

WHITMAN (C. O.)

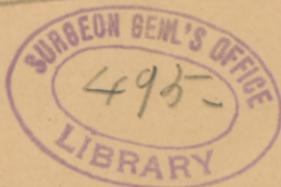
A MARINE BIOLOGICAL
OBSERVATORY

BY

C. O. WHITMAN ✓

HEAD PROFESSOR OF BIOLOGY IN THE UNIVERSITY OF CHICAGO

presented by the author —



REPRINTED FROM THE POPULAR SCIENCE MONTHLY
FOR FEBRUARY, 1893

NEW YORK
D. APPLETON AND COMPANY

1893

A MARINE BIOLOGICAL
OBSERVATORY

BY

C. O. WHITMAN

HEAD PROFESSOR OF BIOLOGY IN THE UNIVERSITY OF CHICAGO

REPRINTED FROM THE POPULAR SCIENCE MONTHLY
FOR FEBRUARY, 1893



NEW YORK
D. APPLETON AND COMPANY

1893

COPYRIGHT, 1893,
BY D. APPLETON AND COMPANY.

A MARINE BIOLOGICAL OBSERVATORY.*

IT is now twenty years since the memorable attempt to found a seaside laboratory on Penikese. Prof. Louis Agassiz lived long enough to demonstrate the impracticability of maintaining a summer school in such an inaccessible place, but unfortunately not long enough to repeat the experiment under more favorable conditions. The idea of transplanting the laboratory to the more convenient locality of Woods Holl, proposed by Alexander Agassiz, was abandoned on account of the little interest shown by the colleges which were appealed to for support. Although the continuance of this school was cut short by the untimely death of its master, the interest it awakened lived on and has brought forth a fairly rich crop of seaside laboratories.

About ten years after the abandonment of the Penikese School, Prof. Baird established, under the auspices of the United States Fish Commission, a marine laboratory at Woods Holl, and succeeded in getting a number of colleges interested in its support. For various reasons—beyond the control of Prof. Baird—the laboratory failed to attract the younger morphologists of the country. There was no lack of facilities, for these were superior to any that had ever before been offered in this country; and there was little lack of means, with the United States Government behind it, supplying money and a fleet of vessels such as no other station in the world has ever had at its command. Of late years, since the station passed into the hands of Colonel Marshall McDonald, its facilities for work have been increased, and a much larger number of morphologists take advantage of them every summer. The main functions of the station, however, continue, and must ever continue, to be devoted to the work of a great fish commission. No other like commission in the world has been able to

* Read before the American Society of Naturalists, December 28, 1892.

work on so grand a scale and with such immense effect. The results obtained each year reflect the highest credit on the management of the work and on the development of the vast field of economical interests charged to its care. The presence of such a powerful plant as this at Woods Holl adds very materially to the advantages of the situation.

The fact remains, however—and this is now conceded on all sides—that a marine biological observatory, devoted exclusively to research, must be independent of any control or interference on the part of the General Government, and rest on an endowment furnished by private initiative. This point has been strongly urged by Huxley, Carl Vogt, Herbert Spencer, and many others, and it may be put down as a settled fact. Of course, it does not follow that such an observatory may not receive support from the Government. Such support is, in fact, as important as it is fitting, as has been seen in the history of the station at Naples. The essential thing is that the observatory have an independent organization, and be able to direct its work to the ends of science, regardless of whether they coincide with those pursued by a commission of fish and fisheries. Although all biological investigation may, in fact must, minister directly or indirectly to the higher interests of humanity, its course must not be dominated or handicapped by utilitarian considerations. As I have said on another occasion: "A biological station should be a purely scientific affair from beginning to end. It should have no other aim than to advance science, and its whole organization should be directed to this one great end. We are urged by every consideration of the present, and every regard for the future of biological science in America, to keep this object steadily in view, and to allow nothing to block the way to its attainment" (first Report). Our course at Woods Holl in providing for instruction, as I hope time will demonstrate, is consistent with the end we are seeking.

