

THE FOUNDING OF THE MUSEUM OF COMPARATIVE ZOOLOGY IN AN EDUCATIONAL CRISIS OF MID-NINETEENTH CENTURY NEW ENGLAND*

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In *The Separation of College and State*, John S. Whitehead expresses his perplexity as an historian in explaining the actions of the State of Massachusetts around 1860 in relation to its institutions of higher learning. In 1859 the State decided to distribute a portion of the income from the sale of the Back Bay lands to five of the institutions within the Commonwealth: the proposed Museum of Comparative Zoology, Tufts College, Williams College, Amherst College, and the Wesleyan Academy in Wilbraham.¹⁾ Of these five subsidies, the one for the proposed Museum particularly disturbs Whitehead. For to this institution, then not yet formally organized as a corporation, the General Court decided to grant \$ 100,000, by

* This is the seventh chapter of my dissertation presented to the University of Wisconsin in August 1978, *The Two Sciences and Religion in Ante-bellum New England*. The work is an effort to resolve the difficulties of the Richard Shryock thesis (1948) as well as those of its critics on the history of science in nineteenth century America. The basic hypothesis in this dissertation is that the history of the Lawrence Scientific School at Harvard, the Museum of Comparative Zoology, and the Massachusetts Institute of Technology cannot be adequately described without looking at their foundation within the framework of "two sciences" which played their distinct roles of facilitating and disturbing the transmission of religious habits and customs to a new generation of New Englanders. These two sciences, or two scientific approaches, were the natural history of Louis Agassiz, the Director of the Museum of Comparative Zoology, and the physics of William B. Rogers, the founder of the Massachusetts Institute of Technology.

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far the greatest amount of the five. In addition, the object of this munificence originated in the very Harvard to which the same General Court of the period remained strikingly indifferent. Thus Whitehead cannot but concur with Samuel Eliot Morison who states that Louis Agassiz fascinated the State Legislature "at a time when they would not have given a penny to Harvard."³ To this Whitehead adds his comment: "It is hard to tell what prompted this generosity."³

The present essay tries to explicate the establishment of the Museum by providing an alternative explanation than that traditionally offered by historians.⁴ My thesis is that the Museum received such support because it attempted to resolve the religious crisis in New England educationally. Based upon Agassiz's distinct ideas of nature, the Museum was to provide a most systematic training in natural history to the public school teachers of the State who in turn could guide their pupils to piety and humility before the Creator. The State and its inhabitants viewed the Agassiz Museum as the capstone of the whole system of public education from elementary to normal schools. It was to transmit the best of the cultural tradition in the name of modern science. I will try to show this by analyzing how the Museum of Comparative Zoology was organized as a Corporation that included among its Trustees the Governor, the Lieutenant-Governor, the President of the Senate, the Speaker of the House, the Secretary of the Board of Education, and the Chief Justice of the Supreme Judicial Court, precisely when the Commonwealth lost its interest in the support and control of Harvard.

I

By the fall of 1857, when the first two volumes of Louis Agassiz's *Contributions to the Natural History of the United States of America* appeared, some naturalists began to doubt his ability

in the area of animal classification. In the next year, for example, James D. Dana of Yale published a lengthy two-part review of Agassiz's "Essay on Classification" in which he noted the predominance of ideas over facts in Agassiz's work. In Dana's judgment, Agassiz often based his arguments upon indisputable assumptions when "science is far from a conclusion based on well established natural history facts."⁶ As a consequence, his methods were faulty, for instance, in explaining the incongruence between Vertebrates as one of the major branches of his classification, on the one hand, and some of the facts about those animals subsumed under this category, on the other.⁶ Dana's disappointment seems particularly understandable because Agassiz had proclaimed the essay as part of the work that would "exemplify the nature of the investigations I have been tracing during the last ten years, and show what is likely to be the character of the whole series."⁷

This loss of confidence in Agassiz's natural history on the part of some professional scientists⁸ was more than offset by an increased support of his science of zoology on the part of the wider audience. For example, on November 6, 1857, only a few months after the publication of the two volumes, the first meeting of the Agassiz Natural History Society was held in Boston. Not a few of its members, including George P. Huntington and Frederick Ware, were ex-members of the Boston Society of Natural History. In their single-hearted devotion to Agassiz's natural history, they had separated themselves from the Boston Society to form a new sect. The degree of their devotion to the master was demonstrated in several ways. On January 29, 1858, in its twelfth meeting, the new Society officially decided to "to adopt Agassiz's classification instead of Cuvier's" thus distinguishing itself also in principle from the Boston Society whose Common Seal was the profile of the head of Cuvier. They also read in their meetings from Agassiz's and Gould's *Principles of Zoology*, and celebrated Agassiz's fifty-first birthday in a special manner by doubling the

frequency of their future meetings per. week until September 1860 when they decided that "meetings be held only once a fortnight."⁹

Additional support and encouragement for Agassiz came from Francis C. Gray, a wealthy Bostonian who was interested in natural history and literature. Agassiz dedicated the *Contributions* volumes to Gray, and it was Gray's aid that permitted Agassiz to embark on the ten-volume project without serious financial difficulty.¹⁰ This also meant that, unlike Abbott Lawrence, Francis C. Gray was sympathetic with Agassiz's even greater project, the establishment of a museum of natural history in Cambridge. Toward the end of 1856, when the two volumes of the *Contributions* were still in press, Francis C. Gray died. His will was to be disclosed in two years. Having apparently talked with him over its specific contents in reference to the planned museum, Agassiz used the occasion of Gray's obituary in the American Academy meeting on January 13, 1857 to reveal Gray's intention to contribute \$ 50,000 for the project that was to follow the *Contributions*. "He had conceived the plan of a great institution," stated Agassiz, "devoted chiefly to the study of Natural History in its widest ramifications, which should in course of time be for this country what the British Museum and the Jardin des Plantes are for England and France."¹¹

When Francis C. Gray's will was disclosed in 1858, Agassiz's museum project entered a new stage. On December 15, Agassiz prepared his report to the annual Visiting Committee to the Lawrence Scientific School. Within a week, Gray's bequest was to be announced to the Harvard College Corporation. Naturally the museum project, whose first step lay concealed in that bequest, occupied Agassiz's mind. Finishing the formal duty of reporting on his teaching activities for the past year in a single paragraph, Agassiz thereupon devoted a dozen paragraphs to his main subject.

