

is calculated and the regular polygons treated, in particular those of five and of seventeen sides.

Congruence, symmetry, similarity, concurrence and collinearity are taken up in the next section, and Desargues's, Pascal's, Poncelet's and other famous theorems presented for demonstration.

The remaining chapters treat of conics and other plane curves, with historical notes and references to certain applications, completing in an attractive way a valuable addition to the literature of elementary geometry—a serviceable condensation of mathematical properties, theorems, puzzles and problems. We may be permitted to doubt, however, whether the average student who has attained to that acquaintance with radicals, logarithms and positional geometry which is evidently assumed in Chapters XI.-XIV., will often stop to obtain his actual results by folding. In fact the frequent use of the word 'draw' implies the author's permission of a shortcut; but it would probably be an encouragement to the pupil actually to bring his folding into the higher problems if in connection with it the use of the compass, dividers and straight-edge were frankly sanctioned. Simply in the interest of accuracy in folding, a thin rule, preferably of nickel-plated steel, beveled, would be desirable.

Where the claim of the author is so modest and his aim in so high degree attained, the task of criticism is a light one. It is singular that the expression 'equal halves,' if in the original, should have passed two revisers unnoticed; and one could wish that pericycloids, the involute and the cartesian ovals had not been omitted, and that the relative importance of the curves treated were better indicated by the space allotted to them.

The editors have performed a genuine service in bringing this work before an American audience and in such neat and attractive form. The twenty-six exquisite half-tone illustrations with which they have replaced the line drawings of the original, are a decided enrichment of the volume. The practically equal number of footnote references to their own series, in one case duplicated, compels the

question how far permission to edit carries with it advertising privileges.

F. N. WILLSON.

PRINCETON, N. J.,

February, 1902.

*Pleuronectes (the Plaice)*. By F. J. COLE and JAMES JOHNSTONE. Liverpool Marine Biology Committee Memoirs, No. 8. London, Williams & Norgate. Dec., 1901. Pp. 260, 11 plates. Price, 7s.

In these L. M. B. C. Memoirs a single animal or plant type is described by a specialist in such a way as to serve primarily the interests of college and private students of biology and young amateurs. They are, however, far more than mere laboratory guides, being authoritative sources of information based on original work upon species which for the most part are not elsewhere adequately described.

This, the latest memoir of the series, is devoted to an important food fish, the plaice, containing descriptions with excellent figures of the skeleton, abdominal viscera, blood vascular system, nervous system and sense organs, together with appendixes on life history, habits and practical fishery matters. Its chief interest for biologists in general lies in the discussion of the asymmetry of the Heterosomata, or flat fishes, of which the plaice is probably the best known British representative.

In explaining this asymmetry the authors follow Traquair, disposing first of the mischievous assumptions that the left eye has passed either through the substance of the head or over the top of the head to reach its definitive position on the right side of the body. "The fact is," they remark, "that the left eye is *not on the right side at all*. Its presence there is purely illusory. What has happened is that the *whole* of the cranium *in the region of the orbit* has rotated on its longitudinal axis to the right side, until the two eyes, instead of occupying a horizontal plane, have assumed a vertical one, and the left eye is *dorsal* to the right."

The part of the work next in importance to the discussion of the asymmetry is the section devoted to the cranial nerves, which are given a thorough critical treatment. The key to the

comprehension of the cranial nerves is the doctrine of nerve components as developed (chiefly by American students) during the past decade, a doctrine which apparently very few neurologists in Europe have yet really comprehended. The fifty pages of this work devoted to the peripheral nervous system will serve as an admirable and not too technical introduction to this important subject, and will doubtless hasten the day when it will filter down into the text-books.

C. JUDSON HERRICK.

#### SOCIETIES AND ACADEMIES.

##### RESEARCH CLUB OF THE UNIVERSITY OF MICHIGAN.

SINCE last reported this Club has held two meetings, one on December 18, 1901, the other on January 8, 1902.

At the former meeting, Dr. A. R. Cushny read a paper on 'Renal Secretion and Diuresis,' in which he first discussed the two chief theories on the subject and then attempted to apply them to the explanation of the diuresis induced by the intravenous injection of saline solutions. When a mixture of sulphate and chloride of sodium in equal parts is injected, the chloride of the urine first exceeds the sulphate in amount, while later the reverse is the case. This is most simply explained by the reabsorption of chloride in the renal tubules, which take up this salt much more readily than the sulphate. When the absorption is accelerated by partial closure of the ureter, which increases the pressure in the tubules, the chloride of the urine diminishes much more than the sulphate. The behavior of the chloride and sulphate of the urine thus confirms Ludwig's theory that the renal tubules are absorptive rather than secretory organs. In the discussion which followed, it was intimated by the reader of the paper that there were grounds to believe that the secretory cells of the renal capsule are unable to discriminate between sulphate and chloride and that the relative amounts of these in the glomerular fluid is determined by their relative proportion in the plasma of the blood.

At the conclusion of Dr. Cushny's paper, Professor Henry C. Adams spoke on 'Trusts.' Giving at first the older classification of busi-

ness and commercial organizations as limited by profitable administration, the speaker devoted his time to the enquiry as to whether conditions have so changed as to make possible the profitable combination into one organization of two or more formerly economically distinct classes of business.

At the meeting of January 8, Dr. Guthe spoke on the action of the coherer with special reference to the investigations which he has published in the *Annalen der Physik*, 4, p. 762, 1901, and in the *Physical Review*, 12, p. 245, 1901.

After a short description of the single contact coherer used by him and an explanation of the so-called decohesion, he calculated how near the metallic surfaces must be brought together in order to produce coherer action. The work of Earhart on sparking distances leads to the conclusion that the insulating layer can only have a thickness of a fraction of the wave-length of sodium light, while the distance corresponding to the critical voltages of different metals, as found by him, must be of molecular dimensions. Thus the thickness of the air film, if the original high resistance is really due to such a film, can be only a very small fraction of its normal value. But it seems unnecessary to assume the presence of a layer of air between the surfaces in all cases in which coherence takes place. The decrease in resistance or actual metallic contact between the coherer particles, Dr. Guthe believed to be due mainly to the welding together of the metals at the point of contact by the heat produced when even a minute quantity of electricity passes through an extremely small area of high resistance.

Dr. Guthe was followed by Dr. S. J. Holmes, who spoke on 'The Habits of Amphipods,' detailing many interesting actions in their life history. Portions of the results obtained by Dr. Holmes have been published in the *Biological Bulletin* and in the *American Journal of Physiology*. The later observations have appeared in abstract in *SCIENCE* in the report of the Chicago meeting of the Morphological Society.

FREDERICK C. NEWCOMBE,

*Secretary.*