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## LOUIS AGASSIZ.

Professor Agassiz is dead. Suddenly, unexpectedly, and apparently in the full vigor of his physical and mental power, the great master has been stricken down in the very midst of his labors, leaving to other hands the completion of his manifold enterprises, to other minds the development of the grand works to which his days have been so earnestly, so purely, devoted. Grief, sincere and deep, will everywhere greet these saddest of tidings, for the loss is not to the country but to the world; and wherever civilization extends her sway, there will his mourners be found.

It is but a melancholy duty of the journalist to pen the brief lines which constitute the last tribute to the memory of one distinguished in any walk of life, from whose lips and to whose actions the people have learned to look for counsel as from the oracles of old, or to indite the curt sentences which imprint *finis* on the work of which death has forbidden the continuance. Doubly sad is the task which now devolves upon us, in thus recording that the voice which so often, through these pages, has imparted to the world the great efforts of a master genius is for ever hushed, and that the indefatigable student and wise teacher, whose achievements have added so brilliant a luster to the works of American Science, is now but a thing of the memory, a reminiscence to be cherished, but buried in the irrevocable past.

We leave to others, who have been his immediate colaborers in the cause of education, the detailing the chronicle of his private life. To the outside world, however, we may justly say that it seemed as if he were every one's immediate friend; his personality was of that magnetic order which appeals directly to the heart, and it was the charming simplicity of his manner, coupled with the glow of enthusiasm which pervaded his every utterance, that made even the dullest units of his vast audiences feel that the subject under treatment, though never so dry, was invested with new attributes of rare and before unseen interest. It mattered little whether men were capable of grasping the thread of his consummate arguments, or whether they failed to appreciate the single hearted devotion with which he embraced the study of Science for itself and itself alone. When their intellects failed to respond to his, or, conscious of inferiority, shrank from the encounter, their sympathies were irresistibly drawn towards him; and the magic of his voice his winning smile and the sincerity of his purpose gained the trust and confidence of even those who condemned his opinions and opposed the donation of the necessary means for the furtherance of his favored projects.

There are many anecdotes of Agassiz which just now are invested with a sad but timely interest, and which, perhaps, more truly indicate the character of the man than the most carefully worded eulogy which we might produce. It was this overflowing cordiality of his nature which gained him his object even above the most stubborn of opposition, and to his qualities of heart, probably as largely as to those of brain, did he owe the completion of many of his most cherished schemes. His Cambridge Museum was built by private subscription, and his celebrated voyage up the Amazon was carried out through the munificence of a Boston millionaire. Did he need a State appropriation, he fairly charmed it out of the stingiest of legislatures; and indeed a Massachusetts law maker at one time opposed his being allowed to press his request in person, for the reason, as stated, that no opposition could stand before him. Penikese, with the princely sum accompanying, was the gift of one unskilled in Science. And the few enthusiastic *extempore* speeches made by him in San Francisco, after the Hassler voyage, brought forth the unexampled donation of Mr. James Lick, and gave Science on the Pacific coast an inestimable assistance. He gained friends by thousands simply by his smile. "We want you to come and beam upon us, that is all," said a friend who had arranged a social reception for him in Washington. "Agassiz came," said his entertainer, subsequently, "and merely shook hands. There was nothing formal, but he beamed on everybody with such a pleasant smile that it seemed as if he were diffusing happiness through the whole company." And yet, with all his success in the cause of education, it is even the more remarkable that he persistently refused to use his efforts for his private ends. "You would make any amount of money in the business," urged a wealthy capitalist who was desirous of securing Agassiz as a partner, and using his great technical knowledge for commercial enterprises. "I have no time to make money," replied the Professor. Similar to this was his answer to a publisher, who pressed him to write text books for schools. "I wrote them," said he, and his eyes sparkled with indignation, "that I was not the man to do this sort of work. And I told them, too, that the less of this work was done, the better. It is not school books that we want, but students. The book of Nature is always open. All that I can say or write shall be to make them study that book, and not pin their faith to any other." These were not the only brilliant offers, pointing to almost unlimited wealth, which he rejected, while his salary was only $1,500 a year. One more story and we pass to a brief review of his life. Agassiz detested "Science falsely so called" most cordially; and if in anything he manifested impatience or became actually incensed, it was when theories or ideas which he believed false or deceptive were submitted to his examination. In such cases, indeed, his wrath became mighty. It is related that some friends once invited him to a spiritualist exhibition to make a scientific investigation of the alleged manifestations. He turned his back upon them and motioned them to the open door in almost speechless rage, nor did he return to the subject except to express surprise at the insult which he considered had been offered him.