First, he asked the Committee's permission to dwell on the explanation of his current situation. Agassiz mentioned the

invitations from the *Jardin des Plantes* which he had firmly declined. He emphasized that the advantages that would accrue through such an affiliation were very large, but that he believed that he might "be able to do more for the advancement of science here than in Europe."¹²⁾ This advancement, however, could not be brought about automatically, but required persistent effort. One first needed favorable conditions of study conducive to the fruition of his goals. For the first time Agassiz showed the Visiting Committee the concrete plan of the museum for whose realization the Committee's cooperation was indispensable.

His concrete proposal consisted of two parts, one on a needed building and the other on the personnel of the institution. For the past twelve years the amount of accumulated specimens had increased rapidly and had placed pressure on all available space. As the result, the effective utilization of specimens both for research and instruction was impossible. Besides this, the present wooden building was a fire trap, dangerous for the accumulated specimens. To make these specimens educationally useful as well as free from possible destruction, a properly constructed building was essential, though Agassiz realized that the cost of such a structure would be high. He therefore proposed that "let us first erect a wing of that ideal museum at an expense of perhaps \$ 50,000."¹³⁾ In order to secure space for further expansion, the site was never to be on a corner or a similar place, but on "such grounds as will never be an impediment to its indefinite increase."¹⁴⁾

Second, Agassiz mentioned the need for curators for the establishment. Thus far he had privately hired a few assistants for the management of specimens. Now the growing amount of increased specimens required a salaried curator for each department of zoology. Agassiz proposed here that some of the wealthy citizens of Boston might perhaps be willing to found a number of curatorships. Apparently, this system was the American version of the one in the *Jardin des Plantes* which had some professors

whose salaries were provided by the government. Soon, these curatorships would be endowed "so as to afford the means of appointing special professors for each branch, and as soon as this is accomplished, our organization would be more perfect than that of either the British Museum or the Jardin des Plantes."¹⁵ An early realization of all this, of course, was difficult. Yet, from four to five curators were needed quickly. Again, each department could secure one professional if the College could give distinguished naturalists in the country the title of honorary professors whose duty was to deliver lectures in Cambridge during each academic year. After putting forth all these proposals, Agassiz appealed to "all who are well-inclined to our scheme, for contributions, be they ever so small, to create a fund for current expenses...to make it possible to keep the Museum open at all times, and for all persons, free of any charge."¹⁶

II

On January 7 of the next year, a few weeks after the communication of the Gray bequest to the College Corporation, governor Nathaniel Banks delivered his annual address before the two branches of the State Legislature. One of his major subjects concerned the disposal of the income from the sales of the Back Bay lands which the Commonwealth had acquired through the supreme court the year before. The total amount of money the lands were expected to bring to the State within five years was between three and five million dollars. If the State had had a serious public debt, claimed Banks, there was no argument as to its appropriation. But Massachusetts then had nothing of that kind. Banks therefore recommended that, first, up to three million dollars should be applied to "such public educational improvements as will keep the name of the Commonwealth forever green in the

memory of her children.”¹⁷⁾ His first priority was the enlargement of the public school fund.

Then the governor called the attention of the legislative members to the state of affairs of the natural history of Massachusetts. In spite of some efforts on the part of individuals, associations, and institutions, that branch of the State was “almost entirely undeveloped and unrepresented.” Ought not Massachusetts, he asked, continuously provide for the study of natural history “until in her museum of nature, should be found correct representations of every form of inorganic and organic life, (which) would enable her instructed people to trace the separate stages of existence through all mutations, from nothing to Deity?” Had Agassiz listened to the address, he perhaps would not have given consent to every expression of Banks. But Banks nevertheless identified Agassiz as the person to whom the task to direct the labors of cooperative individuals, associations and institutions was to be entrusted, by referring to him as “one who has withstood imperial solicitation and declined the chair of science which the death of Cuvier leaves yet vacant, choosing rather citizenship and scientific labor among the American people.”¹⁸⁾

The letter of William Gray dated December 20, 1858 officially communicated the will of Francis C. Gray, his uncle, to the Harvard College Corporation. This was five days after Agassiz drew up his report to the Visiting Committee and about two weeks before the governor read his address. The portion of Francis C. Gray’s will that was relevant to the Museum included the following :

... also give, out of such surplus only, to Harvard College, or such other institution as you see fit, the further sum of fifty thousand dollars; the income to be applied to establishing and maintaining a Museum of Comparative Zoology; not to be appended to any other department; but to be under the charge of an independent Faculty,

responsible only to the Corporation and Overseers. No part of said income is to be expended for real estate or for the payment of salaries.¹⁹⁾

In Gray's will the emphasis upon the independence of the proposed establishment obscures the basic control of the Museum by the College Corporation. Following the original intent of his uncle, William Gray, on the occasion of the transfer of the bequest, specified some ten further conditions in accordance with the will of Francis C. Gray. They stated more clearly the relationship between the College Corporation and the Museum. The sixth condition read that "the President of the College shall be the President of the Faculty." In case of a vacancy in members, other than that of President, "the Faculty shall from time to time nominate to the Corporation persons to fill such vacancies; and if confirmed by the Corporation, such persons are to become members of the Faculty; if rejected, new nominations shall be made by the Faculty to the Corporation."²⁰⁾ All this meant that the Faculty of the proposed Museum of Comparative Zoology was essentially under the control of the College Corporation in matters of appointment.

