

**THE METHODS EMPLOYED AT THE  
NAPLES ZOOLOGICAL  
STATION FOR THE PRESERVATION  
OF MARINE ANIMALS PP. 4-40**

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The Methods Employed at the Naples Zoological Station for the Preservation of Marine  
Animals pp. 4-40 by Salvatore Lo Bianco

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**SALVATORE LO BIANCO**

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SMITHSONIAN INSTITUTION.  
UNITED STATES NATIONAL MUSEUM.

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BY

DR. SALVATORE LO BLANCO.

Translated from the original Italian

BY

EDMUND OTIS HOVEY.

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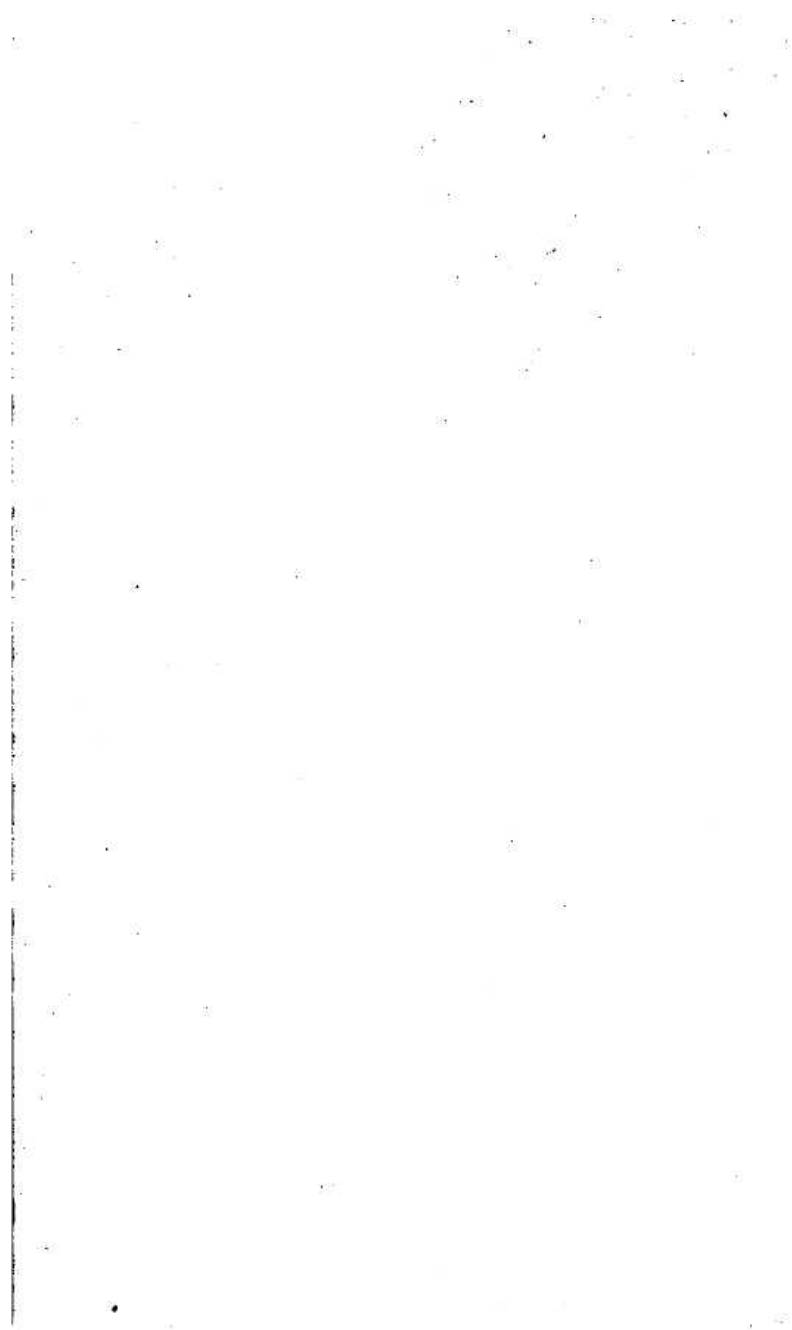
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work rooms. The smaller building is used for receiving, preserving, and storing the material brought in from day to day, and for laboratories and study rooms for some of the officials and others. The aquarium proper contains twenty-six tanks having glass fronts and lighted from above in such a manner that, as a person gazes into them, he can readily imagine himself standing on the bottom of the sea with the animals at home about him. There are no open tanks and no light enters the room except that which comes through the water.