The history of efforts to make Woods Holl a center for marine research, and the location there of the National Fish Commission, with resources that make it an ally of the greatest importance, are so much in favor of the place. Woods Holl is not, of course, the only available locality for our purpose, but it offers many natural advantages, and every summer's work has strengthened the conviction that we have been fortunate in our choice of position. Our experience simply confirms the opinion of the late Prof. Baird, that Woods Holl is *the* place of all the places on our coast for a marine station. It is easily reached by rail or by boat from New York, Boston, Providence, Fall River, or New Bedford. With Vineyard Sound in front, Buzzard's Bay behind, the beautiful Elizabeth Islands extending to the southwest, Martha's Vine-

yard in full sight a few miles away, Cottage City, Gay Head, and Nantucket in neighborly proximity, the environment is certainly not without attractive features. In the "gutters," "holes," and tidal currents; in the stretches of shore, varied and multiplied by "necks," rocky points, bays, flats, and adjacent islands; in a multitude of fresh-water basins and lakes completely isolated and inviting to experimental studies—in all these the naturalist finds a combination of natural advantages that is assuredly rare. One of the indispensable conditions to our work is *pure* sea-water, and that we find at Woods Holl, for there is no muddy river or city sewerage to vitiate it and drive away shore forms of life. The climate is cool and invigorating throughout the summer, and in the winter it is moderated by ocean temperatures. The fauna and flora are exceptionally rich for this latitude, and every year adds to the wealth of material which we can control for embryological purposes. The tropical seas, of course, offer greater riches in this respect; but the question we have to consider is this: *Where can an observatory best be placed to meet the needs of the greater number of biologists for summer work, and at the same time to best serve the ends of a permanent staff of investigators?* Accessibility and a stimulating climate outweigh all the advantages of a rich fauna and flora, when these must be accepted with a climate which, if not dangerous, is at least enervating, and when the locality is not within convenient reach. In fact, all such advantages can be added without neglecting the paramount considerations of health and availability. They can not only be added, but also multiplied almost without limit, by simply equipping a station with such means as will enable it to carry its research to any part of the Atlantic or Pacific coast, or even to the more remote seas of the earth. Such an equipment would be expensive, but is it not precisely what a biological observatory demands? No single locality, be it never so rich in life, can furnish more than an infinitesimal part of the wealth of the seas. *The only effective means of commanding extensive advantages in the way of select material is that of itinerary research.* This fact has been recognized and emphasized by those who have given most attention to marine work. Any plan for a great central station which does not include this all-important feature may be pronounced a failure in advance. Such provision must be equally necessary and equally expensive, whether the location be in the tropical or the temperate zone. If special material is required, it must be sought where it abides, be this one mile or twelve thousand from the center. Center there must be, and the more you limit the radius, the more local and the less satisfactory your facilities. Let the center be where the investigator can afford to spend his life, where his vitality is highest, and his energy most

productive. If desirable material calls him to a climate that induces lassitude and exposes him to infectious diseases, let his salary or the funds at his disposal for research be sufficient to enable him to choose his time and limit his stay to the necessities of the case.

Having said this much on the principles that must guide us to a wise choice of location, I must add a word on the tendency to scatter forces. On this point the words of Lacaze-Duthiers (*Archives de Zoologie expérimentale et générale*, tome ix, 1891, page 258), the distinguished director of the Marine Laboratory of Roscoff and Banyuls, are of interest. Speaking of the tendency to multiply seaside laboratories in France, he says: "We have been able to count as many as seventeen or eighteen stations on our coasts in the course of 1891. Are they all born to live? Will they all endure as long as the pompous announcements that have accompanied or preceded them would have us believe? Have not some discounted too quickly the future? . . . *Is this not also an exaggeration and a dissipation of precious energies, which, if concentrated into a single strong organization, might render very great service?*"