Louis John Rudolph Agassiz was born in Motiers, Switzerland, on May 28, 1807, his father and indeed his ancestors for six generations back being clergymen. Originally beginning the study of medicine, he entered the medical school at Zurich, thence he went to Heidelberg, and finally, at the age of twenty, began a course at the University of Munich. Here he commenced his studies in embryology, and received instructions from Wagler, Oken and Martins, and issued his first publications in the shape of brief treatises on special subjects. Subsequently becoming deeply interested in a work that he was selected to perform, namely, the classification of a variety of fishes, brought back by a Brazil exploring expedition, Agassiz gave up the practice of medicine, though not until after he had obtained his doctorate both in that art and in philosophy. His course, during the following years, was upward; for becoming a favored pupil of the great Cuvier and enjoying the association of such men as Owen, Milne-Edwards, and others of equal eminence, he laid the basis for his establishment of fossil ichthyology, and its translation to a cognate from a hitherto unknown science. Aided by Baron Von Humboldt, he was enabled to publish his great work, in which about 1,000 species are fully described and 700 more partially so, and thus to firmly establish his fame as a naturalist. Then came the enunciation of his glacial theory, the assertion of the existence of a vast sheet of ice which overspread existing continents, leaving its tracks behind. The view has been vehemently opposed, but it has triumphed, and is now an accepted scientific fact. Numerous other works were published by Agassiz in Europe, to which we need not stop to allude, except perhaps to say that they are standard volumes of reference, and invaluable to the naturalist. In 1846, he emigrated to this country, and became connected with the United States coast survey. It was not long, however, before he recognized the position of the United States in the scientific world. He saw that as a nation, we were far in the rear, and that, although in point of fertility of inventive genius, we were unsurpassed, yet Science for itself met with no fostering, and that we were content to depend upon the efforts of the learned men of the old world. Original thought was comparatively absent, and original research unknown to the masses. Seeing the need, he at once devoted his energies to its fulfilment. Accepting the chair of zöology and geology in Harvard College, he began the endeavors which have culminated in the establishment of the Cambridge museum (the most extensive of its kind in the world) and the education of scores of able and learned students of natural science. Of the more recent labors in which Professor Agassiz has been engaged, it is hardly necessary for us particularly to speak. Important expeditions have been made by him, years ago to Lake Superior, and Florida Reefs, and more lately up the Amazon and around Cape Horn.

As an opponent of the Darwinian theory, Agassiz has of late been drawn into the immediate attention of the entire world. His last writings were upon this subject; and in the *Atlantic Monthly* for January, we find an exhaustive and brilliant paper, beginning a series, in the course of which the writer designed to go over his entire ground, and clearly explain the arguments supporting his position. In his concluding lines he says: "The more I look at the great complex of the animal world, the more sure do I feel that we have not yet reached its hidden meaning, and the more do I regret that the young and ardent spirits of our day give themselves to speculation rather than to close and accurate investigation. I hope in future articles to show, first, that, however broken the geological record may be, there is a complete sequence in many parts of it, from which the character of the succession may be ascertained; secondly, that since the most exquisitely delicate structures, as well as embryonic phases of the most perishable nature, have been preserved from very early deposits, we have no right to infer the disappearance of types because their absence disproves some favorite theory; and lastly, that there is no evidence of a direct descent of later from earlier species in the geological succession of animals."

The place of a preceptor, of an instructor whose grasp of the subjects of which he taught extended to their minutest ramifications, left by Agassiz, it will indeed be difficult to fill; and the cause of scientific education has sustained a bereavement, the magnitude of which time alone will suffer us to realize. The example of the master is, however, immortal, his renown is part of the history of his adopted country; and posterity, in striving to emulate the one, will have before it a constant beacon pointing to the attainment of the proud rewards of the other.

