

to be accounted for,— facts, possibly, best explained on the supposition of a greater subsidence of the western as compared with the eastern regions leading to submergence of the plains under water sufficiently deep to carry icebergs of large size.

GEORGE M. DAWSON.

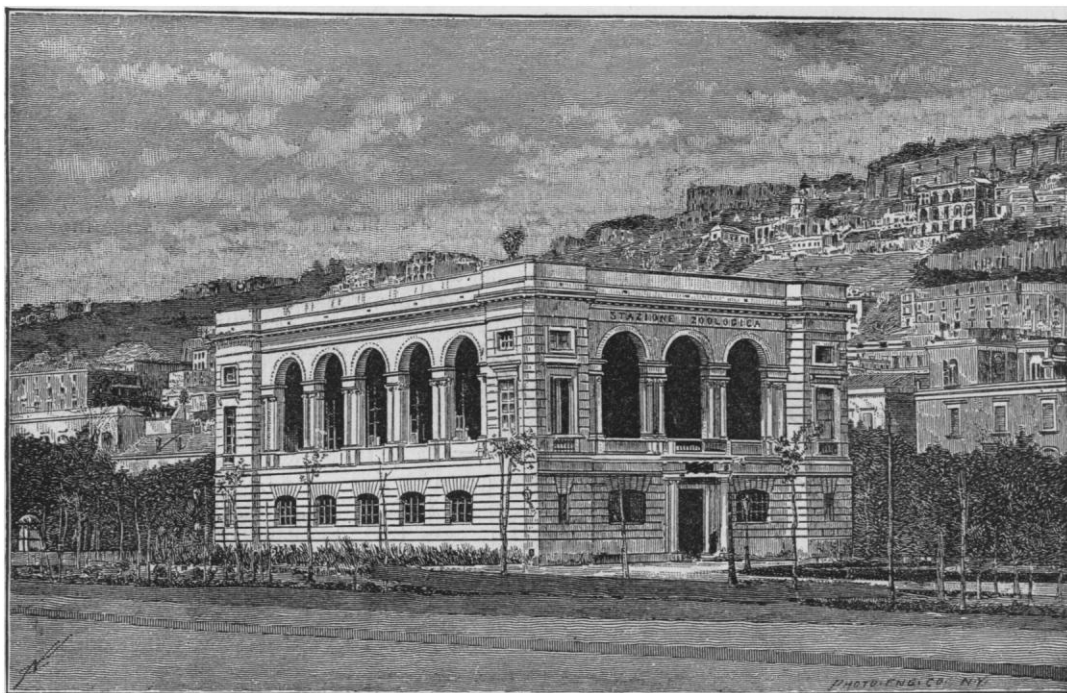
Geol. survey of Canada, Ottawa,
April 10, 1883.

THE NAPLES ZOÖLOGICAL STATION.

I.

FOR half a century past, Naples has been the favorite resort of the zoölogists of Europe

Dr. Anton Dohrn, in his voyages to the Mediterranean to carry out his researches, experienced, as others had done, grave difficulties which he could not, single-handed, overcome. To realize the conditions necessary for extensive and thorough work requires not only a large expenditure of money and time, but a permanent and growing institution, which provides all the instruments of research in a locality where nature furnishes in abundance and variety the material to be studied. To carry on biological work on a large scale in as many directions as possible, with a thoroughly equipped laboratory, permitting investigators to apply to their researches the most



on account of the wealth of the fauna of the neighboring waters. But the independent efforts of solitary naturalists were naturally unable to secure all the advantages for science which could be gained by suitable organization. Two old fishermen, who, forty years ago, were turned aside from fishing for the market, and trained to collect for science by Johannes Müller, are still at work in the gulf, not now alone, but with a dozen other men, collecting with dredges, nets, hooks, and scaphandra, material for nearly thirty investigators, studying with all the resources of a completely organized laboratory in the zoölogical station.

elaborate technical processes, and to make use of the best modern methods, with all the material that these rich southern regions can supply, all the help that may be had from a well-furnished library, all the aid that can be obtained from well-trained attendants and subordinates, and all the stimulus and assistance that consciously and unconsciously comes from the intercourse of many minds giving their best powers to the same work,—this is the aim of the zoölogical station. To this object Dr. Dohrn has devoted the last fifteen years of his life, making even his own important researches a secondary consideration ;

and, having founded the station, he has gathered about him a group of earnest investigators, animated by the same spirit, who form its permanent scientific staff.