The survival of the fittest will in time answer these questions for us. But there is something to be said in favor of multiplying stations, if their creation be well considered, and determined with a view to *extend* rather than *duplicate* the facilities of a central station. Obviously a central station organized on a foundation that would permit of supplementing local by itinerary research would profit immensely by stations at favorable points, standing in auxiliary relations. Of such stations let us have all that we can possibly have without diverting either forces or funds that should go to make a strong common center. The danger lies, not in the possession of auxiliaries, but in the tendency to build up isolated laboratories in antagonistic rather than co-operative relations. In union there is strength, in division impotence. The advantages of a strong central station are so immeasurably superior to those of many weak local ones, that we are bound to encourage the former and discourage the latter. Our first effort should be to secure *one* foundation in the interest of *all*, rather than a multitude of isolated ones in the interest of individual colleges or universities. No university in this country can undertake to found a biological observatory for the whole country; but all can well afford to unite in the support of one founded by private munificence and open to all on equal terms. This is the only basis on which we can expect to secure an observatory of national importance. No scheme that ignores this simple, common-sense fact can ever lead to anything more than a small local success at the best. Now, I think every prominent naturalist in the country

will indorse the opinion that American biology would profit immensely more on the basis I have suggested than it could through any plan that would divide forces and build up weak college dependencies. Moreover, the individual interests of every institution in the country that maintains a biological department would be most economically and efficiently provided for in the same way. The interests of biologists, biological schools, and the science at large, all coincide in this matter, and each emphasizes and re-enforces the same verdict. Here we stand on principles that are too obvious, as it seems to me, to fail of commanding general assent.

This point dismissed, the task of finding a plan acceptable to all remains. Does any one of the marine laboratories now in existence afford a suitable vantage-ground for united action? This is a delicate matter to handle while rival schemes are afloat. But the question may at once be stripped of most of its difficulties by simply ruling out all schemes proposed in the interest of any particular institution and based on *local* organization. No disapprobation is intended for any one of these; they may all be useful and worthy of encouragement; but if they declare themselves organized under the auspices of some university or college, as most of them do, they certainly can make no just pretension to being national in aim and scope, and hence do not appeal to our highest need. And so, while wishing them all every possible success, we invite them to co-operate in a broader undertaking which will in no way encroach upon their private ground, but which, on the contrary, may extend and supplement their work, while sustaining facilities that are beyond their reach. Some of these laboratories, perhaps all of them, have offered their privileges to investigators from the outside, and it is to be hoped that they will continue to do so, for this forms an important part of the co-operation which a general observatory would invite and profit by.

The proposal recently made for the establishment of a biological observatory at Jamaica under the auspices of the British Government, aided by private subscription, is one to be strongly commended. Such an observatory would bring many important advantages to American as well as English biologists, and it might well be an international establishment. A national observatory on our coast, such as we have looked forward to, would find in a station at Jamaica an invaluable adjunct to its facilities, and might be expected not only to avail itself of its advantages, but also to lend it such support as its means might permit. The plan is in no way a rival or a substitute for the one already under way at Woods Holl. It would make no provision for instruction either for students or for beginners in investigation; its work would be

limited to research, and its workers would be few and for the most part transients in search of material to be taken away and worked up elsewhere. Its function, however, would be none the less important in subserving interests that could not otherwise be so conveniently and efficiently provided for. It ought, therefore, to receive the heartiest support from all who are interested in the advancement of biology.

Of the marine laboratories now in existence on our coast, the Marine Biological Laboratory holds a somewhat exceptional position, both in its organization and in its general aims. It owes its inception to some members of the Boston Society of Natural History acting in co-operation with the Woman's Educational Association of that city. It is controlled by a board of some twenty trustees, representing the following institutions: Harvard, Yale, Columbia, Princeton, Harvard Medical School, Massachusetts Institute of Technology, Williams College, University of Cincinnati, Bowdoin College, Boston Society of Natural History, the Missouri Botanical Garden of St. Louis, Philadelphia Academy of Science, University of Chicago, and the University of Toronto. This representative board has been extended every year until it may now be said to have a national character, including the majority of our leading biologists who are interested in marine work. Its officers of instruction have been taken from Harvard, Brown, Princeton, Clark, Chicago, Massachusetts Institute of Technology, Bryn Mawr, Cornell, Massachusetts Experiment Station, University of Nebraska, Boston Society of Natural History, University of Cincinnati, Ohio Wesleyan University, and the Allis Lake Laboratory. Its membership has extended to nearly all the more important educational institutions of the country. It represents the third attempt that has been made to unite our universities and colleges in the support of a marine laboratory. Mr. Alexander Agassiz made the first attempt as early as 1874, at the close of the last season at Penikese; and ten years later a second attempt was made by Prof. Baird. Although these efforts failed of their immediate object, they certainly prepared the way for whatever has been accomplished since. The aim from the outset has been to provide for both investigation and instruction, but for the latter as subsidiary to the former. The problem has been to combine the two in such relations that each would contribute most to the same end—the advancement of science. We have always kept in view the necessity of providing as early as possible a separate building for the exclusive use of investigators. Our effort from the beginning, as declared in every annual report, and as shown in every step thus far taken, has been to uphold a plan of national breadth; and it is on this basis that we have asked and received the support