The stocking of the aquarium and the supply of material for the naturalists at work in the station is cared for in a very complete way. The station owns two steam launches, which are used for dredging and other heavy or distant work, and two or more small rowboats, which are kept constantly busy collecting jelly-fish and other surface forms of life which are driven into the harbor from the open sea. Furthermore, all the fishermen in the bay regularly bring to the station all the animals that come up in their nets that are known to be desired. These objects are paid for as they are brought in. Every day the naturalists state what they need for the next day's work, and every evening corresponding orders are given to the crews of the boats belonging to the station. One naturalist may want fifty sea-urchins of a kind, another twenty-five starfish, another a large or small number of jelly-fish or crustaceans or what not, and each finds his wants supplied the next morning, if the weather has been favorable. It is very interesting to observe the pride which the rough fishermen of the bay now take in bringing to the station all rarities and other forms of life which they know to be desired there.

Although the aquarium is the most popular portion of the institution and the public sees only that and the preserved animals which are sent out to museums, the chief mission of the station, in the eyes of the director, Dr. Dohrn, and of all other scientists as well, is to provide a place for the investigation of marine life under the best conditions attainable on land, and most of the station building is given up to provisions for this purpose. The regular scientific corps consists of nine men, including the director, each of whom makes a special study of some form of animal life. The average number of naturalists not connected with the institution who study there is about forty in each year, though not more than from twenty-five to thirty may be there at one time. Each of these is an independent worker along some particular line of study, no elementary instruction being given by the officers. Each student is provided with a table or desk, drawers, racks, bookshelves, microscope, glassware, alcohol, and other reagents, drawing materials, glass tanks with running and stationary water, and, in fact, with everything needed to carry on his investigations, and with animals to work upon.

The library is very full on all subjects bearing upon zoology, a speciality being made of periodicals. Furthermore, fully equipped laboratories are provided for the investigation of the chemical and



physical questions which arise, and there are optical and photographic rooms, and a machine shop fitted up for doing all ordinary grades of work. More than a thousand naturalists have availed themselves of these opportunities for study. Of this number 375 have been Germans, 240 Italians, 85 Russians, 80 Englishmen, 40 Dutchmen, 40 Americans (from the United States), 30 Swiss, 35 Austrians, 22 Belgians, 17 Spaniards, 17 Hungarians, the remainder being Scandinavians, Greeks, Roumanians, Bulgarians, Japanese, and Hindoos. Truly an international array!

The activity of the investigators at the station does not expend itself wholly or even largely upon the description and naming of new species. It seeks rather to discover the innermost secrets of life, and to learn all the comparisons that can be made between one set of animals and another. The results of the work are published in three ways and appear periodically. The description of the Fauna and Flora of the Gulf of Naples began to be published in 1880, and up to the end of 1897 twenty-four quarto volumes of these exhaustive memoirs had been issued, magnificently illustrated with numerous text figures and colored and plain plates. The Contributions from the Zoological Stations are the shorter articles brought out by the workers at the station, and thirteen volumes of these have appeared. The Zoological Yearbook is now in its twenty-first volume, and seeks to give not only a list of all articles and books of the current year pertaining to the science, but also brief abstracts of their contents.

To inaugurate the station in 1872 required about \$100,000, besides the land in the beautiful Villa Nazionale donated by the city of Naples. Friends of science in Germany and England contributed about \$40,000 of this amount, but the remainder came from Dr. Dohrn's own fortune. The money necessary to meet the running expenses of the institution comes from several sources. Each contributor of £100 annually to the station supports a "table," and has the right to name a person to receive the benefits thereof. At present 30 tables are thus provided for, the Italian Government paying for 7, different institutions in Germany for 11, England for 3, Russia, Austria, and the United States<sup>1</sup> for 2 each, and Belgium, Holland, and Switzerland for 1 each. The tables are paid for year by year, and there is no endowment fund, though Dr. Dohrn is striving now to establish one. The German Government appropriates £2,600 for the station; the fees of visitors to the aquarium amount to about £1,000; the sale of preserved animals to about £700, and the sale of old material of various kinds to about £100. The expenses, however, always manage to keep pace with

<sup>1</sup>The Smithsonian Institution has supported a table at the Station regularly since 1893. The Collegiate Alumnae have begun supporting a "woman's table" in commemoration of the twenty-fifth anniversary of the Station. During some years Columbia University has had a table, and one has been paid for at intervals by a few of the leading American universities alone or in conjunction with the American Society of Naturalists.

the income, or exceed it, although the officers of the institution work for almost nothing, the highest salary paid being less than \$1,100 a year.

