

## THE ZOOLOGICAL STATION OF NAPLES.

AT the recent meeting of the British Association at Leeds, much difficulty was experienced in obtaining the renewal of the vote for the occupation, by a British naturalist, of a table at the Zoological Station at Naples—a grant which has received the sanction of the Committee of Recommendations of the Association for many successive years. It was alleged, we believe, that the Zoological Station at Naples was used by those sent to it rather for educational purposes than as a place for original research, and objections were also raised, perhaps with greater force, to the policy of continuing to support an already thriving institution for an indefinite period. Had it not been for the munificence of an individual member of the Association, Captain Andrew Noble, C.B., F.R.S., who kindly offered to supply the debated sum of £100, the Association could not have continued, during the present year, to send naturalists to work at the Naples Station.

So far, however, from being mainly used for education, as was affirmed by some of its criticizers, Dr. Dohrn's station at Naples (for, as Dr. Dohrn is its founder, director, and proprietor, we may fairly call it by his name) is, it may be truly said, almost entirely devoted to original investigations. The investigators, no doubt, get a large amount of education out of their work, but the leading idea at Naples is *research*. All the minor works at the station are subordinated to this leading idea. As we have lately established in this country an institution with nearly similar aims and objects—we mean the Laboratory of the Marine Biological Association at Plymouth—it may be useful shortly to review the state to which the institution at Naples has arrived after a career of twenty years, and to show an ideal to which its British imitator may, we trust, hope to attain after a certain period.

The Zoological Station of Naples consists of two buildings, connected by a gallery, and placed on the Chiaja, in the beautiful public garden which occupies part of the strand of the world-renowned Bay of Naples. The lower portion of the larger building contains a long series of tanks arranged for public inspection, so as to give sightseers a sample of the fishes and other marine wonders of the Bay of Naples. This portion of the building is open to the public, at stated hours, at an admission fee of two francs, and produces a revenue of about £1000 a year to the institution. The large tanks

which it contains are at the same time very useful as storehouses for the specimens required by the students. The whole of the upper stories of the larger building, and the whole of the smaller building are devoted entirely to scientific purposes. They contain the naturalists' working tables and tanks, the library, the studies and apartments of the Director and other officials, and the rooms used for the reception, preservation, and storage of specimens.

There is room in the buildings at Naples for about fifty naturalists' "tables," by which term is designated not merely the table itself, but the adjoining tank for specimens and every other sort of accommodation required for work in any branch of marine zoology. The tables actually rented continuously from year to year (at £100 each) are about twenty in number. Of these Prussia takes four, Baden one, Bavaria one, Saxony one, Hesse one, and Wurtemberg one, making altogether nine occupied by the various German Governments. Of nations foreign to Germany, Italy takes no less than seven, five of these being rented by the Ministry of Public Instruction, and two by that of Agriculture. France, in view of national prejudice, and having zoological stations of her own, could perhaps be scarcely expected to subscribe to what is essentially a German institution; but Switzerland, Hungary, and Holland each take a table, and the University of Cambridge occupies the only table rented in England, if, as now seems possible, that of the British Association will be given up. Besides these twenty "certain tables," others, varying in number from eight to sixteen, are let every year. These are taken by Russia, Belgium, Austria, Spain, and occasionally by some of the Italian provincial Governments. On the whole, this second "uncertain" series may be reckoned to number about ten on an average of years. Thus altogether thirty naturalists' tables are let and tenanted, and produce a revenue of about £3000 a year to the institution.

A certain number of these tables are occupied throughout the year, but in the height of summer the workers are reduced to a minimum, while in the early spring, perhaps, they attain their maximum number. At such an intermediate period as November 18 last, when the writer of this article had last the pleasure of visiting the establishment, eighteen naturalists were found to be in full work. The following list gives the names of these gentlemen, together with the names of the tables which they occupied and the objects of their various studies:—