of the colleges and the co-operation of investigators, and on the same ground we have rested every appeal for pecuniary assistance.

In certain respects of fundamental importance, then, the Marine Biological Laboratory stands alone among the seaside laboratories now in existence. Its general policy has been national in scope; the organization of its governing board and its staff of instructors is entirely non-sectional in character; it is an independent establishment, free from the control of any other institution, and owes its existence to private initiative; its record of five years has been such as to win the desired support of many of our leading colleges, and thus to place it on a vantage-ground that insures its development along the line of its choice.

Its growth in numbers and prosperity has far outrun expectation. Starting in 1888 with an attendance of seventeen, representing thirteen different institutions, it increased that number to forty-four in 1889, forty-seven in 1890, seventy-one in 1891, and one hundred and ten in 1892, representing fifty-two of our higher educational centers. The number of colleges, universities, seminaries, academies, schools, etc., represented during the five seasons is one hundred and ten. We now have thirty private rooms for the use of investigators, and five general laboratories for the use of students and beginners in investigation. Every room and every laboratory has been filled the past summer to overflowing, so that the library room had to be again occupied, notwithstanding the addition of new buildings more than doubling the capacity of the original laboratory. During the summer we have had no less than fifty investigators, over thirty of whom occupied rooms as independent workers. We can now point to scientific results that secure for the laboratory a reputation of which many a richer foundation might be envious.

With so encouraging a beginning already made, what option have we but to go on and build up on this basis, trusting that friends of our science will be found who will appreciate its work and its need and give it an adequate foundation?

Biology in America has many needs, but not one that rises to the importance of a marine observatory. In that its highest interests now center, and I am sure that I only express the conviction of my scientific colleagues, both in this country and abroad, when I say that the establishment of such an observatory is an object worthy of the most splendid gift that private munificence has ever bestowed on any branch of science. It costs many millions nowadays to create a first-class university; and not a few low-grade affairs might better have never been planted. Instead of multiplying such institutions, it would be wise to create scientific institutes for the larger and more important branches of

science. In this direction the benefactors of education and science have still almost everything to do. It is, in fact, the field that promises the greatest returns and the greatest blessings to mankind. As examples of what such institutes signify, may be mentioned the Pasteur Institute in Paris, the Zoölogical Station at Naples, the Lick Observatory, and the Smithsonian Institution. In what way could money bring swifter, surer, more magnificent, or more lasting rewards than when invested in such foundations? Our country suffers from the lack of these, while it is burdened with a plethora of impotent colleges. For this pathological overplus of colleges, secreting a sort of purulent education, with little or none of the saving basic properties of scientific culture, the best anti-toxine would be the creation of research laboratories. There is no antagonism between scientific and literary education; but no one will now venture to deny that culture implies something more than a knowledge of words. Mr. Arnold's definition of culture—"to know the best that has been thought and said in the world"—needs the supplement furnished by Huxley: "Culture implies the possession of an ideal, and the habit of critically estimating the value of things by comparison with a theoretic standard. *Perfect culture should supply a complete theory of life, based upon a clear knowledge alike of its possibilities and of its limitations.*" "Observation and reflection"—the significant words with which Carl Ernst von Baer closed his *Embryology of Animals*—connote mental attributes that are the fundamentals of culture. They imply powers and habits best nurtured by scientific, but best polished and adorned by literary, training. Both means of culture are to be combined, but duly balanced. My plea is not against any source of culture, but against exaggerating one out of proportion with another. At present we are in desperate need of more science, and my appeal is in behalf of science in general, and biology in particular. I rejoice in the splendid gifts to astronomy, physics, and chemistry, but I feel impelled to urge that that great division of sciences, comprising the whole animate world, has claims upon the enlightened generosity of this country which have not yet been fairly met. The claim which I would place foremost at the present moment is the urgent need of an American marine biological observatory. What grander commemoration of the labors of Louis Agassiz at Penikese or of the efforts of Spencer F. Baird at Woods Holl, or what higher and more fitting tribute to the memory of the discoverer of this hemisphere, could this centennial year bring than the foundation of such an observatory? My humble plea is but the echo of a chorus of voices a thousand times more potent from the leading biologists of America and Europe. This weighty consensus of opinion shows so well how the scientific world regards this subject, and how broadly and