The Corporation would control the Faculty's finance in a similar way. According to the seventh condition specified by William Gray "the Faculty are not to be at liberty to expend any part of the income of the Fund, unless previously placed at their disposal by the Corporation."²¹⁾ The final decisions as to the finance rested with the College rather with the Faculty. In this way, the Museum of Comparative Zoology as it was envisaged by Francis C. Gray in 1856 and by his nephew William Gray on December 20, 1858 was undoubtedly part of the Harvard College Corporation and was to be firmly under its control.

This basic scheme of the proposed Museum underwent a transformation within a few months. By the beginning of April 1859, when the Trustees of the Museum of Comparative Zoology were

incorporated, the organization rather completely separated itself from Harvard. This time the President of the institution was the Governor. The Trustees were composed of fifteen members which included, as ex-officio members, the Governor, the Lieutenant-Governor, the President of the Senate, the Speaker of the House of Representatives, the Secretary of the Board of Education, and the Chief Justice of the Supreme Judiciary Court. Of other Trustees, Louis Agassiz, the Director of the Museum, and William Gray, its Secretary, and their successors were to be replaced or their vacancies filled "by a concurrent vote of the Senate and the House of Representatives." Other Trustees, except the ex-officio members, were to be filled "by the election by the whole Board of Trustees."²² All this signified that the appointment of the members of the body was virtually in the hands of the State. For the six ex-officio members, plus two Trustees officially appointed by the Legislature, the Director and the Secretary, constituted the majority of the fifteen Trustees. Again the finances of the Museum were under the control of a Treasurer who, in turn, was under the supervision of a Committee of Finance of four members, all of them members of the Trustees.²³

This dominance of the State in the newly created Corporation was ever more evident when placed against the now diminished place of the College Corporation therein. Nominally, the Board of Trustees represented the "Commonwealth and the University."²⁴ This was partly because the College Corporation kept the \$ 50,000 Gray bequest, and partly because the College conveyed its collection as well as five acres of land to the new Corporation.²⁵ But President James Walker was the only Trustee who formally represented the College Corporation.²⁶ Nothing should obscure the fact that Harvard was greatly removed from the scene as far as management and representation in the Museum was concerned. Just as Alexander Agassiz, Louis Agassiz's son and his collaborator in the administration of the new establishment, stated years later,

until 1876 the Museum "was considered as a State institution."²⁷⁾

So what happened during the period of a few months in which this transformation in the character of the Museum organization took place? As we have seen, Francis C. Gray's will and the conditions of bequest specified by its executor pointed to the establishment of a Museum that formed part of the Harvard College Corporation. It is also undeniable that Louis Agassiz had some influence upon the two Grays in relation to the specifications of the will and its more concrete conditions.²⁸⁾ As was shown in his announcement in the meeting of the American Academy, Agassiz already knew the outline of Gray's will. The mention of the Museum of Comparative Zoology in the will testified to Agassiz's influence upon it. Thus, it perhaps was not accidental that, in his report to the Visiting Committee drawn on December 15, Agassiz referred to the planned erection of "a wing of that ideal museum, at an expense of perhaps \$50,000," exactly the same amount Francis C. Gray specified in his will. All this suggests that, until the very beginning of 1859, not only William Gray the executor but also Agassiz himself did not plan to make the Museum as a Corporation independent of Harvard.

Then what prompted the transformation of this proposed Faculty of the College into a State institution? An immediate clue to this query is found in one of the conditions of the Gray donation. As it turned out, \$50,000 from the Gray bequest was not to be appropriated for any real estate. In other words, Agassiz could not spend any part of it for the construction of a Museum building. In spite of his influence upon Francis C. Gray, Agassiz probably did not know the details of the will, thus proposing unknowingly the beginning construction of a Museum building with \$50,000. Or ever an ingenious politician, he may already have known the details, but intentionally played the role of a man who was discouraged by the disappointing outcome of the will.

Whichever was the case, the disclosure of Gray's will and its

conditions had the effect of presenting to the public eye the lack of funds for the construction of a Museum building. This impression was particularly strong because by now more than enough income was secured for the consolidation and increase of the collection itself. It was natural that those Bostonians who came to Agassiz's support late January 1858 singled out the construction of a building as the purpose of their contributions,²⁹⁾ when Agassiz himself asked the month before for help in curator's salaries as well as in the establishment of a building. For there was by now the need for the structure that could accommodate not only those specimens already acquired but also those new specimens secured by the Gray bequest. Elizabeth C. Agassiz interpreted Agassiz's approach to the Legislature along this line when she stated later that, "since the Gray fund provided for no edifice, an appeal was made to the Legislature of Massachusetts to make good that deficiency."³⁰⁾

In a strict sense, Elizabeth C. Agassiz's statement is misleading. She claims that Agassiz and his friends made an appeal to the State Legislature because the Gray fund did not provide money for the construction of a Museum building. Checked against the chronological facts, this was not exactly true. The content of the Gray will and the conditions of its transfer to the Harvard Corporation were first made public in the Board of Overseers meeting on January 27, 1859. It was on this occasion that the following resolution was adopted:

... in view of the cost and immense value of the Museum of Natural History collected for Harvard College through the exertions of Professor Agassiz, and imminent peril there is of its being destroyed, as well as the impossibility of its being properly availed of for the purposes of scientific study by reason of the character of the building in which it is deposited, a committee of the Overseers be authorized to address the Legislature in their behalf,

soliciting the appropriation of the necessary means to provide for the erection of a suitable building."¹¹

The overseers made this decision after they listened to the Communication from William Gray and to Agassiz's report along with that of the Visiting Committee both of which were presented before this meeting. What should be noted here is the date on which the Governor gave his annual address to the Legislature. It was on January 7, about three weeks before the said meeting of the Board of Overseers. The significance of this is that well before Agassiz and his friends appealed to the Legislature, the head of the State himself already publicly expressed a firm support of Agassiz's endeavor in connection with the establishment of a Natural History Museum. In other words, it is misleading simply to suppose that Agassiz and his friends asked for help and the State responded to their request. The initiative did not necessarily lie with Agassiz and his friends. From the beginning, influential people in the State of Massachusetts *already* shared the idea of a public museum.

