

(p. 39) the older young, which have attained a length of over an inch and may be several weeks, or even months, old.

It might appear hypercritical to raise the question whether the walking legs of a higher crustacean like the crayfish have claws (p. 23). Huxley got around this difficulty by using the terms "double" and "single claws" for the forceps of the first three and the "nails" of the last two pairs of legs, respectively, which describe the conditions met with in the crayfish exactly. This, however, does not correct the inappropriate though technical use of the Latin word *chela* for the pincers alone.

It is certain that metamorphosis in the higher crustacea has been reduced or eliminated under very different conditions in the rather numerous cases in which a reduction has occurred, as seen not only in the common lobsters (*Homarus*), but in many deep sea shrimps, shallow water *Alphei* and terrestrial crabs (*Gegarcinus*). As regards the possible influence which conditions of life in fresh water may entail, it is interesting to note that metamorphosis has been practically eliminated, not only in the fluviatile crayfish, but also in *Palæmonetes varians* of Europe and in *P. exilipes*, of parts of the eastern United States, one of the few fresh-water genera of prawns known, and that in this case their immediate marine ancestor, the common little *Palæmonetes vulgaris*, has a metamorphosis both long and complete.

FRANCIS H. HERRICK

Astronomy of To-day. By CECIL G. DOLMAGE, F.R.A.S. Pp. xvi + 363, with 45 illustrations and diagrams. Philadelphia, J. B. Lippincott. 1909.

The fascination of astronomy seems as strong to-day as in the distant past, when some knowledge of the heavens was essential to the every-day life of the traveler and the householder. To-day the compass, not the pole-star, guides the voyager across the seas and deserts; the watch and the calendar have replaced as timepieces the sun and the constellations, yet the interest in matters astro-

nomical never wanes. To a large extent this interest is due to the ever-widening fields of astronomical research. Fifty years ago astronomy was practically confined to a mathematical explanation of planetary motion, with a few dry statistical facts concerning the size, shape and mass of the various bodies. To-day astronomy deals with the bodies themselves, with their physical conditions, their life histories, and the probable stages of their evolution. Physics and chemistry are the tools with which an astronomer of to-day works, photography and the photographic plate have replaced the eye and the hand in picturing the wonders of the heavens. Now this new astronomy appeals more directly to the popular reader than did the mathematical astronomy of the past century: one is more interested in knowing what a body is and how it came into being, than in learning the minute details of the path it is describing. That such is the case and that the interest in things astronomical is general, is evidenced by the increasing number of popular and non-technical books on various astronomical subjects.

The field of astronomy to-day, however, is so broad, it covers so much ground, that it can hardly be adequately treated of in a single small volume. The space in even a large book hardly suffices to give proper account of a single minor division of the great science. A single volume, which attempts to cover the entire field, can be but little more than a general index, pointing out to the reader the divisions of the subject, the relative importance of each, sketching in a broad way the principal facts and the underlying theories of celestial development, and indicating who the real workers are and where special details and facts can be obtained.

Now in some of these particulars the well got up and attractive book of Mr. Dolmage falls short of what such a book might be. If we regard the amount of space devoted to a subject as indicating to a certain extent the importance of the subject, then this volume shows some rather remarkable conceptions. For us the sun is undoubtedly the most important body in the heavens, it is the center

from which is derived the heat, the energy, the life of the earth. The countless myriads of stars and the numerous planets could be blotted out of existence without sensibly affecting our daily life; but if the sun ceased to shine the days of the world would be numbered. Again, the sun is a typical star and only by a minute and careful study of the solar constitution can we ever hope to derive some knowledge of the condition of the stars and the course of stellar evolution. Yet Mr. Dolmage devotes but eighteen pages to the study of the sun, and gives twenty-five to the moon and forty-four to eclipses. Comets, the ephemeral by-products of the solar system, are given just as much prominence as the sun itself. Again, the lines along which modern research is progressing are not clearly set forth, and the reader is often left in doubt as to who are the real workers and leaders in astronomical thought. Too much prominence is given to the opinions of writers of scientific fiction; it is certainly an innovation in a serious work to find H. G. Wells so freely quoted.

The book is well written and well printed, and it may serve the purpose described by its subtitle as "a popular introduction in non-technical language." The illustrations are well selected and many of the photographs are beautifully reproduced. The three views of the moon, taken from photographs made in the Paris Observatory, are exceptionally well rendered in the plates.

CHARLES LANE POOR

The Royal Society Archives: Some Account of the Letters and Papers of the Period 1741-1806, with an Index of Authors. Compiled by A. H. CHURCH, D.Sc., F.R.S. Pp. 73. Oxford, 1908.

A valuable aid to the student who may wish to consult the original communications made between 1741 and 1806 to the Royal Society of London has been prepared by Dr. A. H. Church, to whom we are already indebted for a manuscript calendar of the collection of guard-books designated as "Classified Papers." An earlier collection of letters addressed to the society or its officers, and comprised in

forty-eight volumes, was indexed by W. E. Shuckard in 1840. The third set of guard-books, which comprises both letters and papers, consists of 127 volumes and these have been grouped in twelve decades, the letters and papers in each of these being numbered consecutively. The series is designated "Letters and Papers." Although most of the material of the letters was published in the *Philosophical Transactions* of the society, they were edited to a considerable extent, and much of the personal note was removed in this way. From among many interesting items noted by Dr. Church in his pamphlet, we select the following:

Decade I., No. 403. In a letter dated May 4, 1745, R. A. F. de Réaumur says:

I heartily wish there was in the world as strong a moral attractive power as there is a natural one that might dispose our two nations particularly to seek to unite by mutual acts of friendship and good will.

Decade II., No. 198. An unpublished letter of Benjamin Franklin, dated February 4, 1750, describes certain experiments in killing hens and turkeys by the electric current. Franklin proceeds to relate his personal experience of an electric shock from the apparatus employed:

In making these Experiments, I found that a man can without great Detriment bear a much greater Electrical Shock than I imagin'd. For I inadvertently took the Stroke of two of those Jars thro' my Arms and Body, when they were very near full charg'd. It seem'd an universal Blow from head to foot throughout the Body, and was followed by a violent quick Trembling in the Trunk, which went gradually off in a few seconds. . . . My Arms and Back of my Neck felt somewhat numb the remainder of the Evening, and my Breastbone was sore for a Week after, as if it had been bruised.

Decade II., No. 494. A letter in Latin from Linnæus, acknowledging his election to the society. A facsimile of this letter is given in Dr. Church's pamphlet.

Decade III., No. 117. A letter, also in Latin, from Josef Stepling, concerning a shower of meteoric stones that fell near Strkow in Bohemia, July 3, 1753. One of these aerolites is now in the British Museum.