this point. Heidenhain has observed that in suckling mammals, which must necessarily be absorbing fat, there are very few leucocytes present in the intestinal mucus membrane. He also throws doubt on the fatty nature of the granules observed returning leucocytes that respond to the osmic-acid test, observing, with considerable point, "Nicht alles ist Fett, was in Osmium säure dunkelt." It is thus possible to bring such observations as these of Schäfer's quoted above into line with the views advanced by Heidenhain. Leucocytes may, as described, divide, migrate out near the surface of the mucus membrane, take up food and convey it back into the lacteal, but the rest of the organism is not dependent upon them.

The third phase of digestion is that which takes place in the cells, and consists in building-up of food substance into protoplasm. This process is of chemical nature and consequently wholly beyond the reach of direct observation. The advances that are being made in the province of organic chemistry lead to the hope that the albumen formula may eventually be discovered, and were this done the synthesis of protoplasm would be at least a theoretical possibility. At present, however, our knowledge of the actual conditions that exist in living matter is so slight that even speculation is useless.

Howard Crawley.
University of Pennsylvania.

SCIENTIFIC BOOKS.

Zoological Results based on Material from New Britain, New Guinea, Loyalty Islands and Elsewhere, collected during the years 1895, 1896 and 1897. By Arthur Willey. Cambridge, Eng., the University Press. 4to. Part I., 1898; pp viii+120; pls. 11. Part II., 1899; pp. 85; pls. 12.

The zoological materials collected by Dr. Arthur Willey during his search for the Pearly Nautilus have been distributed to specialists and will form the basis for a series of five or six published parts, the first two of which have already appeared. These of themselves are a substantial acknowledgment to the Board of Managers of the Balfour Studentship and to the Government Grant Committee of the Royal Society, by whose generosity Dr. Willey was enabled to prosecute his researches.

Part I. opens with an account, by Dr. Willey himself, of the anatomy and development of a new species of *Peripatus* from New Britain. The species hitherto described, as Sedgwick has shown, fall into three natural groups, corresponding to their geographical distribution: Neotropical, Australasian and Ethiopean. For each of these Pocock has proposed new generic names. Dr. Willey's new species represents a fourth geographical group, which may be called the Melanesian, and for which he proposes the generic or subgeneric name of *Paraperipatus*, the species being *P. novæ—britanniæ*. As Dr. Willey justly remarks, it is not to be expected that a new species of *Peripatus* would throw much light on the vexed question: Is *Peripatus* an annelid or an arthropod? What is probably needed is something between *Peripatus* and other forms rather than more *Peripatus*.

The Phasmidæ, or walking sticks, have been reported by Dr. D. Sharp. Upwards of twenty species were collected, of which fourteen seem new to science. The report contains an extended account of the eggs and pre-adult stages of these insects.

The scorpions, pedipalpi and spiders were represented by forty-nine species, of which sixteen are stated by Pocock to be species novæ. The descriptions of these include a number of interesting biological notes. The cocooning habits of *Fecenia* and *Ordgarius* are described, and a species of *Conothele* which has subvertical mandibles is shown for the first time to build its nest on trees in the same way as other trapdoor spiders that have this structural peculiarity. In a new species of *Plexippus* the mandibles and maxillæ form a stridulating organ.

Besides this report, Pocock has also contributed an account of the centipedes and millipedes, of which there were twenty-one species, thirteen new to science.

The first part also contains the description of

a new species of Caprellidæ, *Metaprotella sandalensis*, by Dr. P. Mayer, and notes on a little known sea-snake by G. A. Boulenger.

Part II. contains a description of the coral-like *Millepores* by S. J. Hickson. All the specimens are referred to one species, *M. alcicornis*. Material for the study of the soft parts of these delicate organisms was collected. Some of this was found to be infected by what seemed to be a species of *Bacterium*, and which Hickson has named *B. milleporæ*. The nettling capsules were studied in detail, and in some the 'thread' had the form of a delicate tube, in the center of which was a filament. This is probably contractile and brings about the remarkable retraction of the 'threads,' as observed by Dr. Willey in the living animal.

Of the crinoids, sea urchins, star fishes and brittle stars thirty-nine species are reported by F. Jeffrey Bell, almost all of which were well-known forms. Of the twenty-four species of sea-cucumbers collected, F. P. Bedford reported two new to science.

None of the twenty-three species of Sipunculids obtained were new, a fact accounted for by Shipley from the circumstance that the two largest collections of these worms ever made, namely, those of Semper and of Sluiter, were made in the same general region as that in which Dr. Willey worked. While such an outcome may be disappointing to those who are ambitious for the description of new species, it is reassuring in that it shows that a piece of zoological work once well done need not be repeated.

Fourteen species of solitary corals are recorded by J. S. Gardiner, and of these no less than eleven are new. Gardiner also contributes a paper on the post-embryonic development of one of these, *Cycloseris*, in which the close affinity of this genus with *Fungia* is emphasized. Of the thirteen species of fleshy corals of the family gorgonaceæ reported by I. L. Hiles five are new.

The earthworms were studied by F. E. Beddard. Some were too immature for certain identification, but among the well-developed specimens nine species were recognized, three of which were new.

The second part is fully equal to the first and is especially noteworthy for the success with which photography has been used in its illustrations. The photogravure plate accompanying Gardiner's paper on *Cycloseris* is remarkable for the sharpness of its detail; the naturalness of the figures exceeds that found in the best hand lithography. The photographic prints which illustrate Hickson's paper on the *Millepores* give an idea of the nature of the material collected, which in the case of these extremely variable animals could be obtained by no other method. The authors and publishers alike are to be congratulated on their successful use of photography.

So far as the present work is concerned, such criticism as may be offered touches rather the whole undertaking than any particular part thus far completed. While it may be gratifying to an explorer to see the results of his collecting and personal investigation in the form of a compact whole, it is not always certain that this is the best way in which to make it accessible. Such publications are dependent largely on subscription for their circulation and necessarily fall much behind the better class of scientific journals. Since, as in the present case, they contain the first descriptions of many new species, their relative inaccessibility is often a serious obstacle to succeeding investigators. It is to be regretted that all the present series of contributions could not have found places in some of the current zoological journals, as, in fact, some have, thus, in a measure, assuring the accessibility of their contents.

G. H. P.

Traité élémentaire de mécanique chimique, fondée sur la thermodynamique. By P. DUHEM. Vol. III.; 18x25 cm.; pp. 374. Vol. IV.; 18x25 cm.; pp. 381. Paris, A. Hermann. 1898 and 1899.

Vol. III. treats of homogeneous mixtures and solutions with only one volatile component. The opening chapter deals with the thermodynamic potential of a homogeneous mixture. This is followed by one on the state of dissolved substances and by another on dilute solutions. Next in order comes osmotic pressure, and then we find chapters on the hypotheses of Van't Hoff and of Arrhenius, and on the mass law.