No chemical tests were made for the presence of cyanide.

WESLEY P. FLINT
STATE ENTOMOLOGIST'S OFFICE,
URBANA, ILL.,
August 6, 1915

A NEW MITOTIC STRUCTURE

IN the *Journal of the Royal Microscopical Society,* April, 1915, Mr. E. Sheppard, F.R.M.S., published a paper entitled "A New Mitotic Structure Disclosed as the Result of New Technique." He describes at the ends of the dividing chromosomes "bead-like chromatin extensions" where the spindle fibers are attached. I want to draw his attention to the fact that these structures are well known to cytologists and that there is no special technique needed for their disclosure. My own experience is that they are most extremely developed in the maturation divisions of Trematodes. I have figured them in my paper "Die Chromatinreifung der Geschlechtszellen des Zoogonus mirus, etc.," *Arch. Zellforschg.,* Vol. 2, 1908. Better figures are found in Grégoire's publication, based on the same slides "La réduction dans le Zoogonus mirus, etc.," *La Cellule,* 25, 1909. He calls these structures "renflement d'insertion." For *Fasciola hepatica* they are described by A. Schellenberg, "Ovogenese, Eireifung und Befruchtung von *Fasciola hepatica* Arch. Zellforschg.," Vol. 6, 1910, and I know their presence in some other trematodes.

R. GOLDSCHMIDT

A METHOD OF MAINTAINING A SUPPLY OF PROTOZOA FOR LABORATORY USE

ONE of the difficulties that confront the teacher of elementary biology, especially in those institutions where a large number of students must be provided for, is that of obtaining a satisfactory supply of protozoa, especially of such forms as *Ameba, Euglena* and *Paramecium.* I have overcome this difficulty in such a simple manner that it may be worth while to state briefly how I keep a supply of these forms on hand. Four years ago I obtained from a pond some water and rubbish in which were present a few individuals of *Ameba, Euglena* and *Paramecium.* I prepared a culture made by boiling a handful of hay in about a half-gallon of water until the liquid assumed a dark brown color. This with a part of the hay was placed in a two-quart, cylindrical battery jar and permitted to stand open in the laboratory for twenty-four hours. The jar was then covered loosely with a pane of glass and set aside till bacteria had formed a scum over the surface of the liquid. The pond water and rubbish were then added and the jar still covered was set in a north window of the laboratory.

In a short time an abundance of *Paramecia* was present in the culture. The *Euglenæ* and *Amebæ* multiplied more slowly, but at the end of six months the jar was swarming with these two forms, while the *Paramecia* had decreased in number and were to be found chiefly at the bottom of the jar. Such a culture will usually afford a good supply for a year but I prepare a new culture every six months and stock it from the old one. By this method I have for the past four years kept on hand an abundant supply of these protozoa without going outside of my laboratory. At the opening of college I have on hand a culture newly prepared, in order to have an abundance of *Paramecia,* a second culture six months old and a third one year old. The hay infusion and the decomposing vegetable matter in the jar seem to furnish suitable food for the bacteria and *Euglena; Paramecium* feeds on the bacteria and *Ameba* on the encysted *Euglena.* Rotifers and a host of other protozoan forms abound in the cultures but the three forms most used in laboratory exercises are always present in abundance. In my laboratory I find it necessary to keep the culture in a north window; direct sunlight is not only not necessary but decidedly harmful, due probably to the heat rather than the light.

J. B. PARKER
BIOLOGICAL LABORATORY,
CATHOLIC UNIVERSITY OF AMERICA

QUOTATIONS

SCIENCE IN NATIONAL AFFAIRS

WE printed last week a valuable address by Professor J. A. Fleming on "Science in the

War and after the War." Though the address was an introductory lecture at University College, London, and was open to the public without fee or ticket, only the briefest mention of it appeared in the periodical press, and the points of national importance dealt with in it were unrecorded, except in our columns, in which it was our privilege to publish the address almost in full. We understand, of course, that the demands made upon the space available in the daily papers are many and insistent, yet we should have supposed that during the progress of a war in which victory will depend as much upon science and machinery as upon men, a summary of some of the points made by a leading authority upon applied science would be of greater public interest and importance than much of the unsubstantial chatter with which we are supplied daily.

In the course of his address, Professor Fleming himself supplied a reason for the neglect of scientific aspects of national affairs, in comparison with the attention given to the superficial views of politicians and other publicists. While success in science is measured solely by discovery of facts or relationships, in politics and public life generally it is secured by fluent speech and facile pen. In scientific work attention must be concentrated upon material fact, but the politician and the writer attach greater importance to persuasive words and phrases, and by their oratory or literary style are able to exert an influence upon public affairs altogether out of proportion to their position as determined by true standards of national value. Power, as regards government of the affairs of the nation, does not come from knowledge, but from dialectics: it is the lawyer who rules, with mind obsessed by the virtues of precedent and expediency, and to him men of science and inventors are but hewers of wood and drawers of water.

