We heartily concur with Major Powell, in his remarks on the undesirability of amateur collectors and travellers. Unfortunately, many explorers are so little conversant with the elements of ethnology, and so little able to consider natives from any other point of view than that of our own civilization, or to enter into their methods of thinking, that they do more harm than good. Any one who has studied ethnological literature knows how true this is. It is an underestimation of private work, however, when Powell says, "Experience has shown that individual travellers, unguided and without common system, have failed to obtain the best results in examining members of native tribes both as individuals and as aggregations." This affirmation is opposed to the encouragement of private researches, which Powell has so successfully made the policy of the bureau. We do not doubt that scientists who are supported by the moral influence and the means of the bureau have better chances of success than those who travel without such support; but, as the bureau of ethnology is not able to carry out all the field-work that is necessary and desirable, researches of scientists undertaken outside of the systematical plan of the bureau ought to be welcome.

We consider the plan by which the researches of the bureau are carried on a very successful one. The principal idea is that the phenomena of ethnology and archeology must be studied from a common point of view, and that a knowledge of the former is indispensable for understanding the latter, and that the supposition of sudden cataclysms, instead of that of a continuous development, is only justified where clear evidence of the occurrence of such phenomena can be shown. The work of the bureau is of great importance not only for science, but also for a successful method of making the Indian a useful member of the state and of human society. We cannot press upon him our civilization. A thorough knowledge of the Indian character is necessary to reach satisfactory results in this line. Both scientists and philanthropists must wish that the work of the bureau be carried on as vigorously as possible, and that its operations ought not to be hampered by lack of means for extensive field-work and publications.

DR. FRANZ BOAS.

THE ROTIFERA.

IN our previous notice of this work (vol. vii. p. 402) we based the favorable judgment, which we then expressed, upon the first two parts. We have now before us the completed work, the examination of which strengthens our previous favorable opinion. The authors are not of those whose studies are prompted by an insatiable eagerness for knowledge, but rather, it appears to us, are they lovers of Nature, who seek the closest intimacy with her to gratify their affections. They are pleased to quote upon the reverse of their titlepage Shelley's lines: —

> "Those viewless beings,
> Whose mansion is the smallest particle
> Of the impassive atmosphere,
> Enjoy and live like man."

We do not mean that the characterization of the species is vague and dreamlike. It would be difficult for a biologist to determine the systematic position of Shelley's 'viewless beings' from the poet's description; but Mr. Hudson's are scientifically exact, although they are rendered interesting by the addition of something of the literary flavor that alone is present in Shelley's beautiful inexactitude. It is this combination of qualities which imparts a double merit to Hudson and Gosse's monograph, and renders it acceptable and welcome alike to the professional and to the amateur naturalist.

The work is a valuable contribution to science, as every conscientious monograph must be; for it is indispensable to progress that we should have from time to time, in regard to a given subject, a comprehensive presentation of the accumulated knowledge. A monograph of the Rotifera was very much needed, for it is twenty-five years since the revision by Dr. Arlidge. To execute the task worthily, it was necessary that the many, by no means always rare, species which had remained undescribed should be properly investigated, so as to be included in the monograph. This laborious undertaking the authors have accomplished. Their work contains more than one hundred and twenty species which were unrecognized when Dr. Arlidge wrote: nearly all of these have been added to science by the authors themselves, some eighty of them by Mr. Gosse.

When Mr. Hudson passes beyond his *rôle* of observation and description, and occupies himself with problems of morphology and of the affinities of the Rotifera, he is less fortunate than we could wish. Thus, he says in his preface that his discovery of the remarkable Pedalion mirum "has put beyond question the fact that the Rotifera, in one point at least, are closely linked to the Arthropoda." Now, Pedalion is a true rotifer, which has six limb-like appendages, two of which are on the median line (one being dorsal, the other ventral), and four of which are lateral. The limbs have terminal bristles. These appendages impart, in

The Rotifera; or, Wheel-animalcules. By C. T. HUDSON, assisted by T. H. GOSSE, F.R.S. Parts iii.–vi. London, Longmans. 8°.

fact, something of a Nauplius-like appearance to the animal; and, inasmuch as the Nauplius is the larval stage of certain Crustacea, Pedalion may be said to offer some resemblance to an arthropod. It must be remembered that arthropod limbs are always symmetrically disposed, and never occupy a position in the median line, except as a secondary modification resulting from the fusion of two originally distinct limbs into one median structure; as occurs, for example, in the Labium. Moreover, arthropod limbs are the appendages of segments, and are arranged in serial order lengthwise of the body and by segments. In the Rotifera, on the contrary, there is and can be no such arrangement, because there are no segments. In fact, we must interpret the similarity — which, after all, is imperfect — of the limbs of Pedalion to those of the Nauplius as an analogy, and not as an homology.