This circumstance is related to our central question of how the originally proposed Museum as part of the College Corporation turned itself into an independent, public corporation within a few months. At this stage one thing seems clear. It again is dangerous simply to suppose, as do Morison and Whitehead, that Agassiz and his friends made this independent corporation. Technically, these people could have been solely responsible for the organization of the corporation except for its legal sanction and approval on the part of the State. However, the attribution of the achievement to a single personality or to his friends is untenable. The mere composition of the Trustees which included six major State officers dissuades us from that line of interpretation. It was too large a product to be explained simply in terms of a person's or some persons' ingenuity.

Why was the proposed Museum transformed into an independent,

public corporation? The purpose of the rest of the essay is to answer this question. My hypothetical answer is that the Museum was the state-supported enterprise to resolve the religious crisis of the Commonwealth educationally. I will try to establish this in the following three ways: 1) by comparing Agassiz's ideal and actual Museum with two European Museums; 2) by analyzing the arguments with which Agassiz tried to persuade the Legislature; and 3) by analyzing the supposed and actual roles of the proposed Museum within the State.

III

Already in early 1857 in the obituary of Francis C. Gray Agassiz stated that his proposed Museum would "in the course of time be for this country what the British Museum and the Jardin des Plantes are for England and France." In his report to the Visiting Committee two years later, he again compared his enterprise with the two Museums. But this time he further proclaimed that the organization of his Museum soon "would be more perfect than that of either the British Museum or the Jardin des Plantes." One of the grounds for this assertion was related to the number of special professors in zoology. In the 1857 report, Agassiz did not specify the number of necessary specialists within the Museum except that "there should be as many curators as there are branches in zoology, including embryology and zoological anthropology."³² Ten months later, in his sketch of the plan of the organization of the Museum, his objectives were more concrete. In addition to Agassiz, at least eight professors would be required for the teaching of natural history: "One for Mammalia and Birds, one for Reptiles and Fishes, one for Insects, one for Crustacea and Worms, one for Mollusks, one for Radiata, one for Embryology, and one for Paleontology."³³ Besides these professors, perhaps eighteen assistants were needed to care for specimens of the respective department.³⁴ These various employees would work

together to attain the three-fold purpose: collection of specimens, instruction in zoology and the advancement of science.³⁵⁾

When completed, how did Agassiz's Museum compare with the European Museums? As early as 1842, the *Jardin des Plantes* had fifteen professors whose salaries were paid by the state.³⁶⁾ By 1858, this number amounted to more than twenty; ten of them specialized in those areas within Agassiz's scope that covered from natural history of Mammalia and birds to anthropology. The *Jardin* did not have a specialist in embryology, but it already had a chair of paleontology that was instituted in 1853.³⁷⁾ Besides all this, the *Jardin des Plantes* of the mid-nineteenth century was, along with the *Collège de France*, a highly research centered institution and a noted center of scientific studies in Europe.³⁸⁾

As for the British Museum, the number of full-time professionals affiliated with its zoological department was rather limited. As of 1858, beside J. E. Gray, Keeper, there were only three professionals specialized in Birds, Insects, and Mollusca and lower animals respectively. Another attendant took care of Vertebrates except Birds.³⁹⁾ Yet, one should not forget that, by 1857, the famous Richard Owen presided over the natural history departments of the Museum. As far as the number of professionals was concerned, Agassiz's planned Museum, we may conclude, compared favorably with the two European institutions. On the other hand, it was difficult for Agassiz's Museum to overtake, much less to supersede, these two establishments during the early 1860s when he had with him only young assistants.⁴⁰⁾

In terms of the actual number of specimens accumulated, Agassiz's Museum lagged behind the British Museum. To be sure the speed with which Agassiz increased his collection for the first few years around 1860 was phenomenal. In 1860 alone, for instance, the Museum added to its collection 91,000 specimens representing 10,884 species, while the zoological department of the British Museum accumulated 408,331 specimens within the ten years.

that started in 1860.⁴¹⁾ But the total number Agassiz had collected during the twelve years from 1847 to 1859 was between 100,000 to 200,000.⁴²⁾ By 1860, the British Museum already had a collection over three times the latter figure.⁴³⁾ No wonder that J. E. Gray referred to his own department as, "at the present day, the most important zoological Museum in the world."⁴⁴⁾ Given all this, it is hard to say that Agassiz's Museum had the prospect of superseding the British Museum during the 1860s. Indeed, at the very beginning of his undertaking, Agassiz himself admitted that that would take about twenty years.⁴⁵⁾

There was still something quite novel about the organization of the proposed Museum that attracted the attention of those who were affiliated with the European Museums. As early as 1861, Richard Owen, Superintendent of the natural history departments of the British Museum, fully recognized a distinct merit in Agassiz's institution. Owen's admiration was such that he stated that "of all my contemporaries and fellow laborers, he (Agassiz) is the one in whose opinion as to the scope and aims of a Public Museum of Natural History I have the greatest confidence."⁴⁶⁾ Which aspect of the Agassiz Museum impressed Owen? Specifically, it was Agassiz's proposal and practice of combined exhibition of the collection of fossils and those of existing animals.⁴⁷⁾ As demonstrated in our previous essay, this scheme reflected the nature of Agassiz's zoology, which interpreted behind the successive creations of plants and animals a unified, ordered plan in the world of organized beings. More generally, what impressed Owen was the Agassiz who "has associated the practical labors of the Museum Curator with those of the public scientific teacher and of the original scientific investigator."⁴⁸⁾

