genera derived from the above-named mother families. We doubt whether this sweeping and easy way of grouping the American native races will stand the test of rigid ethnologic investigation; we suspect it will require much wider data than M. Marcoy had at his command to settle the question satisfactorily. The facts he gives, however, concerning the various tribes with which he came in contact, appear to us to be of considerable value. His descriptions of the peoples, the manners and customs, *physique*, traditions, movements, religious beliefs, vocabularies, &c., are all contributions to science, which the discriminating ethnologist will no doubt know how to make use of.

With regard to what must be considered as the proper source of the Amazon, M. Marcoy agrees so far with Mr. Squier, one of the latest writers on the subject, or rather with Dr. Santiago Tavara, of the Peruvian Hydrographic Commission, that it is not the Marañon. Dr. Tavara decided that as the Ucayali has greater volume and length than the Marañon, the former must be regarded as the Rio Madre del Amazonas. M. Marcoy had long before this concluded that as the Apurimac, a principal tributary of the Ucayali, is seventy-five miles longer than the Quillabamba or Urubamba, the upper part of the Ucayali, the former ought to be regarded as the real source of the Amazon. Several attempts have in recent years been made to discover if any of the many upper tributaries on the right bank of the Amazon could be made available for navigation by steamers, but, so far as we have learnt, with disappointing results, so that it is doubtful if any of these immense tributaries can ever be used as pathways for commerce.

During his slow progress down the Amazon, M. Marcoy frequently halted on its banks, visiting the mission stations, the half-civilised settlements of Brazilians and half-breeds, and the villages of the Indians. He also explored the mouths of some of the rivers flowing into the Amazon, and some of those curious natural canals which unite the main stream with many of its tributaries a considerable distance above the latter's *embouchure*. It is well known that the waters of some of the Amazonian tributaries, as the Rio Negro, are of a very dark colour, resembling coffee. We do not know that this has yet been satisfactorily accounted for; it can hardly, it would seem, be owing to the nature of the ground over which the rivers flow, as this is of very diverse kinds. M. Marcoy declares that when this water is looked at through a transparent vessel, it is perfectly limpid and colourless; only in cases where the current was slow or imperceptible, it had a brown tint. Animals of all kinds abound in and around these curious waters.

M. Marcoy made a careful exploration of the delta of the Purus, a large tributary on the right bank of the Amazon, by which he ascertained that the river has only one *embouchure*, the other openings being really only natural canals. M. Marcoy's knowledge of the hydrography of the south side of the Amazon seems to be clear and accurate, and is certainly extensive, and his frequent dissertations on the subject are worthy the attention of geographers, if they have not already gained it. One of the most valuable features of his work is the set of splendid maps which are prefixed, showing in minute detail the topography of his route.

We must leave M. Marcoy to find his way to Para, and accompany Mr. Keller in his journey up the Madeira. While we certainly think that in regard to the points to which we have referred the value of M. Marcoy's work is capable of being enhanced, still on the whole it must be regarded as deserving to occupy an honourable place among works of travel. It is essentially a popular work, and we hope it may have an extensive sale and many readers, as it contains a vast amount of really valuable information concerning the geography, topography, natural history, and ethnology of Peru and the Upper Amazon. Messrs. Blackie have done well in publishing an English translation, which has been remarkably well done by Mr. Rich.

(*To be continued.*)

MOGGRIDGE'S "HARVESTING ANTS AND TRAP-DOOR SPIDERS"

Supplement to Harvesting Ants and Trap-door Spiders. By J. Traherne Moggridge, F.L.S., F.Z.S. With specific descriptions of the Spiders, by the Rev. O. Pickard-Cambridge. (Reeve and Co., 1874.)

MR. MOGGRIDGE'S original work was reviewed in NATURE, vol. vii. p. 337, and we have already a mass of additional matter, paged continuously so as to form one volume when bound up with the first part. Only twenty pages are here devoted to the ants, yet we find several observations of great interest to the philosophic entomologist. Thus, the actions of lizards and tiger-beetles in attacking the ants were closely observed. The lizards only eat the winged males and females, but show great fear of the workers, always keeping out of their way; and the workers protect the winged ants by surrounding and swarming over them, so that the lizards can only occasionally dash at an outlying straggler. The Tiger-Beetle (*Cicindela*) devours the workers, but only attacks them with great precaution, keeping out of the way of the main body and seizing stragglers by a bite just behind the neck. If it fails to seize them in this exact spot it leaves go again, evidently knowing that if the ant's jaws once close on any part of its legs or antennæ they will never leave go, even after death. These observations apply to the two species of South European Harvesting Ants, *Atta structor* and *A. barbara*, and they furnish a clue to the use and purport of the large bodies of workers, which act as guards to the males and females. They also explain the use of the spines, hooks, and bristles with which so many of the weaker forms of ants are armed, as well as the occurrence of a proportion of soldiers—large-headed workers whose only function is to attack and drive away certain specially dangerous enemies. Some of these large-headed workers are essentially a huge pair of jaws with just enough body to carry them about, and whose sole object in life is to fasten on some special enemy and sacrifice themselves for the good of the community. The most important problem remaining for solution in connection with these harvesting ants is, how they contrive to keep the seeds in their granaries from germinating. Mr. Moggridge has proved that formic acid or its vapour has no influence, that the presence of the ants is necessary to prevent germination, but that their presence alone does not prevent

it. Is it not probable that the whole secret consists in the ants continually using for food those seeds which begin to germinate, and that there always remain many seeds whose germination is delayed?