deeply the interests of science would be affected, that further remarks on my part would be superfluous.

THE OPINIONS OF VARIOUS AUTHORITIES IN SCIENCE ON THE PROPOSED MARINE OBSERVATORY.—Carl Vogt, the veteran biologist of Geneva, the friend and scientific colleague of the late Prof. Louis Agassiz, and the pioneer advocate of marine observatories in Europe, sets forth the aims and the importance of marine biology in the following letter:

UNIVERSITY OF GENEVA, *January 25, 1892.*

DEAR SIR: You ask my opinion concerning the utility of a marine biological laboratory with a view to enlarging and perfecting the one already established, on a plan too modest and limited, at Woods Holl.

I will not begin my letter with a word-quibble. But I believe that, in the actual state of science, institutions like the one you contemplate are not only of great and undoubted utility, but *absolutely necessary*. Neither theoretical and abstract science, nor the application of science to highly important practical ends, can achieve results of value without seriously and systematically supporting marine biological stations.

As you very truly remark in your letter, my convictions on this subject are not of recent date. I have entertained them for more than forty years—in fact, ever since the days when I devoted myself, alone and without other resources than my own activity, to biology, and carried on my studies for several consecutive years on the shores of the Atlantic and Mediterranean. For many years I vainly attempted to get the governments of maritime countries and trained biologists to carry out my ideas and projects. Some could not comprehend them, and to others they seemed eccentric. After years of fruitless attempts on my own part, I was happy to see the efforts of my friends who shared my views meet with success, and I continue to feel a pleasant satisfaction when I hear of the establishment of new stations whenever it is seriously undertaken. And I maintain that you are very fortunate in living in a country where the citizens are accustomed through their own private initiative to found institutions of interest to the public, where they know how to endow their institutions liberally, and often magnificently; whereas in our old continental Europe we can do nothing without the good will of the governments, which interest themselves in every undertaking, and lavish the better part of their revenues in sterile bounties on an unproductive military class.

But let us come down to facts. I maintain that marine stations are necessary for biological science, since nowhere but in the sea can there be found a host of types whose study is indispensable if one desires to form a clear and concise idea of the *ensemble* of the organic world, of which we ourselves are members. Now, the greater part of these organisms, vegetable as well as animal, are so delicate that, notwithstanding our improved methods of preservation, we can not acquire even an approximately correct idea of their characters unless they can be studied in their natural medium—the sea. We now enumerate along the coast of continental Europe almost as many laboratories as universities. Would these have been founded, often at great trouble and expense, if the need of them had not been urgently felt? And to mention only one branch of biological science—*morphology*—would this have reached the position which it occupies to-day were

we not in possession of marine biological laboratories, where most remarkable investigations have been and are still being carried on? To mention only the more important of these laboratories, where would morphology be without the works that have been produced in Naples, Roscoff, Banyuls, Wimereux, Marseilles, Villefranche, and so many other stations? In truth, those who would pretend that morphological science can advance and develop without the aid of these marine laboratories could equally well defend the paradox that astronomy can advance without the aid of observatories.

