SCIENCE.

FRIDAY, JULY 27, 1883.

THE ADVANTAGES OF STUDY AT THE NAPLES ZOÖLOGICAL STATION.

THE opening of the marine laboratory in Naples in 1874 marks an important epoch in the progress of biological studies, as seen, not only in the prodigious and ever-increasing amount of work which it produces, but also in the general interest which its success has inspired in other quarters. As in America seaside schools and laboratories may be traced to the example set at Penikese, so in Europe most of the marine laboratories owe their origin to influences emanating from Naples. But the beneficial influence of the Naples station is by no means confined to Europe. Already we hear of marine stations in Algiers, in Sydney, and in Java. In Japan too, as we are informed, a laboratory has been established by Professor Mitsukuri in a Buddhist temple, — an example the moral of which is easily drawn. Thus the prediction made by the founder of the Naples station, Professor Anton Dohrn, some ten years ago, — that marine zoölogy was destined to become paramount, and that the earth would soon be encircled by a net-work of zoölogical stations, — seems to be rapidly approaching its fulfilment.

Yours very sincerely
Anton Dohrn

Every one can now see that the Naples laboratory was a gigantic enterprise, magnificent alike in conception and in achievement, although few are aware of the magnitude and varied nature of the difficulties which opposed its progress. It is a matter for rejoicing, that this institution was planned on such broad and liberal views, and with such wise prevision of the course its development should take in order to secure a long and prosperous existence. With the addition of a physiological department now determined upon, it becomes a bio-

logical station in the broader sense of the word, — an organization on a grand scale for the study of marine life in all its aspects. Its brilliant career during the first nine years of its existence not only insures its permanency, but also gives pledge of future growth commensurate with the ever-expanding needs of biological research.

The station is no less liberal in its management than comprehensive in its aims; for it opens its doors to naturalists from all quarters of the globe on like conditions. It is the international character of the station, combined with the natural advantages of situation, which has made it, in so short time, the Mecca of biologists, and a seat of unprecedented prolific activity. The mild and equable climate of Naples, the unsurpassed richness of the fauna and flora of its bay, and the best equipped laboratory in the world, conspire to give the Naples station pre-eminence among institutions of its kind, and to render it probable that it will remain what it is now acknowledged to be, — the world's great biological station.

The detailed account given in Miss Nunn's valuable article (SCIENCE, Nos. 17 and 18) makes it unnecessary to enter here into a description of the laboratory; and Mr. Cunningham's excellent review of the work which it has already accomplished (*Nature*, March 15) is doubtless accessible to most of the readers of SCIENCE.

Let us rather consider the practical question of our own interest, as Americans, in this institution. Except in a single and noteworthy case of very recent date, we have thus far taken no active interest in this matter. The distance between us and Naples has seemed to foster the idea that we have no immediate and common concern with European nations in opportunities that lie so much nearer their doors than ours. But recent events have demonstrated that there *is* a demand on the part of American naturalists for just such opportunities as are now offered at Naples, and nowhere else; and with them political isolation is not likely to be mistaken for scientific isolation. That this demand does not arise from whimsical reasons will certainly be conceded by all who understand its meaning. Still there may be some who will ask if the field for investigation is not sufficiently broad at home, and the facilities for work sufficiently ample, to satisfy the requirements of American naturalists. With all due respect to such queries, we would suggest that they do not contain the gist of the matter: for even on the preposterous supposition that our facilities for biological research are fully as great as those at Naples, no one could claim that they are identical; so that it would still be pertinent to ask, Can we not profitably *add* the advantages in Naples to those enjoyed at home? The real question comes to this: Are there advantages at Naples which are not offered here, and are they worth the time and money required to obtain them? Now, it is no disparagement to home talent and resources, to say that the advantages of study at the Naples station are incomparably greater, and certainly more numerous, than those at our command. More than this, there is not a single laboratory in Europe where the student of natural history can pursue his studies under so favorable circumstances as at Naples. This is doubtless much to say, when we remember that the laboratories of Huxley, Lankester, Lacaze-Duthiers, Van Beneden, Leuckart, Haeckel, Gegenbaur, Claus, Semper, Kölliker, Barrois, and Giard are of world-wide repute; but it is not merely our private opinion, it is an acknowledged fact. Of course, we are not now speaking of the comparative merits of this institution for students just beginning their studies, but for those who are already more or less prepared for independent work.