The branch of activity at the station which appeals more strongly to the public than do the scientific investigations is the preservation of marine animals, particularly invertebrates, for exhibition in museums and for purposes of study. To Cav. Dr. Salvatore Lo Bianco is due the major part of the credit for the success which the station has had in this line of work. Beginning work for the station as an attendant, he soon showed peculiar ability in handling the animals which were obtained. He studied their habits, anatomy, and composition carefully, and made many experiments to determine the best method of killing and preparing each species, so that it would present a lifelike appearance in the exhibition jar, until he succeeded in obtaining the beautiful results which have been distributed to museums and colleges all over the world. The animals which are intended for dissection and study must often be preserved in a different manner from those which are intended for exhibition, and in this line of work, also, the Naples station stands preeminent. An investigator may even send word to have specimens prepared in special ways of his own devising, and thus save himself the trouble of making a trip to Naples.

One reason for the beautiful appearance of the material sent out by the station is that it is properly caught in the first place; another is that, for the most part, the animals are alive when the process of preservation begins. With many forms it is indispensable that they be alive at the beginning of operations; with some it is not so necessary, but with all it is highly desirable. A fish which has been put into alcohol after death looks entirely different from another specimen of the same species which has been put into the fluid when still alive. The best methods have been determined for each species by itself, different species of the same genus often requiring different handling, hence it is necessary that the operator should be able to recognize the species with which he has to deal in order to obtain the best results. When new species are encountered, the best mode of procedure must be determined by experiment. The experience of the Naples station has been so long and varied, however, that a knowledge of the methods pursued there will be of value to naturalists all over the world. For this reason the writer, with the consent of Professor Dohrn and the consent and cooperation of Dr. Lo Bianco, has undertaken the translation of the latter's "*Metodi usati nella Stazione Zoologica per la conservazione degli animali marini,*"<sup>1</sup> incorporating therewith the notes made during a stay of five weeks at the station in the autumn of 1897 for the express purpose of studying those methods for the benefit of the American Museum of Natural History. It is to be understood that the methods have all been devised by Dr. Lo Bianco, unless otherwise stated.

EDMUND OTIS HOVEY.

NEW YORK, *March, 1899.*

<sup>1</sup> Mittheilungen a. d. Zoologischen Station zu Neapel, Pt. 3, IX, 1890, pp. 435-474.

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By Dr. SALVATORE LO BIANCO.

[Translated from the original Italian by Edmund Otis Hovey.]

### UTENSILS.

The laboratory of the station is provided with large tanks containing running and stationary sea water, a table covered with sheet lead and furnished with a drain, a great variety of glass and earthenware dishes, and tools of different kinds and materials.

Cylindrical glass jars, with glass stoppers ground to fit, are used for exhibition purposes and for storage. Those with necks are employed for the most part, but those without necks and with a flat top are preferred for elegant installation. Cylindrical jars are the most economical of fluid and are the cheapest to get.<sup>1</sup> Since glass jars are expensive, earthenware jars and basins are used for many laboratory manipulations. The small, globular vessels which have the bottom formed by a glass stopper, concave within, are recommended for small spherical animals. Round-bottomed glass tubes are very useful, but care must be exercised to see that the walls are not too thin. The edge of the orifice should be smoothed in the Bunsen flame. When the tubes are more than 30 mm. (1.2 inches) in diameter, the lip should be flared out so that a piece of bladder can be readily tied over the opening.

Corks should be selected from the best stock, should be as compact as possible, and should be without cracks or other defects. In form they should be cylindrical, so as to make a good joint with the sides of the tube. The ends must be flat, with clean cut edges, so that no fragments can get into the alcohol. With large tubes it is desirable to put a plug of cotton inside the tube next to the cork, since the alcohol extracts the tannic acid from the cork and is stained brown thereby.

<sup>1</sup> For convenience in suspending objects in the liquid, those having a glass hook in the under side of the stopper should be obtained.

E. O. H.