Of these different labors, Owen was particularly interested in the second, those as the public scientific teacher. Owen had emphasized this very point in address before the British Association on Museum reform a few years earlier:

... wherever that Museum may ultimately stand, it is the

duty of the Representatives of Associated British Science here to urge that the Curator of each class of animals should have assigned to him the charge of delivering a public course of lecture on the characteristics, principles of classification, habits, instincts, and economical use of such class ... Our present system of opening the book of nature to the masses, as in the Galleries of the British Museum, without any provision for expounding her language, is akin to that which keeps the book of God sealed to the multitude in a dead tongue.⁴⁹⁾

Thus what was novel about the Agassiz Museum from Owen's perspective was not so much the promotion of purely scientific research as its combination with a larger enterprise of public education through the zoological Museum. This was exactly what the British Museum of the time overlooked.

IV

In fact, this emphasis upon the educational aspect of Natural History which Owen saw in Agassiz's enterprise played a crucial role in the movement to establish the Museum. During the first quarter of 1859, when the law related to the incorporation of the Museum was being considered, Agassiz had at least two public occasions in which he could fully expound his plans and their significance for the State before those most interested in his project. One was on February 25, 1859, a few weeks after the printed report of Agassiz and that of the Visiting Committee were distributed to "each member of the Executive and Legislative departments of the government."⁵⁰⁾ In this appeal made before the Joint Legislative Committee on Education, Agassiz at the outset explained briefly what kind of circumstances brought him to that place. "I am emboldened to do so," stated Agassiz, "by the recommendation of his Excellency, Governor Banks, that the money accruing from

the sales of Back Bay lands be devoted to scientific, educational and charitable purposes." He then proceeded to discuss the subject more specifically. According to him, the past one hundred years had witnessed changed interests in knowledge and learning. They shifted from what he called "productions of human mind... work of the human genius" to the "forces acting in nature... the productions which our earth contains... the animals and plants which inhabit its surface." As the result of this change, the role of the Museum underwent a transformation. Until then it had been largely a curiosity shop. By now it came to play a vital role in the effective exploitation of natural resources for the purpose of human welfare. Hence the Museum was to be "an exhibition systematically arranged, of all the productions of nature, in which everybody can gather the information which is needed for general or special purposes."⁵¹ A public Museum of this kind was a supreme necessity for the Commonwealth.

After elaborating this utilitarian aspect, perhaps somewhat against his belief, Agassiz next lightly touched on the characteristic nature of education which the proposed Museum could provide for the young. The Museum offered the training of the eyes through which the human mind received strong and lasting impressions. In the proposed institution, "there should be exhibited all these manifold collections, in such a manner that a mere walk through its walls could give the most direct information, and to be the most valuable lesson a student can receive." Finally, the Museum could have a high value from the perspective of moral training. For the establishment might be arranged "to exhibit the thoughts of the Creator, as manifested in the visible world."⁵² All this was followed by his appeal that was essentially identical with his 1858 report to the Visiting Committee. In this way, he brought forth before the Joint Legislative Committee on Education the blue prints as well as the significance of the proposed Museum, by by somewhat disproportionally emphasizing its useful aspects and

giving a high hope of even surpassing the European institutions.

However, this was not the only occasion of his appearance before the public on the Museum issue. A month later immediately before the final action by the Legislature, Agassiz again had an opportunity to talk in the State House in order to make the success of his project doubly sure. This time his speech showed a considerable shift in emphasis in relation to the justification of the establishment of the institution, although the purpose of his talk remained the same.

The subject for March 25 was "Training of the young, from their earliest years, to observe and study the works of God in Nature, as among the best means of disciplining the intellectual faculties and enriching them with knowledge, and also of exalting the heart toward the Creator." In this longer address, Agassiz first emphasized the increasingly significant knowledge of nature by pointing to Alexander Humboldt as a supreme example who became "an object of reverence throughout the world, merely by his devotion to the study of nature." When the promotion of the welfare of the State was added to this general significance of knowledge of nature, there was little doubt that the school system of Massachusetts, already so advanced, would be further improved by the introduction of the study of natural history. However, the lack of competent teachers in this discipline was a major obstacle to be overcome. This deficiency was alarming since the new approach in this field was quite different from book learning. Instead of letting the pupils depend on printed materials, teachers of natural history had to confront them with real objects. For it was only by the ability of observing for themselves that the pupils could be liberated from the burden of authority and become able to judge by themselves.⁵³⁾

Then what were the objects of observation in order for the study of natural history to fulfill its stated purpose of making the pupils become aware of God? Agassiz mentioned them in the

following manner :

(It was) by taking first those facts which are unchangeable, those facts over which man, with all his pride, can have no control. Man cannot make the sun to start off and move in space; man cannot change the principles of the solar system; he cannot make plants sprout out of their season; he must take the phenomena of nature as they are. They should teach him humility and truth.⁵⁴⁾

How was this kind of study better facilitated in his proposed institution, the Museum of Comparative Zoology? According to Agassiz, individual observations of animals were no more than separate and unrelated facts. In order for these facts to yield some significance, they had to be compared. Through this procedure of comparison individuals would then learn that something that lay behind those seemingly isolated observations, a common plan that gave unity to all these unrelated facts of observation would appear :

When we thus trace the relations which exist between organized beings, and reach higher and higher generalizations, it is not our thoughts that we put in nature, which we read out of it. It is in fact God's thoughts as manifested in tangible realities which we attempt to decipher.⁵⁵⁾

Thus, immediately before the Legislator's decision on the Museum matter, Agassiz appealed to the public by emphasizing the educational trouble in the Commonwealth and seeking its solution through the extensive and systematic application of the study of natural history. When the established authority, symbolized by the older written materials and by conventional pedagogy, was crumbling, particularly in the sphere of the transmission of religious habits and customs to the young, Agassiz advocated the introduction of natural history into the public school. Natural history could demonstrate the correctness of

traditional morality and ethics without resorting to outmoded materials of teaching. This whole enterprise had to be begun with the training of teachers in a distinctly new way. This training was to be provided by Agassiz's methods of natural history based on comparison of extinct and existing creatures. And the edifice in which all of this was to be carried out systematically and scientifically and all the necessary specimens stored and arranged was none other than the proposed Museum of Comparative Zoology at Cambridge under Agassiz's supervision. Thus, in his final appeal to the Legislature and the public, Agassiz played his trump card.

