One of the greatest naturalists and biology teachers of the 19th century was the Swiss-born scientist, Louis Agassiz. More than any one man, Agassiz was responsible for bringing science to the general public. William James, the philosopher, gives us an insight into the popular feeling about Agassiz when he said: "He was of so commanding a presence, so curious and inquiring, so responsive and expressive, and so generous of himself and of his own, that everyone said of him: 'Here is no musty savant, but a man, a great man... '."

Agassiz also made outstanding contributions to the study of natural history and geology and achieved lasting fame through his innovative teaching methods which changed the direction of science education in the United States.

Louis Agassiz was born May 28th, 1807, in the small village of Motier, Switzerland, the son of a local protestant minister. He was educated first at home and studied later at the academy of Lausanne. His collegiate studies were conducted at the universities of Zurich, Heidelberg and Munich. In 1829, at the age of twenty-two, the degree of Doctor of Philosophy was awarded to him by the University of Munich, and a year later in 1830, the Doctor of Medicine degree.

Even as a young boy the world of biology fascinated him. He spent many hours studying the freshwater fish of his native Switzerland. His interest in ichthyology continued throughout his college studies, and prior to his second graduation from the University of Munich in 1830, he edited an important work on the freshwater fishes of Brazil. The specimens for this study were largely collected from the Amazon River and had been brought back to Germany by two eminent naturalists, one of which died in 1826. Thereupon the collection was turned over to the young Agassiz for description and classification. He threw himself into this work, and in the year 1829 the task was completed and culminated in the publication Selecta Genera et Piscium.

After graduation in 1830, Agassiz moved to Paris, France, where he worked in the Museum of Natural History. He soon became the protege of French paleontologist and anatomist Baron Cuvier. After Cuvier's death in 1832, Agassiz obtained a professorship in natural history at the University of Neuchatel, Switzerland. Here he began his monumental study of fossil fish which resulted in his five volume work entitled Studies on Fossil Fish. Using the principles of comparative anatomy learned from Cuvier, he was able to describe more than 1,700 species of fossil fish, 300 of which were previously unknown. Agassiz's work gave impetus to the study of extinct life and laid the foundation for the new science of paleichthyology.

In 1836, Agassiz began his study of glaciers. He had a hut constructed on one of the glaciers and lived in it during the summer months. After charting glacier movements, Agassiz was soon convinced that at one time vast areas of the earth were covered with sheets of ice (glaciers) resembling those now found in Greenland. His findings contradicted the then held belief that only uniform and gradual changes in the earth’s geological history had occurred. In 1840, his work on glaciers resulted in the publication of his book Studies on the Glaciers. This work brought him widespread fame as the originator of the concept of ice ages and gave fresh impetus to the study of glacial phenomena worldwide.

In 1846, Agassiz was invited to give a series of lectures in Boston. He immediately fell in love with America and was enthusiastically received by the audiences he spoke before. While lecturing, Agassiz would draw chalk diagrams of the various forms of life he was talking about. Ernest Longfellow, son of the poet and an artist himself, said, "It was a real treat to see a perfect fish or a skeleton develop under his hand with extraordinary sureness and perfect knowledge, without any hesitation or correcting." He decided to remain in America.
In 1848, Harvard University offered him a professorship in natural history. It soon became apparent that Agassiz was quite different from the other professors of his day. As the Boston Transcript reported, Agassiz "smashed all the traditions of correctness of demeanor and chilly aloofness.... He wore a soft hat and smoked like a steam engine." While at Harvard he founded the Museum of Comparative Zoology (later named in his honor) and served as its first curator. His scientific works during this period consisted of the following: Lake Superior (1850), Contributions to the Natural History of the United States (1857-62), and Essay on Classification (1859) which failed to take into account the fact that science was moving away from the idea of creationism toward that of Darwin's theory of evolution. A deeply religious man, Agassiz believed that evolutionary change was brought about by God, who in order to make a new design would first destroy the original living thing. Besides his major contributions to biology, there were many papers written on various topics in the field of natural history and especially on fishes.

Ichthyology continued to fascinate him, and so in 1868, Agassiz organized an expedition to Brazil, primarily to study the fish life of the Amazon River. He and his wife co-authored an interesting account of this expedition entitled A Journey to Brazil (1868). In 1871, he furthered his study of ichthyology by taking a trip to California to study the coastal surf fishes.

Agassiz's method of teaching was to emphasize the observation of nature over that of learning from books. He discouraged the use of textbooks and was often quoted as saying, "Read nature not books." The purpose of study was not to memorize facts but rather to observe the natural world in order to gather the needed facts.

At times he would give his students specimens for observation while he lectured. He did this because as he said, "My intention is not, however, to impart information, but to throw the burden of study on you. If I succeed in teaching you to observe, my aim will be attained." Agassiz felt the best source for these specimens were the students themselves. They were encouraged to collect specimens from the natural habitat.

In the laboratory Agassiz emphasized the inductive approach to learning. He felt it was his responsibility as a teacher to define a problem but the students' responsibility to solve the problem. A laboratory session in Agassiz's class was often a strenuous situation. He would leave the laboratory for hours at a time looking in every so often to ask the students what they had learned from their specimens. If Agassiz was not satisfied with the students' answers, he would tell them that it was not enough and leave the students to observe for a while longer.

In the interest of better science teaching, Agassiz founded the first summer school for biology teachers on the island of Penikese in Buzzards Bay, MA in 1873. This school was named after John Anderson, a wealthy New York merchant, who upon reading of Agassiz's proposal for a summer school in the New York newspapers, donated the island and fifty thousand dollars in cash. The Anderson School of Natural History opened July 8, 1873, with 58 students in attendance.

As a result of his teaching activities, it has been said that every notable biology teacher of the latter half of the nineteenth century was either a pupil of Agassiz at one time or had been taught by one of Agassiz's former students. Because of this fact, Agassiz is considered to be the "Father of American biology." When asked what his greatest accomplishment in life was, Agassiz replied, "I have taught men to observe." And so he had in that his teaching methods let students discover for themselves.

References