## LOOK TO YOUR STOVES.

The noxious effects of carbonic acid and carbonic oxide gas were recently illustrated, in an alarming manner, at Oakland, Pa., at a school near the Susquehanna depot. The school had been in session about two hours in the morning, when, to the astonishment of the teacher, one of her smaller pupils fell to the floor, apparently in a swoon; very soon three or four others were in a similar condition; then the number quickly increased to a dozen, all thrown down and unconscious. The teacher, greatly alarmed, dismissed the school, but only a portion of the scholars were able to move from their seats. The windows and doors were thrown open and assistance summoned. The teacher, with the aid of older scholars, dragged out the unconscious ones. A physician came; and after long effort, all were restored to consciousness and recovered, except a few who are still suffering.

It appeared, on examination, that the smoke pipe had been jammed too far into the chimney, causing a stoppage of the draft of the stove, throwing all the deadly gases of combustion into the school room. The escape of the children as well as they did is matter for congratulation.

The gases of combustion, chiefly carbonic oxide and carbonic acid, are, when taken into the lungs in comparatively small quantities, dangerous to life. One one-hundredth part of carbonic oxide gas in a given volume of air renders such air noxious.

Carbonic acid gas is not quite so bad. It may be taken into the stomach without injury. Soda water, as everybody knows, is water charged with carbonic acid gas. But when the gas is taken into the lungs, even in small quantities, its effects are injurious. One of the great causes of ill health is the accumulation and breathing of the deadly carbonic acid gas in the dwellings and apartments in which people live. Too little attention is paid to ventilation. Every one hundred volumes of air discharged from the lungs contain four volumes of carbonic acid gas. Now if air containing one two hundredth part of the gas is breathed, headache and languor are soon produced. Air that has been once breathed is therefore highly dangerous. The average amount of the gas thrown out by every person is seven cubic feet per hour. A single six foot gas light in a room gives off as much carbonic acid gas as a person in breathing.

## THE REPORT OF THE CHIEF ENGINEER OF THE NAVY

Chief Engineer W. W. W. Wood, United States Navy, in charge of the Bureau of Steam Engineering, submits an annual report which contains a large amount of interesting and valuable information. Among other topics discussed, we note opinions upon compound engines, which may be taken as the result of a series of careful experiments and comparisons made by a board of prominent officers. The conclusion definitely reached is that the method of using steam of high pressure and expanding in separate cylinders (one or more in number, depending upon the power to be transmitted) is more economical and advantageous in its practical application than the former method, in simple cylindered engines, with the pressures heretofore used in such cylinders. This opinion is based upon comparisons of some forty non-compound and fifteen compound engines, though it may be considered as merely an official corroboration of facts already agreed upon by the majority of engineers.

The subject of machinery for steam vessels of war is next discussed, and the report of a board appointed to examine designs is embodied. Commenting upon the latter, the Chief of the Bureau says that no plan presented was considered as a whole superior to those emanating from the Government engineers, and hence the designs of the last mentioned officers were adopted. The following contracts for construction were awarded, work to be completed six months from their date: Atlantic Works, Boston, two engines of 800 H. P., cost $175,000 and $163,000. James Murphy, New York, one pair, 175,000. John Roach, New York, one pair, 560 H. P., for $120,000. Woodruff Iron Works, Hartford, one pair, 800 H. P., for $175,000, and Wm. Wright & Co., Newburgh, one pair, 800 H. P., for $175,000.

With reference to the internal corrosion of naval boilers, the report states that, by a careful analysis made at the Naval Laboratory in New York, this difficulty in vessels using surface condensers is found to be caused by oleate of copper, formed in the condenser, from which it passes to the boiler, where it is slowly transformed into oleate of iron, deriving the iron from the different parts of the boiler with which it comes in contact and precipitating its copper. The oleate of copper adhering to the iron under the condition of high pressures and temperatures, the deposition of copper and the absorption of iron begins. As a preventive, a method of arresting the destructive agents formed in the condenser, through a process patented by Mr. W. C. Selden of New York, is spoken of in quite favorable terms.

The most interesting part of the report relates to the question of screw propellers, and embodies the results obtained in certain changes made in the screws of vessels—from four to two blades—with a view of rendering such vessels more efficient while under sail alone. With equal propelling surfaces, it has been determined that no advantage