I need hardly say that I do not limit the term "morphology" to investigations in the structure and organization of the various organisms to be found in the sea; I would also include under it the most lofty questions and most abstract generalizations to which we are led by morphological research. Researches in organic evolution, to which Darwin has given so powerful and fruitful an impetus, can not be undertaken without due consideration of the marine fauna. The sea is really the source of organic life in its *ensemble*; researches on the relationships of different animals, on their origin, on their individual development, from the first visible germ to the completion of their life-cycle, are continually and necessarily leading us back to marine organisms. In order to form a conception of the development of the organic horizons as they extend through the successive periods of the history of our planet, we are obliged continually to recur to the comparative study of marine forms.

But the researches of present and future science are not limited to morphology and its conclusions. We demand a knowledge of the functions of the various organs whose structure has been studied, in order to understand the *rôle* which they played in the elaboration of life; we are desirous of knowing how the varied functions over which the organs preside are exercised. This is the aim of *physiological* investigation, which up to the present has been carried on only on man and a few animals predestined to experiment, such as the dog, the rabbit, and the frog.

I do not hesitate to say, if there were no marine laboratories in existence, they should be created for the prosecution of physiological investigation. In every case existing and future laboratories should be constructed in such a way as to admit of the carrying out of physiological experiments on a grand scale. The field is almost new; it has hardly been touched as yet, but the few works which have been produced in this line prove that most magnificent results await us in the future, and that general physiology will be quite as much enriched and even improved by means of such laboratories as has been the case with morphology. Many of my friends, themselves directors of marine laboratories, have felt the need of physiological equipment; many of them have expressed themselves to this effect in articles and other publications. In Naples they have taken a step in advance in this direction; but, to render these studies productive, delicate instruments are needed, apparatus costly beyond the means of existing laboratories. Will your fellow-countrymen furnish such means? It would be a glory to the United States could these projects there be realized, which have to be abandoned in other countries on account of insufficient resources.

You justly call your prospective laboratory "biological." I ardently wish that your countrymen, so nobly generous when it comes to founding scientific institutions, would saturate themselves with the meaning of the word "biological." *Biology* includes much more than morphology and physiology, which treat only of the mainsprings of individual life; it includes also the life of organisms in its totality; it should study the reciprocal relations which animals living in a

common medium bear to one another; their relations with their surroundings, and without which they would be unable to sustain the struggle for existence. Here, again, lies a field, little explored as yet, open to researches which have not only great scientific interest but immediate and undeniable practical value. I should perhaps surprise the public, who are in the habit of attributing to us *savants* a much greater fund of scientific knowledge than we really possess—I should perhaps surprise the public by maintaining that, with the exception of the herring and the sole, which have been studied of late years, we have only very fragmentary, incomplete, and insufficient knowledge of the life conditions of a host of marine animals, the fishery of which enriches so many industries and supplies us with so valuable a store of food. Our laws and regulations respecting marine fisheries (I speak only of continental Europe) are based on the vaguest notions—to a great extent only on suppositions or on analogies drawn from freshwater fisheries. I am well aware of the fact that the settling of these questions, on the solution of which so largely depends the future of our fisheries, and with these the nourishment of our posterity—I am well aware of the fact, I say, that here also considerable resources are necessary: extensive aquaria, steam launches for long excursions—in short, all sorts of paraphernalia. But more requisite than all these are patient observers, indefatigable workers, who will not hesitate to devote years of labor to the solution of problems that may be summed up in a few words or even prove insoluble. I am convinced, however, that when once the utility—yes, the necessity—of such researches is generally recognized, citizens interested in the welfare and progress of their country will be found to furnish, some the financial resources, others the sustained intellectual labor.

Such are, to my mind, the aims of a marine biological laboratory. Has the utility, the necessity of such institutions been demonstrated? I trust that it has. I do not deny that the pursuit of these aims will require very considerable sums. I may add that the expense will be still further increased by the purchase and maintenance of an appropriate *library*. A neighboring library, to which access can not be had without some trouble, will not be sufficient. The investigators should be able while their work is in progress, to put their hands on all the books that can give them any information on the subject of their study. It is the possession of just such a library that assigns so important a rank to the station at Naples.