Naturalists.	Residence.	Tables Occupied.	Objects of Study.
Dr. G. Jatta ... ..	Naples	Italy	Monograph of Cephalopods.
Dr. G. Cano ... ..	Sassari	"	Crustaceans, system and embryology.
Dr. C. Crety ... ..	Rome	"	Anatomy of Entozoa.
Dr. F. Monticelli ... ..	Naples	"	Helminthozoa, system and anatomy.
Dr. G. Mazzairelli ... ..	"	"	Anatomy of Gastropods.
Dr. S. Pansini ... ..	Molfetta	"	Bacteriology.
Dr. Salviati ... ..	Naples	"	"
Dr. M. Verworn ... ..	Jena	Prussia	Physiology of Protozoa and Coelenterata.
Dr. M. Meadthal ... ..	Königsberg	"	Anatomy of Nereidæ.
Dr. C. v. Wistinghausen ...	Berlin	"	Embryology of Annelids.
Dr. A. Looss ... ..	Leipzig	Saxony	General study of the fauna.
Dr. J. Loeb ... ..	Strassburg	Strassburg	Physiological experiments on Coelenterata and Worms.
Dr. M. Davidoff ... ..	Munich	Zoological Station	Monograph of Appendicularia.
Mr. W. Melly ... ..	Liverpool	British Association	Anatomy of Sponges.
Dr. J. Koningsberger ...	Utrecht	Holland	Embryology of Nemertean and Nudibranchs.
Sr. Rioja y Martin ... ..	Madrid	Spain	General study of fauna.
Lieutenant Borja ... ..	"	"	Conservation of marine animals.
Lieutenant Anglada ... ..	"	"	" " "

But these were by no means the only naturalists at work in the Zoological Station of Naples in November last. Besides the eighteen regular occupants of the "tables," the following members of the Station carried on sci-

tific work whenever leisure from their ordinary duties permitted them to do so:—

Members of the Staff of the Zoological Station.	Subjects of Work.
Prof. A. Dohrn (Director)	Comparative embryology of Vertebrates.
Prof. H. Eisig ... ..	Anatomy and embryology of Annelids.
Prof. P. Mayer (Editor of Publications) ... ..	Morphology of Vertebrates.
Dr. W. Giesbrecht ... ..	Monograph of the Copepoda.
Dr. P. Schiemenz (Librarian) ... ..	Mollusks: monograph of the Pteropods.
Dr. F. Raffaele ... ..	General fishery questions. Development of the skeleton in Vertebrates.
Dr. W. Kruse ... ..	Bacteriology.
Dr. E. Herter ... ..	Physiology, chemistry.
Dr. Schöbel ... ..	Branchial apparatus of Selachians, microscopic drawing.

The whole number of naturalists that have occupied "tables" and worked at the Zoological Station of Naples since its opening, some twenty years ago, is 575. Of these, 228 have been Germans, 127 Italians, 52 English, 48 Russians, 32 Dutch, 26 Austro-Hungarians, 23 Swiss, 18 Spaniards, 14 Belgians, and 4 Americans, while the remaining 12 were of various other nationalities. Much of the good work that has thus been produced has been scattered abroad over the world in articles contributed to different scientific periodicals. But a portion of it, sufficiently solid to show its general character, has been published in a noble series of memoirs on various departments of the flora and fauna of the Bay of Naples, which now extends to sixteen elaborate and abundantly illustrated quarto memoirs. These are:—

- (1) "Ctenophoræ," by Dr. C. Chun, 1880, with 18 plates.
- (2) "Fierasfer," by Dr. C. Emery, 1880, with 9 plates.
- (3) "Pantopoda," by Dr. A. Dohrn, 1881, with 17 plates.
- (4) "Die Corallinenalgen," by Graf zu Solms-Laubach, 1881, with 3 plates.
- (5) "I Chaetognathi," by Dr. B. Grassi, 1883, with 13 plates.
- (6) "Die Caprelliden," by P. Mayer, 1882, with 10 plates.
- (7) "Cystoseiræ," by R. Valiante, 1883, with 15 plates.
- (8) "Bangiaceæ," by Dr. G. Berthold, 1882, with 1 plate.
- (9) "Le Attinie," by A. Andres, Vol. I., 1884, with 13 plates.
- (10) "Doliolum," by Dr. B. Uljanin, 1884, with 12 plates.
- (11) "Polycladidea," by Dr. A. Lang, 1884, 2 Parts, with 35 plates.
- (12) "Die Cryptonemiaceen," by Dr. G. Berthold, 1884, with 8 plates.
- (13) "Die Koloniebildenden Radiolarien," by Dr. K. Brandt, 1886, with 8 plates.
- (14) "Polygordius," by Prof. J. Fraipont, 1887, with 16 plates.
- (15) "Die Gorgoniden," by G. v. Koch, 1887, with 10 plates.
- (16) "Die Capitelliden," by Dr. H. Eisig, 1888, 2 Parts, with 37 plates.

