THE MARINE BIOLOGICAL STATION OF THE UNIVERSITY OF TEXAS.

BY CHARLES L. EDWARDS, AUSTIN, TEXAS.

ANY ONE familiar with the brilliant pioneer work of Agassiz, Pourtalès, and Brooks, together with their students, upon the fauna of the Gulf of Mexico and neighboring waters will gladly welcome the inauguration of any movement, however modest, to continue the exploration of the American Mediterranean. The successive summer expeditions sent from the Johns Hopkins University since 1887, to the different Bahama Islands and Jamaica, and the proposed establishment of the Columbus Station on the latter islands, are familiar to all interested in the work of this field.

An important part of the School of Biology, created in January, 1892, by the regents of the University of Texas, both as regards instruction and research, is the Gulf of Mexico Station. As a result of a brief preliminary survey which, at the request of the regents, I made last summer at Aransas Pass and Galveston, several facts of prime importance in locating a biological station became apparent. The low Texas coast is bordered by exceedingly shallow bays, from two to ten miles wide, cut off from the Gulf of Mexico by a very narrow sand-formation. This almost continuous stretch of sand, raised unevenly by innumerable dunes formed by the wind, is broken at eight places by narrow channels into seven islands, and at three other points partially unites with the mainland to form extended peninsulas. Its gulf shore is unindented, while, on the other hand, its bay shore-line is quite irregular. Vast areas of the bays are exposed at low tide, forming mud-flats; while even in Corpus Christi and Matagorda Bays the depth does not exceed fifteen feet. Since the mean tide is less than half a foot at most places in the bays, an advantageous location for a biological station must be contiguous to the free waters of the Gulf. Even then one must go from along most of the outer shore five miles to seaward, in order to reach the ten-fathom curve. Directly off the entrance to Galveston Bay this depth of less than ten fathoms extends for a distance of thirty miles.

Reaching from near the mouth of the Rio Grande along the extreme southern Texas coast for one hundred and fifty miles northward is Padre Island. The bay which it cuts off, Laguna Madre, is for the most part a vast mud flat, and the Padre itself is inaccessible. Farther north, at either Aransas Pass, where Corpus Christi and Aransas Bays empty into the Gulf, or at Pass Cavallo, the entrance to Matagorda Bay, would be, with a suitable building, an excellent location for the station. The entrance to Galveston Bay, while in some respects not having the natural advantages of the other two locations, yet is much more accessible. Here is a highly desirable building, which cost some $15,000, soon to be vacated by the Quarantine Department. Since this building belongs to the State, the Galveston location was recommended and a bill was introduced in the 23d legislature of Texas to set aside the present officers' quarters of the Quarantine Department at Galveston for the purposes of the Marine Biological Station of the University of Texas. With a further item of $5,000 for equipment, the bill was favorably reported from the Committee on Grounds and Buildings of the House, but, owing to the large number of measures having precedence, this bill, unfortunately, was not considered.

Besides a building fully supplied with the necessary aquaria, microscopes, reagents, etc., for laboratory study, and boats of light draught for work in the shallow water, it is planned, after the idea of Dohrn [1] for the Naples Station, to equip a seaworthy steamer as a floating station for deep-sea collection and observation in the waters of the Gulf of Mexico. For the wonderful possibilities of this field no addition to the eloquent testimony of A. Agassiz,[2] in his description of the work on the "Blake" expeditions, need be added.

[1] Bericht über die Zoölogische Station während der Jahre 1885–1892. Mittheil. Zoöl. Station, Neapel, 10 Bd., 1893, pp. 633–674.

[2] Three Cruises of the "Blake," Boston, 1888.

As Professor Whitman has so ably demonstrated in building up a national station for marine biology at Woods Holl, it is in generous coöperation that the science can best be advanced. The University of Texas extends a welcome to any investigator in the various lines of biology who may desire access to the fauna and flora of the Gulf of Mexico. Going from the various stations established by Agassiz, Brooks, Whitman, and others on the Atlantic and Gulf coasts, to that of Jordan on the Pacific, the investigator may have the enviable advantage of studying a special group of animals or plants under the most diverse geographical conditions. Once this migration, which in Germany is so enlarging and helpful to the student, is made possible among our biological stations, the great advantages are too apparent to need mention.

Since the best conditions are not this summer available for work on the Texas coast, it has been decided to hold the first session of the marine station in the Bemini Islands, Bahamas. Applications for admission will be received until June 20. Of investigators no special fee is required. For students not attending the University of Texas, there is a laboratory fee of $25. The necessary expenses for the session, including transportation from Austin and return, will approximate $100.

METHOD OF MAKING A SANITARY INVESTIGATION OF A RIVER.

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THE following programme of the investigation of the Hudson River and its tributaries has been worked out in our labors for the State Board of Health during the last four years, and may be of interest. The work commenced with an inspection of the shores of the river to determine the causes of certain nuisances which existed along its banks and to determine the method of abating these nuisances. These consisted principally of marshes or badly drained pools with some areas partly covered with water at high stages but open to the sun at low water. A few nuisances arising from the deposit of garbage or the discharge of sewage were also found. All these were evident on inspection and it was possible to abate most of them with little difficulty. In any other case the same would usually be true, except where there are large areas of bottom land which are overflowed by high water and are not well situated for drainage after the high stage is passed. It is possible, however, except in the largest watersheds, to drain much the largest part of such lands. There is no question that such bad conditions as are often found have a decided effect upon the salubrity of the neighboring lands, and that sooner or later treatment of the problem of drainage must begin and be carried through as rapidly as funds will permit.

Where a river is also used as a source of water supply, a much more detailed study must be made of its condition and possibilities. In the case of the Hudson, a study of the geology of the watershed was made to show what the inorganic chemical impurities of the water might be, the result being very favorable to the purity of the water, as much of the area is covered by the oldest formations and supplies but little inorganic matter of any sort. The southern tributaries of the Mohawk bring in more such matter, in the form of lime from the Helderberg and neighboring formations, than any other part of the watershed. Where the surface soil is made up of disintegrated rock it may have a beneficial effect upon the water by acting as a filter to remove some of the organic matter, or it may have a deleterious effect by adding much alkaline matter to water percolating through it. In some cases this may be so serious as to prevent the use of water from some parts of the watershed for water supply. In connection with this study of the geology goes the study of the organic pollution from vegetable sources, since much of this comes from marshes and swamps whose existence is due to the arrangement of the geological strata. There are cases where the amount of such pollution is excessive. It is probable, however, that there are very few cases where the swamps cannot be drained and thus