms "chromatinic" and "achromatinic" are used in place of chromatic and achromatic, the change being adopted on the ground that the latter terms have a distinctly different meaning in optics. We agree that the change is desirable, but there is little probability that it will have a wide following, since these terms are firmly grounded in modern biology. Another new term—"chromidiosome" for the smallest unit of chromatin inside or outside of the nucleus, is most useful so also is the word "endosome" for the German term "Binnenkörper."

Minchin makes a distinction between Protozoa of "cellular" grade and those of "bacterial" grade, but the effort seems to be somewhat obscure and does not help much in defining the Protozoa, having a perplexing rather than a simplifying effect. The bacterial nucleus is sometimes a single karyosome which might be compared with a typical nucleus; more often there is no morphological nucleus, but chromatin granules are scattered about the entire organism. It is presumably this type of bacterial structure that Minchin refers to in Protozoa of bacterial grade, and if so the Spirochaetes might well fall within such a group; but these are treated separately as a doubtful group. On the other hand, some well-defined Protozoa, such as *Dileptus gigas*, for example, have similar scattered chromatin