more properly used in *Die natürlichen Pflanzenfamilien*, but here have become unnecessarily complicated.

Die natürlichen Pflanzenfamilien has been exceedingly unfortunate in the preparation of its cryptogamic portions, not only in the loss of its cryptogamic editor, but, before the completion of their work, of a collaborator in each of the series algæ and fungi, who were removed by untimely death. This has made the treatment of these groups very unsatisfactory, particularly the fungi, which are more varied and complicated and hence more difficult in treatment, and their *Uebersicht* in the present work is surely no improvement over the patch-work of the former treatise. While the *Syllabus* can probably be regarded as the expression of the clearest generalizations with reference to the relations of the higher plants, as a systematic arrangement of the cryptogams it is in many of its features unfortunate and in a few a lamentable failure.

L. M. UNDERWOOD.

A. Text-Book of Special Pathological Anatomy. By ERNST ZIEGLER. Translated and edited from the eighth German edition by DONALD MACALISTER, M.A., M.D. and HENRY W. CATTELL, M.A., M.D. New York, The Macmillan Company. 1896, '97.

Pathology in its modern sense is one of the youngest of the biological sciences, although its subject-matter ranks with anatomy in antiquity. No more rapid strides have been made by any department of biology than have marked the progress of pathology, and none has suffered greater transformation since the promulgation of the cell doctrine. It is to be remembered that it was a pathologist who formulated the doctrine *omnia cellula e cellula*. At the present time pathology embraces several fields more or less distinct, invading, in its persistent search for the prime causes of disease, the domains of botany, on the one hand, and zoology, on the other.

It seems to us natural to regard bacteriology as essentially a medical subject, although the number of species of bacteria of interest and known to the pathologist is but a fraction of those of which the botanist must take account. However, it is to the constant endeavors of the physician that the present relatively extensive knowledge of bacterial species and activities is to be ascribed. Without his quest for the cause of the contagious and infectious diseases, bacteriology as a science would scarcely exist to-day. In the same way the lowest animal forms will receive a new interest and meaning, and there will arise a new impetus to their study, so soon as more diseases are traced to them and improved technical means make it possible to control their investigation, as can now be done with the bacteria.

A fair idea of the progress of pathology can be gained by comparing the two English editions of the text-book under consideration, the first—that which appeared in 1884—with the present one. The main difference is not found in the greatly increased volume of the latter, but in the altered points of view and the definiteness of the one as compared with the other. Pathology, like other natural sciences, has been characterized, in its growth, by two stages—one the acquisition of data, and the other the orderly arrangement and classification of the accumulated facts. Workers all over the world are still busy collecting data and verifying, where possible, their observations and conceptions by experimentation under known conditions. The animal organism is exposed to so many influences of injurious nature—some generated within and others applied from without the organism—that there seems no end to the variety and complexity of the phenomena met with. Notwithstanding this fact, the complex problems of inflammation, new tissue formation, the causes of destructive lesions in liver, kidney and brain, are beginning to be understood no less than the diseases, such as tuberculosis, glanders and malaria, which are due to the invasion of microparasites into the body.

A text-book will of necessity be in the rear, never in advance, of a rapidly-growing subject. It fulfills its purpose, if it is a trustworthy record, in a convenient form, of the more important facts, and if it reflects the spirit of progress of the subject. This Ziegler's text-book has continued to do, improving with each successive edition, until now it has become one of the most useful books in any language. The rapidity with which it goes through editions is testi-

mony to the favor in which it is held by students in its own language, and it can be safely predicted that the new English translation will gain a large following among students of medicine in English-speaking countries. The work of the translators can be commended freely and that of the publishers equally.

Simon Flexner.

Johns Hopkins University.

SOCIETIES AND ACADEMIES.

ZOOLOGICAL CLUB, UNIVERSITY OF CHICAGO. MEETINGS OF THE SPRING QUARTER, 1898.

THE METAMERISM OF HIRUDO MEDICINALIS.

Results were obtained by the use of gold chloride and methylen blue.

The typical somite consists of the double nerve cord, Faivre's nerve, Leydig's cells, six ganglionic sacs, and two pairs of nerves, the anterior of which carries accessory ganglia. The anterior nerve is the principal sensory one, innervating all the ventral sense organs and the marginal and outer lateral on the dorsal side. The posterior nerve innervates the inner lateral and the median sense organs of the dorsal side. The innervation is pentannulate and dimeric, the two posterior rings of one somite being united with the three anterior rings of the next somite in the innervation.

The anal ganglion is clearly made up of seven somites, as indicated by the forty-two ganglionic sacs and the seven pairs of double nerves. The brain, including the supra- and sub-œsophageal ganglia, is likewise composed of seven fused somites. This is proved by the presence of forty-two ganglionic sacs and also by the peripheral distribution of the nerves. Altogether, then, the body of Hirudo consists of thirty-five segments, seven in the head, twenty-one in the body and seven in the caudal region.

V. E. McCaskill.

THE AXES OF THE ANNELID EGG.

The unfertilized egg of *Arenicola cristata* is flattened and elongated, thus possessing three axes of unequal lengths—approximately 1:1.8:2.2. The germinal vesicle lies somewhat nearer one end of the shortest axis and thus furnishes the only means of orientation at this time, since the cytoplasmic structure is uniform. Direct proof of the coincidence of these axes with those found at later stages is thus impossible, but the probability of coincidence is great.

At the time of formation of the first polar spindle the relations of the axes are 1:1.66:2.00; after fertilization and before cleavage and in the resting stages of two and four cells 1:1.37:1.50, eight cell stage 1:1.27:1.27.

In all cases the polar axis is the shortest, and, after cleavage begins, the longest axis is always parallel to the second cleavage plane and the third axis parallel to the first cleavage plane. Thus the first cleavage-spindle lies in the longest axis. In later stages the egg approaches a spherical form. The constancy of the axes in all cases where orientation is possible renders it extremely probable that they are always constant. The two long axes coincide with none of the axes of the adult, but are parallel with the first two cleavage planes.

C. M. Child.

Reviews and other papers presented during the quarter: 'Professor Minot on the Ancestry of Vertebrates,' A. L. Treadwell; 'Spermatogenesis of the Rat' (von Lenhossék), M. F. Guyer; 'Finer Anatomy of the Nerve Cell' (van Gehuchten), G. W. Hunter; 'Origin and Variation of the Wing-bars of Pigeons,' Dr. C. O. Whitman; 'Structure and Development of the Lens in Lower Vertebrates' (Rabl), Miss E. R. Gregory; 'Luminous Organs of Vertebrates,' Dr. S. Watasé; 'Cell-Lineage and Ancestral Reminiscences' (Wilson), A. L. Treadwell; 'The Placentation of Perameles' (Hill), Dr. W. M. Wheeler; 'The Eyes of Amphioxus' (Hesse), Dr. W. M. Wheeler.

NEW BOOKS.

The Nature and Development of Animal Intelligence. Wesley Mills. New York, The Macmillan Company. 1898. Pp. x + 307. $2.00.

An Illustrated Flora of the United States, Canada and the British Possessions. N. L. Britton and Addison Brown. New York, Charles Scribner's Sons. 1898. Vol. III. Pp. xiv+ 588. $3.00.