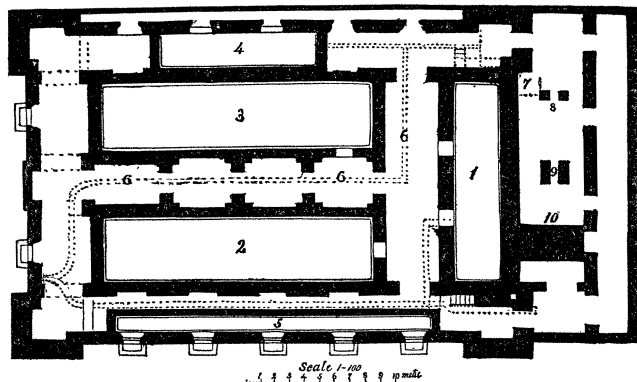
The station was opened in 1874; and the total cost of its building was \$85,000, exclusive of the cost of the site, which was given by the Neapolitan municipality. Dr. Dohrn contributed \$60,000 of his own property, and obtained a grant of \$20,000 from the German government. The other \$5,000 was presented by some of the eminent friends of science in England,—Professor Huxley, Sir Charles Lyell, Mr. Darwin, Mr. Balfour, and others.

The situation of the building is exceedingly

of Ponlippo, eastward to the mountains of St. Angelo, while to the north-east the town rises in terraces from the bay, in the form of an amphitheatre, with the smoke of Vesuvius in the background, rising into the sky, and floating away towards the horizon.

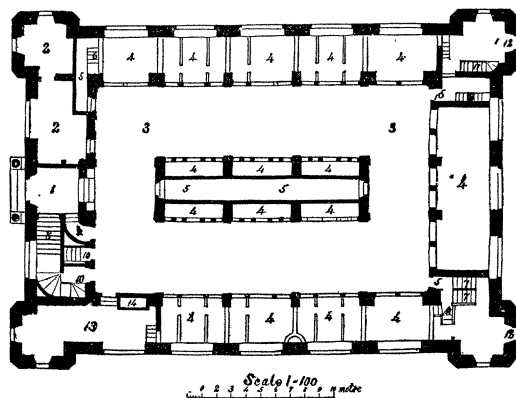
The lower floor of the station is occupied by the well-known public aquarium, which consists of thirty tanks, the largest holding two thousand cubic feet of water. The beautiful creatures of the Mediterranean

are to be seen in these tanks, living in their natural conditions,—the delicate transparent pelagic animals, the medusae, ctenophores, and salpae, the expanded corals and polyps and tube-worms, with their brilliancy and variety of



PLAN OF BASEMENT.

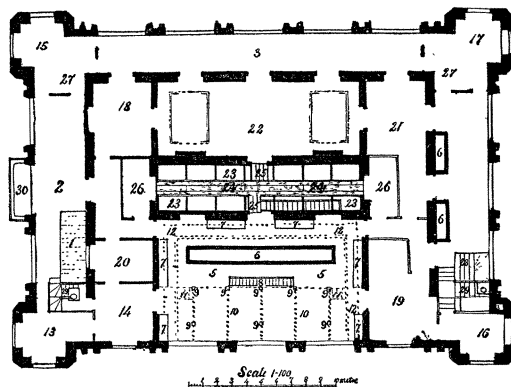
1. West reservoir ; 2. South reservoir ; 3. North reservoir ; 4. 5. Storage basins ; 6. Pipes connecting the reservoirs and basins with the pumps ; 7. Pump-reservoir ; 8. Pumps ; 9. Engine ; 10. Boiler.



PLAN OF GROUND FLOOR, OR AQUARIUM.

1. Entrance ; 2. Office ; 3. Open space for visitors ; 4. Aquarium ; 5, 6. Passages and staircases for the service of the basins ; 7. Staircase to laboratory ; 8. Main staircase to same ; 9. To basement ; 10. To retiring-rooms ; 11. To engine-room ; 12. Entrances for fishermen and attendants ; 13. Small laboratory ; 14. Working aquarium of the same.

fortunate; it stands in the middle of the gardens of the 'Villa nazionale,' a few rods from the shore; and from its loggia one looks southward, over the wide expanse of the gulf, to Capri in the distance, westward to the ridge



PLAN OF UPPER FLOOR, OR LABORATORY.