Under a democratic constitution it is perhaps too much to expect that Parliament will pay much attention to scientific men or methods; yet, as was shown in the debate upon the scheme for the institution of an advisory council of scientific and industrial research last May, the members of the House of Commons are ready to support plans for bringing science in closer connection with industry. The monies provided by Parliament for this purpose are to be under the control of a committee of the Privy Council, which will be advised by a council constituted of scientific and industrial experts. The scheme was conceived rightly enough, but when it passed into the hands of officials of the Board of Education much of its early promise was lost. Most people would regard it as essential that the executive officers of a council concerned with the promotion of industrial research should know what is done in this direction in other countries, and have sufficient knowledge of science and industry to formulate profitable schemes of work. The success of such a body depends largely upon the initiative of the secretary; and in an active and effective council we should expect him to be selected because of close acquaintance with problems of industrial development along scientific lines. But what is the position in this case? The scheme is issued by the president of the Board of Education, Mr. Arthur Henderson, a labor member, who owes his post entirely to political exigencies, the secretary of the committee of the privy council is the secretary of the board, Sir Amherst Selby-Bigge, whose amiability is above reproach, but who knows no more of practical science and technology than a schoolboy, and the secretary of the advisory council is Dr. H. F. Heath, whose interests are similarly in other fields than those of science.

The belief that the expert—whether scientific or industrial—has to be controlled or guided by permanent officials having no special knowledge of the particular subject in hand is typical of our executive system. While such a state of things exists, most of the advantages of enlisting men of science for national services must remain unfulfilled. The various scientific committees which have been appointed recently have, we believe, been able to give valuable aid in connection with problems submitted to them, but they would be far more effective if the chiefs of the departments

with which they are associated possessed a practical knowledge of scientific work and methods. Without such experience the executive is at the mercy of every assertive paradoxer and can not discriminate between impracticable devices and the judgment of science upon them. While, therefore, the country has at its disposal the work—either voluntary or nearly so—of experts in all branches of applied science, it can not use these services to the best advantage unless the departments concerned with them have scientific men among the permanent officials; and that is not the case at present.

The unbusinesslike methods of government departments have received severe criticism lately, but nothing has been said about the unscientific method of appointing committees of experts without well-qualified officers to direct or coordinate their work. The reason is that, with scarcely an exception, no daily paper has any one on its staff possessing the most elementary knowledge of the meaning of scientific research. Our guides and counsellors, both on the political platform and in the periodical press, can scarcely be expected to interest themselves greatly in subjects beyond their mental horizon, so when scientific matters are involved they confine themselves to a few platitudes, or say nothing at all. They are unable to distinguish a quack from a leading authority in science, and prefer to exercise their imaginations upon sensational announcements, rather than discuss the possibilities of sober scientific discovery. In all that relates to the interests of science—and that means in the end the interests of the nation—the men who influence public opinion and control the public services are mostly unenlightened and therefore unsympathetic.

The tacit assumption that public committees or departments concerned with scientific problems must have at their head officers of the army, navy, or civil service is responsible for delay in taking advantage of available expert knowledge and for the neglect to make effective use of science in national affairs, whether in times of war or peace. Just as a member of the government may serve in turn as president of the Board of Education, Board of Agriculture, Board of Trade, or any other department, without possessing any special qualifications to comprehend the work of either, so a public official may be placed in a position to dominate activities of which he can not understand the significance. Some day we hope that this mad system will be swept away, and that the men who exert control in all government offices will be those whose training or experience make them most capable of doing so effectively.—*Nature.*

SCIENTIFIC BOOKS

A Budget of Paradoxes. By AUGUSTUS DE MORGAN. Reprinted, with the author's additions, from the *Athenæum.* Second edition edited by DAVID EUGENE SMITH. Two volumes, I., viii + 402 pp.; II., 387 pp. The Open Court Publishing Co., 1915. Price $3.50 per volume.

The similarity between the work of David Eugene Smith and Augustus De Morgan in the field of popularizing mathematics has long been familiar to students of the history of science. This similarity has extended to many details; both men have participated in the publication of elementary text-books of excellence, both are known as editors of the mathematical department of encyclopedias and dictionaries, both have been energetic collectors of mathematical books and other mathematical material, and both have been distinguished by a wide and human interest in all phases of mathematical development. Hence it is eminently fitting that as editor of this new edition of "A Budget of Paradoxes" we should have Professor Smith, who not long ago continued so ably in the "Rara Arithmetica," De Morgan's bibliographical work, represented by "Arithmetical Books from the Invention of Printing to the Present Time" (London, 1847).

The first question which occurs to the casual reader whose eye catches the title is regarding the significance of the word "paradox." De Morgan answers this [I., 2] in a manner that even to-day has meaning for many who publish books. "A great many individuals, ever since