V

Only a week after this speech, the Act for the incorporation of the Museum passed the Legislature and was confirmed by Governor Banks. Reflecting the situation just discussed, the fourth section of the Act comprised the following clause: "The said Trustees shall arrange, so far as may be done consistently with the interests of the institution, for the distribution of duplicate specimens, by exchange or otherwise, among other colleges and institutions of learning in this Commonwealth and elsewhere."⁶⁶ Besides opening its collection to the public, the proposed Museum was supposed to be a distribution center for materials for the study of natural history among the major institutions of learning within and without of the State. In May of the same year, Agassiz drew up a document titled "Rules and Regulations submitted to the Faculty of the Museum..." that was to be inserted in the "Articles of Agreement" which was soon exchanged between the Trustees of the Museum and the Harvard College Corporation. The ninth article of the document defined the responsibility of the Curator of the Museum in relation to the sphere of instruction. As the article prescribed it, along with those parts of the public who wanted Agassiz's instructions, the Curator's lectures were open to two classes of

people. The first were "regular classes of students under his care," and the second, "the class of teachers of the public schools" and "classes of pupils in the Normal Schools, in the Commonwealth."⁵⁷

For the school year 1860, Agassiz as Curator offered two courses in the new Museum. One was a special lecture on zoology for the advanced students in the Lawrence Scientific School, and which only fourteen students attended. The situation was quite different for the other course on geology, which was open to the undergraduates of Harvard College and to teachers of the State. More than two hundred attended this course, which had an average of 120 who were male and female teachers.⁵⁸ Indeed, Agassiz's influence upon the education of teachers was such that William James asserted in 1897 that "there is probably no public school teacher now in New England who will not tell you how Agassiz used to lock a student up in a room full of turtle shells, or lobster shells, or oyster shells, without a book or word to help him, and not let him out till he had discovered all the truth the object contained."⁵⁹ In their 1861 report, the Visiting Committee to the Lawrence Scientific School referred to the new Museum as "this great Normal School of Natural Science."⁶⁰ Their expression was certainly accurate. For the Museum was not only intended as an advanced center for the study of natural history, however strongly Agassiz himself desired the development of this aspect. The establishment was also seen as the capstone of the whole system of public education of the Commonwealth, which now tried to shift pedagogical foundations away from traditional study to that of science symbolized in Agassiz's zoology. The Museum was the source as the culmination of all this pedagogical and scientific effort.

As was shown in the ideas and actions of Abbott Lawrence, there already existed in mid-nineteenth century New England a persistent demand for a systematic training in applied aspects in science. Without support from these forces, it was then difficult

to achieve any spectacular success in the public arena of the State. The first thing Louis Agassiz had to emphasize in his appeal to the Legislature, probably somewhat against his natural tendency, was the usefulness of the proposed Museum from the point of view of an effective exploitation of natural resources of the Commonwealth. Again, the Visiting Committee to the Lawrence Scientific School appointed in 1860 had to reserve more than five pages of their ten page report for the defense of Agassiz's Museum. For, in the judgment of the Committee, there were some who inclined to think that, concerning the practical usefulness of scientific studies, what might be "true in reference to chemistry and perhaps geology, cannot apply to zoology."⁶¹ The Visiting Committee was pressed to vindicate the project by concluding, somewhat desparately, that "the establishment of this new Museum of Zoology ... is unquestionably calculated to develop the commercial and agricultural resources of our country, and thereby adds to its wealth and prosperity."⁶² These and other remarks on the part of the Museum promoters and supporters testified to the existence, within and without of the Legislature, of prominent forces which valued the worth of scientific studies in terms of their ability to increase wealth.

On the other hand, conservative elements also existed which were increasingly concerned about the transmission of traditional habits and customs to the young in a time of change. It was to this portion of the population that Agassiz directed his March 25 speech in which he expounded the nature of services which the proposed Museum could extend for the training of the next generation in humility and truth before the Creator. In fact, these two kinds of forces were not always found in distinctly separate groups. When Agassiz lectured on "Public Museums" in the Mercantile Library Association in early 1860, for instance, the audience responded with two rounds of applause. One was in return for his statement on the needed study of the Author of

nature as the source of moral value. The other was when Agassiz expressed his wish to make the Museum practically useful and scientifically complete for the sake of those liberal people who supported the establishment.⁶³⁾ These new Englanders had two souls within themselves. Given the physical forces of inevitable industrialism destroying traditional morality and ethics, we cannot but infer that the mind of these men must have been divided.

In the midst of this deepening schism between the systematic utilization of physical forces and the conservation and transmission of traditional cultural values, there had to take place a polarized separation of two scientific elements that Harvard had narrowly anchored so far within herself. By increasingly showing its true character, Agassiz's zoology came to offer, in the name of science, the conservative forces a solid shelter in the edifice of the Museum of Comparative Zoology. Naturally, the principles set forth in his "Essay on Classification" provided the guideline for the classification and arrangement of the specimens of the Museum.⁶⁴⁾

The same period, however, witnessed the arrival of another educational and research institution that evolved in an opposite direction. This effort tried to build a technical institution by actively taking in the possibilities of purely physical sciences. Instead of trying ideologically to disguise those traditional habits and customs, this side based their endeavor upon a completely new outlook on knowledge and its function in the transformation of the world.