You have my best wishes, my dear sir, for the success of your enterprise. I sincerely hope that you will be assisted by your countrymen in every way, munificently, abundantly. You will pardon the length of my letter. If it contributes to the desired result, I shall be more than delighted. It will be a great joy to me in my old age to see arising on the other side of the Atlantic, through the free initiative of your fellow-countrymen, an institution destined to render great service to science, to the country, and to the people. With this wish I remain,

Yours sincerely, C. Vogt.

Prof. Huxley writes:

[LONDON,] October 30, 1891.

DEAR SIR: At this time of day, I do not think that a project for the establishment of a biological laboratory should need much advocacy. Biological problems are certainly before the public, and I hope that it is beginning to dawn upon the veriest Gigadibs of a *littérateur*, that the solutions of them are to be obtained by no book learned speculation however ingenious, but by patient appeal to Nature in the way of observation and experiment. I do not venture to say that

America needs to be reminded of this really fundamental truth more than England does; but, certainly, the greater proportion of new theories of the universe—gloriously unfettered by any acquaintance with realities—which periodically reach me, come from your side of the water; and I mourn over the waste of power and of ingenuity which might have been prevented by three months' work in a laboratory. I shall be very glad to hear of the success of your project; and all the more, that you propose to have it carried out by private enterprise.

I am yours very truly,

T. H. HUXLEY.

NAPLES ZOÖLOGICAL STATION, *January, 1892.*

DEAR PROF. WHITMAN: You want my opinion on your plans regarding a large zoölogical station. I think my opinion has found long since an expression in a far more emphatic way than by ink on paper. Twenty and more years of life I have bestowed on creating and organizing such a station, and you know yourself how far I have met with success, part of which may even be recognized in your plan.

Two things concur to make a station flourishing: *money and good organization.* I have no authority to speak on your chance of finding money enough in your country for your plans; I only lay stress on the fact that money and a good deal of money is necessary to make a zoölogical station successful. It has been for many years my constant preoccupation to raise the income of the Naples station in order to satisfy all the wants science could wish for. I must leave to your appreciation, whether the organization, which I have given to my establishment recommends itself to others as satisfactory. I know myself well enough where it is defective, and how it might be improved; but I know also that there are circumstances in the way that can not be easily removed. As it is, however, it works tolerably well and has done in nineteen years of life some good service to science.

Should you succeed in raising money enough, I think you will be able to establish something so complete and so strong as to rival any existing establishment of the kind. I for one do wish you all possible success in your enterprise. Believe me, dear Prof. Whitman, yours most sincerely,

ANTON DOHRN.

"Your project interests me greatly. Certainly such a station as you contemplate founding will be of the greatest importance to science."—AUGUST WEISMANN, *Freiburg.*

"An appeal to the 'upper ten thousand,' to the men who generously consider not only the needs of the commonwealth, but also those of intellectual progress, will not die away unheeded."—RUD. LEUCKART, *Leipsic.*

"Your communication concerning the erection on the North American coast of a large national marine laboratory as a common center for zoölogical and botanical, morphological and physiological investigations on marine organisms, has excited my keenest interest, and I hope that the considerable pecuniary support so necessary for such an undertaking will be forthcoming."—ERNST HÆCKEL, *Jena.*

"I heartily sympathize with your desire to bring about the foundation of a laboratory on the United States coast for the use of skilled investigators in biology. . . . You ought to have at a favorable point on the American coast as complete and well-organized an institution as that established by our friend Dohn at Naples."—E. RAY LANKESTER, *London.*

"I am convinced that such a station erected at a suitable point on the coast and fully equipped, but, above all things, under judicious management, will greatly further advancing biological science."—C. GEGENBAUR, *Heidelberg*.

"I fully believe that your countrymen, with their accustomed enterprise, will meet your present request."—G. B. HOWES, *London*.

"If you succeed in founding in the United States a biological institution in which the processes of life may be studied in all their magnitude and extent, you will indeed perform a lasting service to humanity."—C. LUDWIG, *Leipsic*.

