(Edinb.), F. R. S, London and New York, Macmillan & Co. 1895. 8°, pp. xi+584, and 371 wood cuts. $4.00.

This volume of the *Cambridge Natural History* bears upon its cover the subtitle *Peripatus, etc., Sedgwick;* from which one gains no hint that the book consists chiefly of the first part of an extensive treatise on Insects by David Sharp. But such is the case, more than five-sixths of the volume being on this subject and by this author.

The volume is begun by an essay on *Peripatus* by Adam Sedgwick, the well-known authority on this genus. This essay, which gives the title to the volume, comprises only 24 pages; but it contains a very clear account of the structure, habits and development of these, the most generalized of all arthropods. To this account are added a synopsis of the known species and a map illustrating the geographical distribution of the genus.

Following the essay on *Peripatus* is one treating of *Myriapods* by F. G. Sinclair. This occupies about 50 pages of the volume. After a somewhat rambling introduction, there is given a brief synopsis of the orders and families of this class, based chiefly on the classification of Koch. This is followed by an excellent account of the structure of Myriapods, including a discussion of the distinctive features of each of the four orders, an outline of the embryology of these animals, and a résumé of our knowledge of fossil forms.

The chief interest in the volume, however, centers in the portion written by Mr. Sharp. During the last few years, in this country at least, there has been a great increase in the number of students of insects; and any work on this subject from the hand of a master is sure to be warmly welcomed. In this case the welcome will not be soon worn out. *Sharp's Entomology*, as this and the succeeding volume should be termed, will find and keep a place on the desk of every working entomologist; for, judging by the part before us, this is the best general treatise on insects that has yet appeared in any language.

The great merit of the work lies in the clearness and simplicity of its style, in the excellence of the illustrations, in the extent to which recent contributions to the morphology of insects are included, and in the numerous bibliographical references.

In the division of the Insecta into orders, a conservative plan is followed, only nine orders being recognized; but most of the smaller orders of recent writers are indicated by subheadings. The following is a list of the orders recognized: *Aptera*, *Orthoptera*, *Neuroptera*, *Hymenoptera*, *Coleoptera*, *Lepidoptera*, *Diptera*, *Physanoptera* and *Hemiptera*.

The resurrection of the old name *Aptera* and its application to the order now almost universally known as the *Thysanura* seems to me to be unfortunate. The advantage of retaining the termination 'ptera' for each of the orders, which seems to be the main reason for this course, could have been attained by the adoption of Brauer's term, Synaptera, which is of the form desired, is not in itself misleading, and has not been used in a widely different sense, as is the case with Aptera.

It seems strange too, in the light of recent contributions on the subject, that our author, in his linear arrangement of the orders, should separate so widely the Trichoptera (included by him in the Neuroptera) and the Lepidoptera; certainly these groups have been shown to be more closely allied than any other two of the nine orders.

But criticisms of details in a brief notice of so important a work as this are hardly worth while. It is enough to say that the plan of treatment is excellent, and that it has been carried out in an admirable manner. Entomologists will eagerly await the appearance of the concluding volume.

JOHN HENRY COMSTOCK.

The Herschels and Modern Astronomy. By AGNES M. CLERKE. Published by Macmillan & Co., New York. Pp. vi+224, with three portraits. Price, $1.25.

For this volume, considered as biography, we have nought but praise. In smoothly flowing lines its author gives, not the annals of the Herschel family, but rather a series of pictures from the lives of Sir William, Sir John and Caroline which suffice to present in vivid colors the individuality of brother, sister and son. We catch

a glimpse of the German lad bred to music as a trade and penury as a condition of life, and are hurried along to another glimpse of the fashionable organist of Bath who has risen to the dignity of professional life, who cultivates the sciences as an amateur and, what is more to the purpose, who has become an Englishman by adoption.

We encounter here the clue to William Herschel's success in life, an ardent temperament coupled with an insatiable greed for knowledge and tireless activity in its pursuit. From one point of view it is proper enough to describe as a lucky accident the discovery of Uranus which transformed the amateur into the professional astronomer, supplied by royal favor with opportunity, which it would be mockery to call leisure, for the building of telescopes and their use in explorations of the heavens. But such a characterization of the turning point in William Herschel's career is less than half the truth, and it is the province of his biographer to insist that zeal and diligence such as his make circumstances and constrain luck to follow them.

We shall not pursue the career which rising from humble beginnings culminates in the presidency of the Royal Society, and closes at the end of a long lifetime with perhaps a suggestion of waning enthusiasm coupled with broken bodily powers. Nor can the career of Caroline, all too briefly told, detain us for more than a glance at its simple loyalty and devotion to her brothers' plans in life, a devotion whose dignity is given a tinge of mingled pathos and humor by her own words anent the reluctant change of vocation from music to astronomy: "I have been throughout annoyed and hindered in my endeavors at perfecting myself in any branch of knowledge by which I could hope to gain a creditable livelihood."

The career of Sir John Herschel, marked though it be with brilliant talents and high achievements, conveys nevertheless a sense of disappointment. The father's steadfastness of purpose was lacking in the son, and we confess to a feeling of regret that the telescopes, great and small, which furnished work for his early manhood were laid away in middle life, never again to be seriously used. Whether Sir John's successive inclinations to mathematics, to the bar, to astronomy, chemistry, physics and political office shall be called versatility or vacillation perchance depends as much upon the critic's mood as on aught else, but we cannot doubt that however they be named they were a limitation upon the achievement possible to any talent placed as was his at the beginning of the era of specialization.