1. Main staircase ; 2. East loggia ; 3. South loggia (both open) ; 4. West loggia, closed by windows ; 5. Large laboratory ; 6. Working aquarium ; 7. Large cabinets ; 8. Iron staircase leading to 10, platform at mid height supported by iron pillars (9) ; 11. Staircase leading to 12, gallery destined for the collections, but at present used as the library ; 13-18. Unfinished rooms attached to the laboratory ; 19, 20, 21. First, second, and third assistants' rooms ; 22. Great hall intended for the library ; 23. Lighted court ; 24, 25. Longitudinal and transverse passages through the same ; 26. Vestibules ; 27. Restaurants ; 28. Staircase to aquarium ; 29. Staircase to attic ; 30. Chimney ; 31. Balcony.

color, and the thousand other creatures of various size, up to the large octopus and the great edible turtle. The aquarium was intended to produce a revenue which should cover a considerable proportion of the expenses of the station, — an expectation which has not been fulfilled. Nevertheless, it is appreciated by all who visit it as a source of great delight and interesting knowledge, while it is indispensable to those who work in the station as a means of study and a reservoir of material.

Beneath the floor of the aquarium is a labyrinth of underground rooms, containing the engines, cisterns, and pumps by which the circulation of water is maintained throughout the tanks and the smaller aquaria in the laboratories above.

To the right of the main entrance to the public aquarium is a marble staircase, which the uninitiated are forbidden, in various languages, to ascend. It leads up to the part of the building devoted to scientific studies; and thus immunity is secured from all noise or disturbance. The naturalists at work hear only the breaking of the waves, or, at times, the sounds of music from the gardens, and the distant murmur of the city. On the northern side of this second story is the great laboratory, lighted by a row of windows twenty-five feet in height. It is fitted up for twelve workers; the tables, drawers, and shelves of each being so arranged as to form under a window a kind of alcove, which is thus well lighted from the north, and is fitted up independently with reagents and apparatus. Down the centre of the room is a long aquarium, consisting of two reservoirs, one above the other; so that, by means of siphons, circulation of sea-water may be kept up in the various vessels which the occupants of the tables use to isolate the animals they are studying, or to contain ova and embryos in course of development.

Besides this general laboratory, there are twenty small rooms fitted up for the same purpose, each provided with its own apparatus and aquaria.

The south side of the large laboratory has two windows opening on a central court lighted by a skylight in the roof, and extending down to the floor of the public aquarium, whose central tanks are arranged around it. A short bridge across this court leads to the library, which corresponds in size to the laboratory, and opens on to a spacious loggia running along the whole south side of the building. The library is well furnished and excellently lighted; and there is scarcely a work on any branch of biology, classical or recent, or

any current scientific periodical of reputation, which is not to be found on its shelves. The height and fine proportions of the room are in keeping with the dignity of its function; and its walls are tastefully decorated with interesting frescos appropriate to the situation and character of the station.

To the west of the laboratory and library are the rooms where the material brought into the station is deposited, sorted, and distributed, and where the conservator, Salvatore Le Bianco, and his assistants, preserve specimens for the collection of the station, and for sending to distant laboratories or private investigators. In one of these rooms are the shallow tubs where the contents of the dredges are poured out, washed, and searched by a number of boys; and the variety of beautiful and interesting creatures to be seen here, everywhere around, produces an enthusiastic delight in the zoölogist on his first visit; and the impression is in no way lessened when he examines the exquisite collection of preserved specimens in Salvatore's room, and sees the most delicate and sensitive creatures — corals, alcyonaria, transparent medusae, and ctenophores — fixed in the fully expanded condition, and preserved in their natural shape. This result is obtained by a different method for almost every animal; and the successful treatment has been discovered, sometimes by a fortunate idea, but usually by patient and careful series of experiments.

THE SPECTRUM OF AN ARGAND BURNER.¹

I HAVE been lately requested to determine the distribution of energy in the spectrum of an argand burner, and have been able to do this by means of the apparatus and methods previously employed at the Allegheny observatory for mapping the invisible spectrum of the sun. The results are curious; and, in the hope that they may also be found useful, I desire to communicate them to the academy. The difficulty in such a determination lies in the mapping of something which is wholly invisible; and it has not been made before, I presume, in spite of its economical importance, because there has been no means known of measuring this invisible energy, except in a rough way, by the thermometer or thermopile, by a process which gives incomplete results.

It was my object not merely to indicate

¹ Read before the National academy of sciences at its Washington meeting, April, 1883.