The remainder of the volume is devoted to Trap-door Spiders, many new species of which have been discovered, and much curious information obtained as to their habits. The spiders and their nests are illustrated by figures which are models of accuracy, and far surpass in delicacy and finish those of the first volume, good as those were. There are some interesting remarks about the British Nest-making Spider (*Atypus sulzeri*), which has very rarely been observed, but which, now attention is called to the subject, will no doubt be found to occur plentifully in the South of England. The new double-tubed and double-doored nest now first described is the perfection of insect architecture; and being constructed by a single insect is far more indicative of intelligence, mechanical skill, and reasoning power, than the habitations of ants or bees.

This volume is a striking example of the way in which the most confirmed invalids may employ and enjoy themselves; of the marvellous interest that attaches to the minute observation of the habits of many of the lower animals; and of the vast field for discovery that is still open to observers. It will long remain a standard work on the subject of which it treats, as well as a worthy memento of the enthusiastic and amiable naturalist whose early departure from among us will be so widely deplored.

A. R. W.

THE UNIONIDÆ

Observations on the genus Unio, together with descriptions of new species in the family Unionidæ. By Isaac Lea, LL.D. (Philadelphia, 4to.)

ALTHOUGH no date of publication is given, the last paper contained in this volume appears to have been read on the 3rd of February, 1874. It is a goodly volume of seventy-four pages, and twenty-two beautiful plates.

The number of this volume (xiii.) shows the extent to which the octogenarian, but still indefatigable author, Dr. Lea, has prosecuted his favourite study. He tells us in the Introduction: "In my twelfth volume I mentioned the number of North American species (Unionidæ) then known to be 772. By adding sixty to these, we have the number 832 species." And he remarks that "these do not by any means constitute the whole number of existing species; many of the smaller streams falling into our large rivers have not been explored, and these when well searched will unquestionably produce new forms of this numerous and interesting family."

Now it seems to us that the little word "forms" thus innocently used must disarm every conchologist of that weapon of criticism (species-making) with which Dr. Lea has been so often and so mercilessly assailed on this side of the Atlantic. Substitute "form" for "species," and what is there to prevent the European Unionidæ attaining a more respectable position as regards number than they do at present? In Great Britain we can show only five species, besides sixteen named and well-marked varieties. In Germany, according to Kreglinger, there are fifteen species (including some of our varieties), and twenty-nine named varieties. The number could be increased almost *ad infinitum* by reckoning every distinct form from each river, stream, lake, canal, and pond in which the Unionidæ are found; and we should lose one test of specific difference, which consists of ignoring all variation of shape caused by habitat, and which induces us to believe that undoubted species are those that live together without any intermingling or gradation. But whether all the North American Unionidæ are called "species," or "varieties," or "forms," Natural History and Conchology in particular are under a great obligation to Dr. Lea for his admirable works. One, perhaps not the least, merit is his symmetrical method of description, the characters of every species being given in the same relative order, so that they can be readily compared and the differences between the several species more easily ascertained. This is certainly important in his case; because some of the figures on the same plates bear a rather suspicious resemblance, *e.g.* those of *Unio globatus* and *subglobatus*, *U. tuscumbiensis* and *radiosus*, *U. crudus* and *pattinoides*, *U. yadkinensis* and *conasaugaensis*, *U. amplus* and *insolidus*, *U. rostellum* and *exacutus*, besides *U. subparallelus* and *basalis*. The above-named species are compared by the author, not with each other, but with different species.

Another reflection occurs to us on the perusal of this work; and that is as to the division of labour. A universal naturalist is now an extinct animal; and the region of biology becomes every day more and more subdivided into separate fields of investigation. Thus, in the Mollusca Mr. Davidson restricts himself to the Brachiopoda, Dr. Lea to the Unionidæ, and Dr. L. Pfeiffer to the Pulmonobranchia. Every other department of zoology, as well as of botany, has its own votaries for different orders and even families; and it is in this way that knowledge is at present advanced, not by some great Coryphæus, but by many less-gifted persons who have the opportunities and inclination

"To labour and effect one thing specially."

OUR BOOK SHELF

La Vie; Physiologie Humaine, appliquée à l'hygiene et à la Médecine. Par le Dr. Gustave le Bon. (Paris: J. Rothschild, 1874.)

MOST authors compose their works first, leaving the preface until the last thing, in order that they may appreciate the full influence of their detailed study when making the generalisations with which they feel bound to start their volume. We have no reason to think that the author of the work under notice is any exception to this rule. In the nine hundred or so pages of his book he explains in a clear and very intelligible manner many of the most important facts and theories of the science of physiology; in some parts introducing improved methods of illustration, in others not quite recognising the most recent advances which have been made, even by his own countrymen. Particular stress is laid, throughout the work, on the bearing of the points discussed on everyday life, on hygiene, and on pathology; in all of which the author, from his experience in the routine of practice and the recent Franco-German war, in which he was engaged in active ambulance service, is able to speak with authority. There are two other points in which the work is