The Naples station makes no pretension to fulfilling the functions of a school or a college: its aim is to advance biological research; and to this end it consecrates all its energies. It is a laboratory organized and equipped, not for training the inexperienced, but for aiding the investigator. It represents, in many respects, the excellences of all the best laboratories of Europe combined, and sur-

passes them all in the inexhaustible wealth of its resources, and in the many exceptional advantages that naturally spring from its international character.

Although no lectures or courses of instruction are provided for, an able staff of assistants are constantly employed, whose aid and counsel in all matters pertaining to methods of work leave nothing to be desired. It is one of the great advantages of work at the station, that it gives one opportunities for the acquisition of methods. An institution which pushes research with such energy and success will naturally be prolific in the discovery of ways and means. The station brings together a body of zealous workers from the best laboratories of Europe, and thus, besides giving a rare opportunity for the formation of valuable acquaintances, direct interchange of thought, and discussion of problems, opens another way for the accumulation and refinement of methods. It is in this way that it becomes a sort of international depot for the reception of discoveries and improvements made elsewhere. The heterogeneous material thus obtained is sifted, systematized, tested, further elaborated and refined, and redistributed. The methods of microscopical research published by Paul Mayer, and the well-known discoveries of Giesbrecht, show that the station is doing no less important work as an originator than as an accumulator and a distributer of methods.

Now, whoever knows the value of methods — and we need not argue with those who do not — will admit, that, in this particular, the Naples station is unrivalled, and that, from the nature of things, it will probably remain so indefinitely. However successful we may become in the development and application of methods, we are not likely to see the time when it will not be desirable to see, and to know by experience, how work is done at Naples. This one but all-important matter, to say nothing of the many other advantages that must accrue to an occupant of a table at the station, — such as social intercourse, direct knowledge of a very important fauna, and opportunities of acquiring a knowledge of the four languages with which every naturalist must now be familiar, — makes it very desirable, particularly for our younger naturalists, to spend some time at Naples.

One of the indispensable requisites to successful work in natural history is an extensive library; and this is precisely one of the needs most felt in seaside laboratories. As a rule, naturalists are compelled to select a few of the books which they conjecture will be useful to them, and transport them to the place of study. This method is, of course, very unsatisfactory, for reasons too obvious to be mentioned. The Naples station has met this difficulty by establishing a permanent library in an apartment adjoining its laboratory. Already this library has become one of the most complete biological libraries in Europe, and forms one of the chief attractions of the station. Its management, we are happy to say, is the least conspicuous thing about it. Those accustomed to depend upon public libraries, open only at stated hours, approached only through officials, and encumbered with rules, blanks, fines, etc., have a pleasing sense of relief on finding the doors of this rich library thrown open to them, with the liberty of helping themselves at any time to whatever books are desired, with no further requirement than to place a card bearing their name in the place of each book taken. This simple device enables others who chance to want the same books to know precisely where to find them.

The supply of material furnishes another topic well worth consideration in this connection. It is the method of supply, rather than its richness, which merits attention. An organized body of men is constantly employed for this purpose; and they make it their business not only to know what material can be obtained, but also when and where. These men now work with all the advantages of long experience and systematic training. The occupant of a table has only to announce what object he wishes to study, and it is delivered alive at his table. In this way the investigator is able to accomplish the largest

amount of work in a given time, and with the least possible annoyance.

The furnishing of the table also deserves attention. Within twenty-four hours after notice is given, one finds his table ready for use, supplied with drawing-material, a large variety of reagents, staining-fluids, and all the appurtenances required for the most difficult kinds of research. It is not the raw material that one finds on his table, but every thing actually prepared and ready for immediate use. Further needs are promptly supplied on request. Thus every thing is arranged to save the time of the investigator, and render his work as effective as possible. Compare these facilities for study with those offered anywhere else, and the contrast is at once apparent.

The conservator's department, under the direction of Salvatore Lo Bianco, has become one of unusual interest and importance; and the work it is doing deserves to be generally known in this country. The work of this department is the preservation of all the material brought to the station, except what is required to supply the tables and the public aquarium. The success with which this most difficult business of preserving marine animals in lifelike appearance is accomplished, is certainly marvellous, and richly deserves the highest tribute of praise. This department is producing results of immense value to science, and its usefulness is now widely recognized. Its beautiful preparations adorn the shelves of nearly every museum in Europe; and it is constantly sending out supplies to laboratories for teaching purposes. Many naturalists who find it inconvenient to work at Naples are supplied by this department with material in such perfect state of preservation for anatomical and histological study, that they are enabled to carry out their investigations without once visiting the station. There are undoubtedly museums and laboratories in this country that would do well to avail themselves of this opportunity. This department has been created for the special purpose of serving science in the above-named ways, and not for increasing the funds of the station; and hence the preparations are made for a sum that scarcely more than covers the expense of the alcohol and other reagents used in their preservation.