It is revealing to see Harvard's response when these two forces were about to crystallize into respective scientific and educational institutions. What could she give to New England whose cultural integrity was just threatened? Unlike Williams and Amherst, Harvard did not conservatively adhere to traditional religion. In 1856, for instance, only 5 percent of the students enrolled in Harvard professed Christianity, when at Williams and Amherst

the figures were 48 percent and 68 percent, respectively. Again, only 2 percent of the Harvard students viewed ministry as their probable career, while the figures for the students at Williams and Amherst were 26 percent and 44 percent, respectively.⁶⁶⁾ Nor did Harvard firmly respond to the requirements of the newly arising industrial forces by organizing within herself a full-fledged engineering school. Her indecisive attitude in this sphere was fully shown in the confrontation with Abbott Lawrence.⁶⁶⁾ For all intents and purposes, the mid-nineteenth century Harvard held these questions in abeyance. From hindsight, we find that in this very non-committal policy lay the germ of Harvard's later strength. For neither natural history nor purely physical sciences in the end proved comprehensive enough to include all the areas of study required in a modern university. Nevertheless, Harvard did little to answer the acute question of the day that pervaded the Commonwealth and its vicinity. To the public that was represented in the Legislature, she seemed to have receded far into the background. No wonder both Charles W. Eliot and Phillips Brooks saw the lowest ebb of their alma mater in the fifties.⁶⁷⁾

In contrast, the proposed Museum of Comparative Zoology increasingly grew in stature. Undaunted by the loss of professional support, Agassiz tried squarely to respond to this highly problematical situation in the establishment of the great edifice of natural history. Within the more or less wavering atmosphere of New England, he focused public hopes and expectations upon himself and his Museum. Thus for Massachusetts the Museum of Comparative Zoology was not only a great system of exhibition of natural history that should in the end rival those in Europe; the establishment also was to be seen as the virtual substitute for Harvard, which had been the State's center of learning and education for the past two centuries. Just as the University of Uppsala with Carl Linnaeus was, a century before, the scientific center of Europe gathering students from all over the Western

world, so now the Museum of Comparative Zoology with Louis Agassiz was to become *the* School of New England, collecting and classifying specimens from all over the world and disseminating the scientific discoveries thus gained to public school teachers of the Commonwealth who in turn trained the next generation. Herein lay the secret of the sustained State munificence to the Agassiz Museum; Massachusetts gave the institution as much as \$ 600,000 over the next thirteen years while it gave virtually nothing to Harvard.⁶⁸⁾ This also explains why the Legislature was willing to incorporate the Museum with six of the State officials included therein when they were quickly losing their interest in the control of Harvard.

Among professional scientists, Agassiz's charismatic power shown in the Museum project proved rather ephemeral. Almost at the outset of that great enterprise, Agassiz had to confront the challenge brought against the foundation of his science by the work of Darwin. In spite of this, or rather because of this threat, his public influence remained potent. The degree of its strength will be reflected in William B. Rogers' hardship, who now would try to assert his ideas on science from a diametrically opposite direction: the establishment of the Massachusetts Institute of Technology.

Footnotes

- 1) On these grants, see: *An Act to increase the School Fund... out of the proceeds of the sales of the Back Bay Lands in Charter of the Museum of Comparative Zoology with a list of the Trustees, the By-laws, and Other Papers.* (hereafter referred to as *Charter of the Museum*), Boston, 1859.
- 2) Samuel Eliot Morison, *Three Centuries of Harvard*, Cambridge, Harvard University Press, 1936, p. 297.
- 3) John S. Whitehead, *The Separation of College and State*, New Haven, Yale University Press, 1973, p. 158.
- 4) The major historical writings on the Museum are: Thomas G. Cary Jr., *An Account of the Organization and Progress of the Museum of Comparative Zoology*. Cambridge, Welch, Bigelow, and Co., 1873;

- Alexander Agassiz, "The Museum which Agassiz Founded" in *The Harvard Graduates Magazine*, Vol. XV, (1906-1907), pp. 595-603; George Russell Agassiz, "The History of the M. C. Z." in *Notes Concerning the History and Contents of the Museum of Comparative Zoology*, Cambridge, 1936, pp. 16-21; Edward Lurie, *The Founding of the Museum of Comparative Zoology*, Cambridge, 1959.
- 5) James D. Dana, "Agassiz's Contributions to the Natural History of the United States" in *American Journal of Science*, 2nd Series, XXV, (May 1958), p. 328.
 - 6) See, *Ibid.*, pp. 340-341.
 - 7) Louis Agassiz, "Preface" to *Contributions to the Natural History of the United States*, Boston, Little, Brown & Co., 1857, p. xi.
 - 8) Among these were Asa Gray, the Harvard botanist, and William B. Rogers.
 - 9) MS, Agassiz Natural History Society, *Records* in three volumes. (Houghton Library, Harvard University), see Vol. I (1857-1859) and Vol. II (1859-1862).
 - 10) See, Agassiz, *op. cit.*, p. vii.
 - 11) American Academy of Arts and Sciences, *Proceedings*, Vol. III, (1857), p. 348.
 - 12) *Report of Professor Agassiz on the Department of Zoology and Geology in Report of the Committee ... to Visit the Lawrence Scientific School*, Boston, 1849, p. 9.
 - 13) *Ibid.*, p. 10.
 - 14) *Ibid.*, p. 11.
 - 15) *Ibid.*, p. 13.
 - 16) *Ibid.*, pp. 15-16.
 - 17) *Address of His Excellency Nathaniel P. Banks, to the Two Branches of the Legislature of Massachusetts, January 7, 1859*, Boston, 1859, p. 30.
 - 18) *Ibid.*, p. 32.
 - 19) MS, *Overseers' Records*, (Harvard Archives), Vol. IX, pp. 420-21.
 - 20) *Ibid.*, p. 422.
 - 21) *Ibid.*
 - 22) *An Act to incorporate the Trustees of the Museum of Comparative Zoology*, April 6, 1859 in *Charter of the Museum*, p. 5.

