

and other equatorials have only been used on special occasions and for visitors, 594 of whom inspected the observatory during the year.

The automatic photographic registration of terrestrial magnetism was obtained with only 34 hours interruption during the year; absolute measurements were made on seven occasions, and instrumental constants, &c. determined.

The series of cloud photographs has been continued, 77 additional pairs of plates being taken from the roof of Parliament House and the observatory grounds respectively. These are now being measured and discussed in connection with visual observations.

**ABNORMAL STARS IN CLUSTERS.**—Prof. E. E. Barnard has for some time been engaged in micrometric determinations of the positions of a number of the individual stars in the great globular clusters M 3, M 5, M 13, M 15, and M 92, and in the course of the work has noticed several peculiarities, the most striking of which is the fact that some of the stars in these clusters shine with a much *bluer* light than the majority of their neighbours, thus producing a remarkable difference between their photographic and visual magnitudes. So striking is this that the images in some cases are so large as to suggest variability (*Astrophysical Journal*, vol. xii., pp. 176–181). Comparisons have been made with a negative enlarged four times from an original of M 13 Hercules, taken with the Potsdam 13-inch photographic refractor in 1891.

The two stars, Nos. 148 and 131 of Scheiner's catalogue of this cluster are practically equally bright to the eye as seen in the sky; but on the photograph No. 148 has an image four or five times larger than No. 131.

Other neighbouring stars, however, register photographically the same relative brightness as determined visually. This led to the minute examination of No. 148 with high magnifying power, when it gave the impression of some object less sharp than stars near it, suggesting the idea of a small planetary nebula. Other stars showing the same abnormal features are detailed, and a numbered sketch of a portion of the cluster given for identification.

Prof. Barnard says he has found similar cases in other clusters, e.g. M 5 *Libræ*. A suggestion by Prof. Hale that a photograph taken through a yellow screen should not show these peculiarities was tested on the 40-inch Yerkes refractor and proved correct, the stars previously mentioned coming out on the photograph with almost the identical relative brightness they show visually in the same telescope.

The suggestion is made that these stars are of similar nature to the condensation or nucleus of the annular nebula in *Lyra*, perhaps bearing the same relation to the other stars of the cluster that the nucleus of that nebula does to the ordinary stars of the sky. It would appear, therefore, that the possibility of these abnormal stars being of the nature of nebulae brings up again the question of nebulosity in the globular clusters.

**RECENT STUDIES OF INFRA-RED REGION OF SOLAR SPECTRUM.**—In the current issue of the *Comptes rendus* (vol. cxxxii. pp. 734–736), Prof. S. P. Langley describes the result of his recent work on the bolometric study of the solar spectrum in the infra-red. At the date of his last communication to the French Academy, in 1894, the knowledge of the region beyond  $\lambda = 1\mu$  was very imperfect, but now, thanks to the great improvement of his bolometer, which is capable of detecting a variation of temperature as minute as the millionth part of a degree, the map of the calorific rays has been carried to  $\lambda = 5.8\mu$ . The article is illustrated by a heliogravure of the calorific spectrum from  $\lambda = 0.76\mu$  to  $\lambda = 5.3\mu$ , both the galvanometer record and the "line" integration being given. More than 600 lines are recorded, each of which has been studied separately and obtained by from six to twenty independent observations. Prof. Langley calls special attention to the observations of the *telluric* infra-red spectra, which have been studied during all seasons from 1895–1900. Systematic variations have been observed in them which appear to have some relation to the season in which they occur, and, although small, are very distinct.

**THE ZODIACAL LIGHT.**—*The Observatory* for November contains the first part of an article giving in a concise form the complete history of the zodiacal light. In this number the history is brought up to the year 1855, being derived mainly from two sources; (1) the article by M. E. Lefébure in *Ciel et Terre*, April, 1894; (2) a Review by Prof. C. E. Brame in the *Popular Science Monthly*, October, 1877.

### THE NAPLES ZOOLOGICAL STATION.<sup>1</sup>

THE Zoological Station at Naples is so well known, either by personal experience or by repute, to zoologists the world over, that it may seem to some that any further account of it is quite unnecessary. But the institution has lately extended its scope and increased its equipment so as to appeal to workers in other lines of biology; and, moreover, as certain Associations and Universities in this country and elsewhere give annual grants towards defraying the expenses of special researches at Naples, it is due to scientific men in general that they should be kept informed from time to time of the conditions under which such work is carried on.