With that part of the author's work which sets forth the relation of the Herschels to modern astronomy we are less pleased, and we opine that no injustice is done in characterizing the spirit of her pages with the maxim of political strife, 'Claim everything! Claim it with confidence!' The contributions of the Herschels to modern astronomy are unquestionably great, but they did not build the entire edifice nor even lay all of the foundations. "The powers of the telescope were so unexpectedly increased that they may almost be said to have been discovered by William Herschel." "He made the first attempt to lay down a definite scale of star magnitudes." "Herschel was in the highest and widest sense the founder of sidereal astronomy." "All modern efforts to widen telescopic capacity primarily derive their impulse from Herschel's passionate desire to see further and to see better than his predecessors." Such are samples of what we must consider exaggerated pretentions which may be pardoned in an obituary discourse, but not in a critical estimate of the lines of development of modern science.

Nor is the author altogether free from slips upon the technical side of her subject. Thus if 'a one-inch glass actually quintuples the diameter of the visible universe, it gives access to' one hundred and twenty-five times, and not to 'seventy-five times the volume of space ranged through by the unassisted eye.' But it may well be doubted if the relation itself is not wholly fallacious. Nor is it true that 'the whole system of micrometrical measurements came into existence through Herschel's double-star determinations.' Gascoign, Auzout, Rœmer and probably others used the filar micrometer before Herschel's time, if not in his manner. So also we may be permitted to doubt whether most of the double star orbits at present known have been calculated by the method

of Sir John Herschel since the method has distinctly fallen into disfavor.

Hostile criticism might easily select other and similar matter for adverse judgment, but much as the book is thus disfigured it remains well worth the writing and the reading thereof.

One feature remains which should not be left unnoticed, since in some measure it serves to correct false impressions elsewhere produced. The active and fecund imagination of William Herschel called into existence a swarm of fancies and hypotheses, some of which have become integral parts of the fabric of modern astronomy, while others have been consigned to the intellectual rubbish heap. Types of each class, the failure as well as the success, are presented to the reader, who, without the light which they cast upon the mental characteristics of the man, might well cry out, here is no flesh and blood, but a demi-god set to unravel the universe. G. C. C.

SCIENTIFIC JOURNALS.

THE JOURNAL OF COMPARATIVE NEUROLOGY. DECEMBER, DOUBLE NUMBER.

On the Brain of Necturus maculatus. By B. F. KINGSBURY. A monograph of 65 pages, accompanied by 3 plates, gives the results of the application of the newer methods of staining to the difficult subject of the amphibian brain. The following points are selected from the summary:

1. As compared with certain smaller urodeles, the brain of Necturus is greatly elongated. This appears to be due largely to a greater inequality between the rates of growth of the brain and skull. This is shown, it is thought, especially by (*a*) the almost entire absence of a pons flexure, (*b*) the length of the olfactory nerves, (*c*) the extent of the diatela.

2. A callosum is considered to be entirely absent in the amphibian brain; what has been generally regarded as such is here thought to be a hippocampal commissure, in part at least, although the homology should be dependent on comparative study.

3. An olfactory tract upon the extreme ventral surface of the cerebrum may be traced to the region just caudad of the infundibulum, presumably the region of the albicantia.

4. The paraphysis is well developed and in communication in the adult with the encephalic cavities. The postparaphysis of some authors is not regarded as a true evagination.

5. The ental origins of the cranial nerves are worked out more less completely. For general results reference may be made to tables on pages 179 and 191 of the text. In particular, the motor portion of the facial nerve is shown to have the same mode of origin as in the majority, at least, of vertebrates. The first two roots of the vago-glossopharyngeal group, stated to be the representative of the lateral nerve of 'fishes,' and the nerve termed 'dorsal seventh,' are composed of fibers of the same appearance and terminate in the dorsal region of the oblongata in the neighborhood of the eighth nerve.

6. Mauthner fibers were demonstrated in the adult *Necturus*, *Amblystoma* and *Diemyctylus*. *Amblystoma* is a land form, hence there is no direct correlation with an aquatic mode of life.

7. Myelinic nerve fibres from the mesencephal pass to the ectal surface of the brain immediately ventrad of the epiphysis; these may possibly represent a parietal nerve.

The Cortical Optical Centres in Birds. By DR. LUDWIG EDINGER.

Dr. Edinger is continuing his interesting studies on the phylogeny of the cerebral cortex. He has previously maintained that the olfactory nerve is the first to effect cortical connections and that the cortex of the Ichthyopsida is exclusively olfactory in function. He now finds in the birds a tract which he names the tractus occipito-tectalis, which puts the optic nerve into similar relations with the cortex. This tract becomes medullated some weeks after hatching, exactly as in the mammals, where it has the same termini. The appearance of this tract he correlates with the remarkable visual powers of birds.

In an editorial note Prof. Herrick criticises Dr. Edinger's position with reference to the evolution of the cortex. In particular he differs from Dr. Edinger's opinion that the olfactory function is the only special sense which enters the psychic life of infra-avian vertebrates, but believes that we have evidence that reptiles also