- 23) See, articles 3 and 4 of *By-laws of the Trustees of the Museum of Comparative Zoology in Charter of the Museum*, p. 9.
- 24) George Russell Agassiz, *op. cit.*, p. 17.
- 25) See, *Deed of the Land*, June 14, 1859 in *Charter of the Museum*, pp. 20-22.
- 26) Besides Walker there was George Ticknor on the Board of Trustees. But he was one of the three leaders in the movement of contribution among the citizens.
- 27) Alexander Agassiz, *op. cit.*, p. 601.
- 28) See, Edward Lurie, *Louis Agassiz: A Life in Science*, Chicago, The University of Chicago Press, 1960, p. 227.
- 29) See, Jacob Bigelow, George Ticknor, James Lawrence, et al., *The Agassiz Museum*, a one page pamphlet issued on January 26, 1859 in Boston.
- 30) Elizabeth C. Agassiz, ed., *Louis Agassiz: His Life and Correspondence*, London, Macmillan and Co., 1885, p. 560.
- 31) *Overseers' Records*, IX, p. 425.
- 32) *Report of Professor Agassiz...*, 1858, p. 13.
- 33) MS, Louis Agassiz, *Sketch of a Plan for the organization of the Museum of Comparative Zoology, submitted to the Faculty of the Museum in Harvard College Papers*, Vol. XXVI, p. 364.
- 34) See, *Ibid.*, pp. 361-62.
- 35) See, *Ibid.*, pp. 360-61.
- 36) See, "Introduction historique" in Pierre Bernard et al., *Le Jardin des Plantes*, Paris, L. Cumer, 1842, p. xx.
- 37) See, *Centenaire de la fondation du Muséum d' Histoire Naturelle*. Paris, Imprimerie Nationale, 1893, pp. iii-vi.
- 38) See, Stephen d'Irsay, *Histoire des Universitiés Francaises et Étrangères*, vol. II, Paris, 1935, pp. 291-292.
- 39) See, Albert E. Gunther, *A Century of Zoology at the British Museum*, Kent, Dawsons of Pall Mall, 1975, pp. 114-115.
- 40) Henry James Clark and Theodore Lyman, in whom Agassiz put confidence, were thirty-three and twenty-six in 1859. As for Agassiz's special faith in these two, see Agassiz's will which he prepared prior to his departure for Europe immediately after laying the foundation of

- the Museum building. Agassiz to James Walker, Cambridge, June 9, 1859, *College Papers*, XXVI, p. 189.
- 41) See, *Report of the Director of the Museum of Comparative Zoology, for the Year 1860* in *Report of the Trustees of the Museum of Comparative Zoology*. Cambridge, 1873, p. 65; Gunther, *op. cit.*, p. 111.
- 42) Louis Agassiz, "Museum of Natural History and Comparative Zoology" in *Evening Courier*, February 26, 1859, see Agassiz's answer to the first question.
- 43) See, Gunther, *op. cit.*, p. 111.
- 44) J. E. Gray, "Address of the President of the Section" in *Notices and Abstracts of the Miscellaneous Communications to the Sections of the British Association Report*, 1865, p. 75.
- 45) See, Agassiz, "Museum of Natural History and Comparative Zoology."
- 46) Richard Owen, "On a National Museum of Natural History" in *The Athenaeum*, August 10, 1861, p. 187.
- 47) See, *Ibid.*, in *The Athenaeum*, July 27, 1861, p. 118; Chapter VI of my dissertation.
- 48) *Ibid.*, in *The Athenaeum*, August 10, 1861, p. 187.
- 49) Richard Owen, "Address of the President" in *Report of the British Association for the Advancement of Science*, London 1858, pp. xcvi-xcvii.
- 50) *Overseers' Records*, IX, p. 432.
- 51) Agassiz, "Museum of Natural History and Comparative Zoology."
- 52) *Ibid.*
- 53) Louis Agassiz, "The Study of Nature" in *Boston Weekly Courier*, March 26, 1859.
- 54) *Ibid.*
- 55) *Ibid.*
- 56) "An Act to incorporate the Trustees of the Museum of Comparative Zoology," in *Charter of the Museum*, p. 5.
- 57) "Articles of Agreement", June 14, 1859 in *Charter of the Museum*, p. 17.
- 58) See, Agassiz, *Report of the Director of the Museum... 1860*, p. 66.
- 59) William James, "Louis Agassiz" in *The Harvard Graduates Magazine*, Vol. V, (1896-1897), p. 535.
- 60) *Report of the Committee... Appointed to Visit the Lawrence Scientific*

School. Boston, 1861, p. 12.

61) *Ibid.*, p. 6.

62) *Ibid.*, p. 10.

63) See, Louis Agassiz, "Public Museums." This is an article included in an unknown newspaper dated January 5, 1860 found in the Museum of Comparative Zoology Library.

64) Louis Agassiz, *Sixth Annual Report of the Director ... in Annual Report of the Trustees of the Museum of Comparative Zoology*, 1864, see, p. 8.

65) See, "College Statistics" in *The American Journal of Education*, No. XVI, (April, 1857), p. 356.

66) See, Chapters IV and V of my dissertation.

67) See, Morison, *op. cit.*, p. 294.

68) See, Lurie, *The Founding of the Museum of Comparative Zoology* p. 6.