About ten years ago the then chairman of the British Association Naples Committee visited Naples, and gave an interesting report (*NATURE*, February 1891, p. 392) on the condition of the Zoological Station, in which he dwelt mainly upon the history, constitution, finance and publications; it will, therefore, be best that I should now draw attention, chiefly to the present facilities for work at this world-renowned laboratory, and to the additions and improvements effected during the last decade. I am indebted to Prof. Dr. Anton Dohrn, the director, and to the secretary, Mr. Linden, for much information given me during my recent visit.

Since Dr. Sclater's visit in 1890 additional accommodation has been obtained by a re-arrangement of the roof of the main building. This gives space for a second laboratory, a supplementary library, and various smaller rooms used as chemical and physiological laboratories, for photography and bacteriology. A good deal of the research in recent years, both on the part of those occupying tables and of the permanent staff, has been in the direction of comparative physiology, experimental embryology, and the bacteriology of sea-water, and all necessary facilities for such work are now provided.

The number of work-places, in some cases separate rooms, known technically as "tables," is about fifty-five, and of these about thirty-four are rented annually by States, Universities, or Associations. Germany takes about ten of these, and Italy seven. There are three American tables, and three English (rented by the Universities of Cambridge and Oxford and the British Association respectively); consequently there are generally about half a dozen English and American biologists at work in the station; but Dr. Dohrn interprets in a most liberal spirit the rules as to the occupancy of a table, and, as a matter of fact, during my recent visit there were, for a short time, no less than three of us occupying simultaneously the British Association "table," and provided with separate rooms.

A work-table is really a small laboratory fitted up with all that is necessary for ordinary biological research, and additional apparatus and reagents can be obtained as required. The investigator is supposed to bring his own microscope and dissecting instruments, but is supplied with alcohol, acids, stains, and other chemicals, glass dishes and bottles of various kinds and sizes, drawing materials and mounting reagents. Requisition forms are placed beside the worker on which to notify his wishes in regard to material or reagents, he is visited at frequent intervals by members of the staff, and all wants are supplied in the most perfect manner. The recent addition of carefully planned filter-beds, by means of which half the sea-water in circulation in the tanks can be filtered and separated from the rest, has materially increased the facilities for some classes of experimental work.

The staff of the station consists of:—

(1) Dr. Anton Dohrn, the founder and director.

(2) Seven or eight scientific assistants—viz. Dr. Eisig, administrator of the laboratories; Dr. Paul Mayer, editor of the publications; Dr. Giesbrecht, assistant editor and supervisor of plates; Dr. Gast, assistant editor and supervisor of microscopic drawings; Dr. Schöbel, librarian; Dr. Lo Bianco, administrator of fisheries and préparateur; Dr. Hollandt, temporarily in charge of the microscopic sections department—all of them well-known men, each eminent in his own line of investigation. The post of assistant in the physiological department, formerly held by the late Dr. Schoenlein, is now vacant.

(3) In addition to the foregoing there are:—The secretary, Mr. Linden; two artists and the engineer.

(4) Also about thirty attendants, collectors and others em-

<sup>1</sup> Abridged from the "Note by the Chairman" of the Naples Committee in the report presented to the British Association at Bradford, September 1900.

ployed in the laboratories, in the collecting and preserving departments, aquarium and elsewhere.

This seems at the first thought a very large staff, but the activities of the institution are most varied and far-reaching, and everything that is undertaken is carried to a high standard of perfection. Whether it be in the exposition of living animals to the public in the wonderful tanks of the "Acquario," in the collection and preparation of choice specimens for Museums, in the supply of laboratory material and mounted microscopic objects to Universities, in the facilities afforded for research, or in the educational influence and inspiration which all young workers in the laboratory feel—in each and all of these directions the Naples station has a world-wide renown. And the best proof of this reputation for excellence is seen in the long list of biologists from all civilised countries who year after year obtain material from the station or enrol as workers in the laboratory. Close on 1200 naturalists have now since the opening of the Zoological Station in 1873 occupied work-tables, and as these men have come from and gone back to practically all the important laboratories of Europe and America, from St.

discovery, and he goes there because he knows he will find material, facilities and environment such as exist nowhere else in the same favourable combination. The British Association Committee consider it most important that these opportunities for research should be open to British biologists in the future as they have been in the past, and it is on this ground that they confidently recommend the policy of sending selected investigators to Naples each year—a practice which has led to such satisfactory results in the past, and is full of promise for the future.