"Speaking as a physiologist, I can hardly say anything too strong on behalf of marine laboratories such as the one you wish to establish."—M. FOSTER, *Cambridge, England*.

"I am glad to learn that your plans for the establishment of a permanent national marine laboratory are taking definite shape, and I hope their importance will be generally recognized. It would be strange if support could not be found for an American laboratory that will bear comparison with those of England, France, Germany, and Italy."—E. B. WILSON, *Columbia*.

"The need of a biological experiment station is even greater in this country than in Europe, where its importance has been recognized for a good many years, as shown in the numerous stations already established."—W. G. FARLOW, *Harvard*.

"I wish to be put down as one who favors the plan most emphatically. . . . I hope that steps will be taken to make the place a summer gathering ground for the biologists of this country in the broadest sense of the word—i. e., let us have investigations in zoölogy, physiology, botany, the study of the environment, both physical and chemical as well as experimental. Let it further be a national, not a sectional movement."—WILLIAM LIBBEY, JR., *Princeton*.

"I am glad that the Marine Biological Laboratory is taking steps toward securing a permanent and adequate endowment. I have watched its development with a good deal of interest, and have gladly contributed my mite for its support."—WILLIAM TRELEASE, *Missouri Botanical Garden*.

"I need hardly assure you of my deep and cordial interest in the permanent establishment of a seaside laboratory, and of my desire that the University of Illinois may share to the limit of its ability in its burdens and in the benefits to be derived from it."—S. A. FORBES, *Illinois State Laboratory of Natural History*.

"I am very deeply interested in the development of the laboratory at Woods Holl. I believe that it is in itself one of the most important educational institutions in the country, and I shall be glad to do all that I can to advance its interests."—DAVID S. JORDAN, *Mentlo Park, Cal.*

ESTABLISHED BY EDWARD L. YOUMANS.

THE POPULAR SCIENCE MONTHLY,

EDITED BY WILLIAM JAY YOUMANS,

Well known as a trustworthy medium for the spread of scientific truth in popular form, is filled with articles of interest to everybody, by the ablest writers of the time. Its range of topics, which is widening with the advance of science, includes--

PREVENTION OF DISEASE AND IMPROVEMENT OF THE RACE.
AGRICULTURAL AND FOOD PRODUCTS.
SOCIAL AND DOMESTIC ECONOMY.
POLITICAL SCIENCE, OR THE CONDUCT OF GOVERNMENT.
SCIENTIFIC ETHICS; MENTAL SCIENCE AND EDUCATION.
MAN'S ORIGIN AND DEVELOPMENT.
RELATIONS OF SCIENCE AND RELIGION.
THE INDUSTRIAL ARTS.
NATURAL HISTORY; DISCOVERY; EXPLORATION, ETC.

With other illustrations, each number contains a finely engraved PORTRAIT of some eminent scientist, with a BIOGRAPHICAL SKETCH.

Among its recent contributors are :

W. A. HAMMOND, M. D.,
HERBERT SPENCER,
DAVID A. WELLS,
T. H. HUXLEY,
SIR JOHN LUBBOCK,
EDWARD ATKINSON,
T. D. CROTHERS, M. D.,
W. K. BROOKS,
E. D. COPE,
DAVID STARR JORDAN,
T. MITCHELL PRUDDEN, M. D.,
JOSEPH LE CONTE,
APPLETON MORGAN,
FELIX L. OSWALD,
J. S. BILLINGS, M. D.,

BENJ. WARD RICHARDSON, M. D.,
ANDREW D. WHITE,
F. W. CLARKE,
HORATIO HALE,
EDWARD S. MORSE,
J. S. NEWBERRY,
WALTER B. PLATT, M. D.,
EUGENE L. RICHARDS,
THOMAS HILL,
N. S. SHALER,
D. G. THOMPSON,
AMBROSE L. RANNEY, M. D.,
GRANT ALLEN,
SIR WILLIAM DAWSON,
J. HUGHLINGS JACKSON, M. D.

Subscription price, \$5.00 per Annum.

New York: D. APPLETON & CO., 1, 3, & 5 Bond Street.