So, much may be said to indicate the limit beyond which the special merits of the work do not extend; but within those limits we find a great deal of the best excellence, which abundantly justifies our congratulating the authors upon the completion of their capital and thorough treatise.

LETTERS TO THE EDITOR.

[Continued from p. 592.]

The cause of consumption.

THIS subject is of such great importance not only in the prevention but also in the treatment of the disease, that I feel sure you will permit me to reply to the important objection raised by 'Medicus' to my theory of consumption. In science we proceed from the known to the unknown. Now, we know that the constant inhalation of small particles produces consumption, and that they evidently reduce the breathing capacity; and we have produced experimentally the disease in animals by simple confinement, which also reduces that capacity. Further, I have produced consumption by reducing the breathing surface of the lungs below a certain point, and I have searched the records in vain to find a case of consumption in which such conditions were not present. The tribes that are absolutely free from this disease are known to live under conditions that tend to develop the lungs; and we see the introduction of civilization amongst them — that is, of conditions that tend to reduce the breathing surface — is followed by the introduction of that disease. But, says 'Medicus,' — and I have had the same objection here, — that is because the bacillus has been introduced. I reply, apply the same process of examination to the bacillian theory, and it fails at the very beginning. Koch's important experiments — they mark an epoch in the knowlege of life — resulted in an apparent affirmative and an absolute negative. In some animals he induced consumption, in others he did not. What is the difference between the two classes of animals? The former evidently had been, and were, subjected to conditions that tend to reduce the breathing capacity; while the latter had not been, and were not, subjected to such conditions to the same extent. What followed the stoppage of the ventilating shafts of several wards at Brompton, an outbreak of consumption? No. Erysipelas. In civilization we do not know where the bacillus, so called, tuberculosis is not, and I am curious to see who will prove their absence amongst the tribes that are yet free from consumption. And while the germicide treatment of the disease has admittedly failed, that based upon this theory has, both in the experiments and in the four cases to which it has been applied, proved completely successful.

G. W. HAMBLETON.

London, May 25.

Scandinavian studies in the United States.

The readers of *Science* had their attention directed to this subject in a recent article written by Daniel Kilham Dodge; but the writer of that article, unwittingly I suppose, does injustice to the Scandinavians in this country as well as to the work that is so nobly being carried on by them. He also omits a prominent university in the north-west which is trying to do what he thinks ought to be done by many American colleges. As to the success of such efforts, his historical account has important lessons.

He states that there is "a population of 107,768 Scandinavians in Minnesota, and there is not a college in which the parent tongues of this great mass of people can be studied."

This might convey a wrong impression about the Scandinavians, if the readers of *Science* were not informed that during the year 1886 between seven and eight hundred students attended the Scandinavian institutions of Minnesota. True, these institutions are not as yet complete colleges in the American sense of the term, but the day is not far distant when some will be an equivalent. Their object is not degrees, but qualifications. These people have been nurtured by European universitiy principles, and with university men in their midst: they are not slow in fathoming the shallowness of a great deal of the American college-training.

Gustavus Adolphus college, situated at St. Peter, Minn., is a flourishing institution with two hundred students, that is lacking only one year of having a four-years' collegiate course. One-half of the professorships are held by men who are not Scandinavians, but Americans educated in eastern American colleges. Latin, English, German, mathematics, and natural sciences are taught by these professors. Augustana college, Rock Island, Ill., is another and older institution, supported by the Swedes, which has been graduating class after class for a period of ten years. Persons holding a diploma from this latter institution are admitted into the University of Upsala without examination. A goodly number of the professors are also American college-bred men. Within recent years a most promising educational work was begun by the Swedes at Lindsborg, Kan. During the past year, over three hundred students attended the different departments of Bethany college and Normal institute, and at the coming commencement they will dedicate an elegant and large college-building.

The Swedes and the Norwegians are alive on educational matters, and their influence is and will continue to be felt in this country. They are Swedes