There is still another way in which this department of the station might be of importance to this country. Doubtless some arrangements might be made between our naval authorities and the director of the station, such as have been made in the case of Germany and Italy, which would enable us to send an officer from time to time to the station, with a view to gaining a practical knowledge of the methods of preserving animals. In this way each of our war-ships might be supplied with one officer prepared to take advantage of the rare opportunities for advancing our knowledge of marine life which arise in the course of their distant cruises.

In view of the considerable number of American students in the biological laboratories of Europe, and the many applications on their part for permission to work at Naples, there has naturally been some surprise at the fact that America has hitherto declined to contribute any thing towards the support of the station. The honor of taking the first step towards rectifying our mistake in this matter belongs to Williams college. It is to be hoped that the example set by President Carter and the trustees of this college will not long remain the only evidence of our appreciation of the Naples station. Three or four tables will at least be required to meet the demands of our zoölogists alone, judging from the number now at work there. It is not right that American students should go to Naples as beggars, to be received out of courtesy, or indirectly through the liberality of English or German universities. Of the twenty-six tables now taken at the station, Germany controls twelve; Italy, four; England, two; Russia, two; Belgium, two; Holland, one; Hungary, one; Switzerland, one; and Williams college, one. There are four tables not yet disposed of, two of which, at least, should be secured at once by America. Will not some one or more of our universities take this matter in hand?

The establishment of a biological station at Wood's Holl, which, in the hands of Professor Baird, will doubtless be pushed to a speedy completion, will create facilities for the study of marine life on a much larger scale than we have hitherto seen in this country; and the successful issue of this enterprise, we venture to predict, will increase rather than diminish the number of American naturalists at Naples. Whatever improves our facilities for study will tend to increase the general interest in biology, and to augment the number of naturalists who will seek the best that the world affords in the way of methods. The time will never come when direct interchange of thought, and comparison of methods of research, will cease to be of the highest importance to the biologist. On the contrary, these things will become more and more a necessary part of the experience of every one who aims to be a useful and successful student of life. The progress of biological studies will soon create a demand for more than one international laboratory, and we certainly hope that the new station at Wood's Holl will take this character. The establishment of several great stations at different points, selected according to the relative richness and importance of the fauna and flora, each offering facilities for study similar to those enjoyed at Naples, and open to naturalists of every country, would prepare the way for a concentration and organization of forces, and inevitably raise the standard of work, and check the accumulation of drift-wood. It is obvious that the usefulness of one station would not be impaired by the existence of others, since the work of each would be supplementary to that of the others.

The character and importance of the publications of the station have been so well stated by Mr. Cunningham in the article before referred to, that little remains to be said on this topic. In looking over the list of subscribers to the *Fauna and flora*, we are again forced to acknowledge the slender interest which America has taken in the Naples station. Here is a colossal series of magnificent monographs, designed to give an exhaustive treatment of the plants and animals found in the Gulf of Naples, and published at a price that ought to insure them a place in the private library of every zoölogist and botanist in the country; and yet the list of subscribers, according to the last circular, numbers only eight. Even such countries as Holland and Switzerland outdo us. Austria and Russia have each twice this number of subscribers; Italy has nearly four times, England about five times, and Germany ten times, as many.

As our poor representation cannot be attributed wholly to indifference, it is safe to conclude that these monographs are not so generally known as they deserve to be. Thirty of the series have already been announced, six of which have been completed. From two to four are published each year in quarto form, and illustrated with numerous expensive plates, at an annual subscription-price of only twelve dollars and a half. The number of subscribers is now two hundred and seventy, and the three hundred and fifty copies of Dr. Chun's *Monographie der Ctenophorae* — the first in the series — have been already nearly exhausted. The monographs are written either in English, German, French, or Italian, according to the preference of the authors. Such brilliant achievements in the line of exhaustive research as are embodied in these monographs certainly command our homage, and assuredly deserve a more generous recognition than they have yet received in this country.

C. O. WHITMAN.

THE NATIONAL RAILWAY EXPOSITION.[1] — III.

IN England and Europe generally, signals of every conceivable variety have been used; but experience has shown that the semaphore is the best signal, and its universal adoption in Great Britain and on the busiest railways on the continent of Europe is a good example of the doctrine of the survival of the fittest. The exposition, we regret to observe, contains many forms of signals that are neither distinct in appearance nor positive in meaning. It is hard to say whether some of them mean safety or danger. A mere change

[1] Continued from No. 23.