W. A. HERDMAN.

### THE BRADFORD MUNICIPAL TECHNICAL COLLEGE.

DURING the recent Bradford meeting of the British Association many members availed themselves of the opportunity of inspecting the splendid Technical College which commenced a new era under the auspices of the Municipal Council twelve months ago. A description of the organisation of the

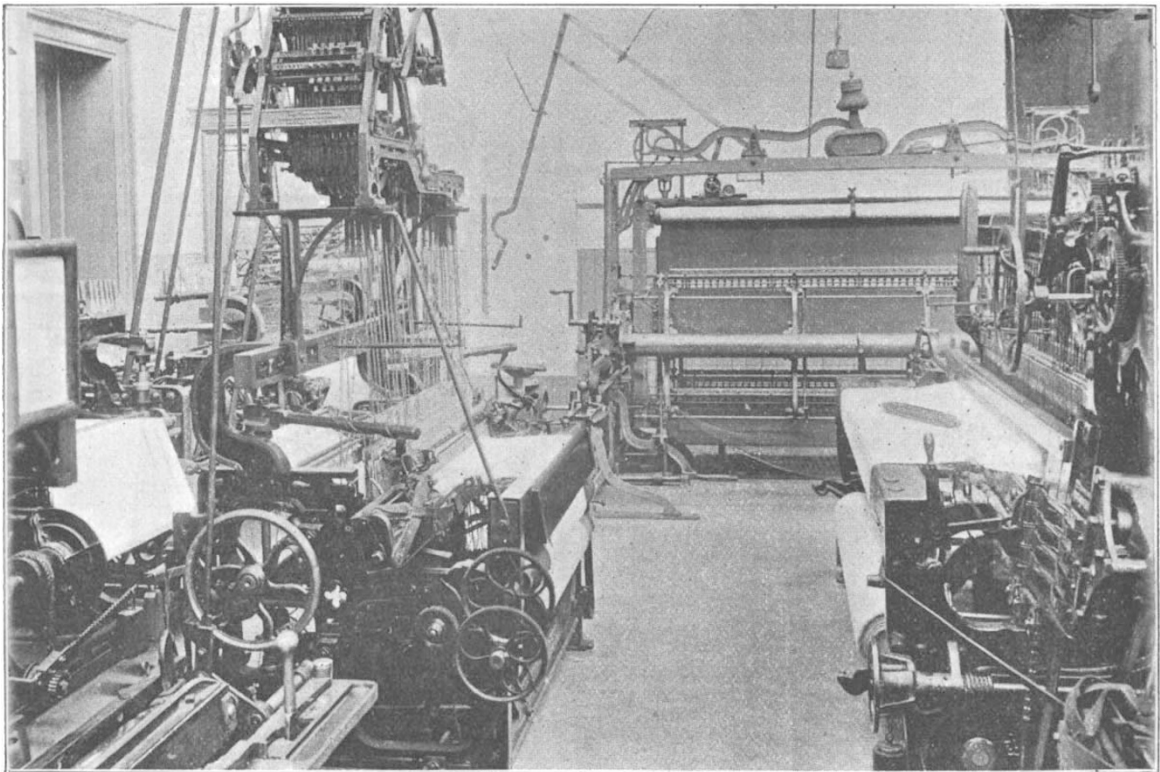


FIG. 1.—Department of Textile Industries, Bradford Municipal Technical College—power loom shed, showing dress goods and coating looms and embroidery frame.

Petersburg to Madrid, and from California to Japan, Naples may fairly claim to have been for the last quarter of a century a great international meeting-ground of biologists, and to have exercised a stimulating and co-ordinating influence upon biological research which it would be difficult to over-estimate.

The opportunities for taking part in collecting expeditions at sea are most valuable to the young naturalist. Dredging, plankton-collection and fishing are carried on daily in the Bay of Naples by means of the two little steamers belonging to the station, and a flotilla of fishing and other smaller boats. Many of the Neapolitan fishermen are more or less in the employ of the station, or bring in such specimens as they find in their work. The collecting organisation, under the charge of Dr. Lo Bianco, is now sufficient to provide from fifty to sixty workers at a time with all the material requisite for their varied researches.

But although the work of the Naples Zoological Station is thus many-sided, the leading idea is certainly original research. An investigator goes to Naples to make some particular

college, and the work of its various departments, is given in the current number of *The Record of Technical and Secondary Education*, from which source, and the *Bradford Observer*, the following particulars have been derived. We are indebted to the Editor of the *Record* and to Mr. J. Nutter, secretary of the school, for the accompanying illustrations.

The management of the college is now in the hands of the Technical Instruction Committee of the Bradford City Council, and the scheme defining the objects of the college is as follows:—  
“The general object of the foundation shall be the maintenance of a technical college under the Technical Instruction Acts for persons above 14 years of age, subject to the provision that no secondary day school or school of science shall be carried on in the college, but that day and evening classes may be held in the subjects of art, and of manual, scientific or technical instruction connected with the trades and manufactures of Bradford and the neighbourhood, to which none shall be admitted under the age of 15 years, except on the recommendation of the governing body of