Besides these memoirs, eight successive volumes of a yearly journal entitled *Mittheilungen aus d. zoologischen Station zu Neapel*, containing smaller contributions to science, have been published during the past twelve years, and, since 1879, a *Zoologische Jahresbericht*, containing a summary of the advances made in the different branches of zoological knowledge during each year, has been regularly issued. In these three undertakings we have ample testimony to the great amount of work carried on at Naples by Dr. Dohrn and his coadjutors, and to the excellent results which they have arrived at.

Having described the nature of the business transacted at the Zoological Station at Naples, let us now consider

the cost at which it is carried on, and the means whereby the necessary funds are obtained. Taking the expenditure of the last three years as a basis, we find, from figures kindly supplied to us by Dr. Dohrn, that about £2400 are required for the general expenses of management—that is, for stocking the tanks, preserving specimens, keeping up the laboratories, machinery and pumps, providing additions to the library, and paying taxes and other outgoings. A similar sum of about £2400 is spent on the salaries of the officials, the higher officers (twelve in number) receiving from £220 to £72 per annum, and the lower grades (34 in all) ranging from £72 to £15, the last-mentioned sum being the wages paid to boys.

These are the two most serious items on the outgoing side, and make together £4800, besides which about £1300 are required for interest on the debt and sinking-fund, £200 for accumulation towards a pension-fund, which was commenced two years ago, and £100 for the publications, which cost about £1400 a year, and only produce a return of about £1300. Thus the total yearly expenditure of the Zoological Station at Naples, as at present carried on, may be reckoned at about £6400. To meet these annual requirements an income which has averaged about £4800 during the past three years is available. As already stated, the receipts from the admission of visitors amount to about £1000, while the thirty tables, let at £100 a year for each table, produce a revenue of £3000. Besides these principal items, the sale of specimens preserved at the Station produces about £700, and that of waste materials of various sorts another £100. Thus the whole income derived from the institution itself reaches only about £4800, and the Station would be carried on at a considerable annual loss were it not for the magnificent subsidy of £2000 a year granted to its support by the German Empire, which just covers the deficiency. This is a good example of the liberal way in which science is encouraged and supported in the "Fatherland," and is the more noteworthy because the object of its well-bestowed bounty in this instance is localized on foreign soil, and, though established and carried on by a German citizen, is by no means restricted for German subjects. We may appropriately contrast this with the conduct of the Government of our own country, which, in the case of the corresponding institution at Plymouth, situated in England, and founded and carried on mainly if not entirely for the benefit of British subjects, could only be persuaded to grant a subsidy of £500 a year for a limited period of five years. P. L. S.

ATTRACTIVE CHARACTERS IN FUNGI.

ON the recent introduction of this subject into the columns of NATURE it was understood, if not so expressed, that the inquiry was to be practically limited to the Hymenomycetal fungi, with the view of restricting it within a definite compass, and preventing too discursive a discussion. The limit was a very natural one, and included the best known and most appropriate objects for exhibiting the presumed attractiveness. Allusions have been made to another remarkable group, the *Phalloidei*, but facts applicable to this group would scarcely serve as illustrations of the *Agaricini*. Moreover, it must be admitted that with the *Phalloidei* the difficulties in the way of arriving at a conclusion are small. Strong foetid odour and bright coloration are features almost universal, the object of which may fairly be accepted as attractive, to the end that the minute spores may be distributed, and the continuity of the species preserved. On this point nothing has been adduced beyond what is contained in Mr. Fulton's communication in the *Annals of Botany* for May 1889, on "The Dispersion of the Spores of Fungi by the Agency of Insects."

As regards the *Hymenomycetes*—that is to say, fungi of the mushroom type, with naked spores—the question ap-