Book Reviews

Reading the Shape of Nature. Comparative Zoology at the Agassiz Museum

By Mary P. Winsor
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There can be no question that Louis Agassiz was one of the most colourful and influential figures in 19th-century science. He is remembered, in particular, for his pioneer work on the description of Paleozoic fishes and for the spreading of the gospel of the Quaternary glaciation, and for studies undertaken while in Switzerland and during travels to, or correspondence with the savants of, other European countries. Upon his immigration to the United States, although his researches continued almost unabated, they were never again to be quite so ground breaking. However, his other achievements were considerable. In particular, he reinvigorated the teaching of zoology and created Harvard's Museum of Comparative Zoology. This museum had two purposes: primarily it was "to provide material for scientific research of the most professional kind" (p. 11), but also it was to serve as an adjunct to the teaching courses.

Agassiz's initial impact upon scientific education in the United States was immense. This was in part because of the originality of his teaching and in part because of his great personal charm; but it was also because of the particular solicitude with which he treated his students, at a time when such an attitude was rare:

> Agassiz cultivated each students' devotion with loving concern. By his interest in the details of their living arrangements, including advice on how to use their spare time and money, he placed himself in the role of parent to these young people, some of whom were indeed still in their teens, none past their early twenties. The feelings of one student were typical of the prevailing euphoria:
>
> Prof. Agassiz is 52 years old and a better man never existed. Good natured and clever... There is no better man in this world than Prof. Agassiz. We all feel toward him like a son to a father... [He is an] advisor and friend, one who is pure, good, noble in every attribute... (p. 31)

Such glowing testimonials speak indeed of an exceptional man; and, when one considers the distinguished roster of his students, one cannot doubt as to the immense indirect contribution Agassiz made to the development of science in the Americas. Several attained high administrative positions in other museums: Frederic Ward Putnam would become Director of the Peabody Museum of Archeology and Ethnology; Joel Araph Allen, Curator of the American Museum of Natural History; and George Brown Goode, Director of the United States National Museum. David Starr Jordan was to be one of America's most distinguished botanists and President of Stanford University. The roster also included such distinguished geologists as Joseph Le Conte, Nathaniel Southgate Shaler, and Charles F. Hartt (the latter a pioneer in Brazilian geology), and such influential paleontologists as Alpheus Hyatt, Alpheus S. Packard Jr., and Samuel Hubbard Scudder. Indeed, as Ms. Winsor remarks, Agassiz was "trying to invent the graduate student, a generation before the German Ph.D. was finally imported into the United States" (p. 64), by training his students in analytical methods and involving them early in research. It was an approach that stimulated their thinking and made them capable of original work themselves.

Yet, as the years went by, Agassiz began to lose the affection of his students and to forfeit his control of them (p. 60). This had several causes. One was that, as with so many other persons with wide-ranging and original minds, the energy he poured initially into new projects faded away as novelty turned into repetitious drudgery (p. 76). Another was the fact that he seemed too often to be claiming those students' work as his own (p. 50, 52). For Agassiz, since he had provided facilities, materials and funds for their work, it **was** his own; but his students did not share that view, especially since they felt his acknowledgements of their labours to be over grudging. A third reason was that Agassiz was a sedulous and vocal opponent of the concepts of Darwinian evolution, believing instead that "patterns of similarity were sure evidence of a Planning Mind" (p. 2). For students who were embracing those novel and stimulating concepts with great eagerness, their Professor's intellectual conservatism was both outmoded and dismaying.

However, the greatest problem was surely that Agassiz's "hungry ambition to accomplish vast projects" (p. 1) caused him to take on far too many tasks. His projects were costly and the problem of financing them was increasingly an anxiety for him. Yes, his "contagious enthusiasm [and] magnetic personality" (p. 4) might gain him the initial funding to build laboratories and launch projects, but the monies to sustain these operations were less easily come by. As early as 1862 his son Alexander perceptively commented that his father was:

> ...killing himself by inches with the Museum, his book [the unfinished *Contributions to the Natural History of the United States of America*], the lec

> tures he has to give to get the money to keep the machine going... [T]his has become too serious a question, his health cannot stand the amount of work. The Labours at the Museum ought to be divided so that Father should not have anything to do with the Direction of the Museum... [but] All I say only serves to irritate Father and to make me fume and boil with rage. (p. 131)

And, indeed, Louis Agassiz wore himself out. After a stroke in 1870, he recovered enough to embark again on intensive campaigns of lecturing and fund-raising. It was too much; he died in December 1873 at the relatively early age of 66.

Already his son Alexander had become rich, through able mine management and percipient investments (p. 137-139). Upon his father's death, he pledged himself thus:

> I shall try and carry out, to the best of my abilities, the many plans regarding Penikese [the island summer shool] and the Museum which were started by my father, and I shall at least have the melancholy satisfaction of knowing that... his views, whether right or wrong, and his dearest wishes, will be faithfully executed, and that I may raise a monument to him expressing what he hoped to be able to show, better perhaps than he himself would have done, because I shall not be constantly drawn aside by new plans and shall not have the incessant temptation of remodelling as I go along. (p. 147)

It was a pledge he had cause deeply to regret. Alexander was a very different personality from his father, with a "cold demeanour and ferocious temper" (p.204), generous in many ways but "not a forgiving man" (p. 210). He was "neither skillful nor happy as a teacher" (p. 134) and, although a competent researcher into the zoology of the marine organisms that interested him, without the gifts of true originality or mental flexibility. Unlike his father, he had come to accept Darwinian evolution (p. 148, 154); but in other regards his mind was closed, as the bitter controversy with Theodore Mortensen of Denmark over echinoid classification was to demonstrate (p. 237-240). His subordinates might be treated generously, but they had need always to tread carefully with Alexander. When Thomas Barbour came to the Museum in 1902, he "soon made a point of developing a cordial relationship with Alexander" (p. 247), a factor in his being able to build a career there, but he noted that Alexander was "considered a terrifying and almost legendary figure by all the graduate students" then at Harvard (p. 247). Alexander's power in the museum remained undiminished until his death in 1910 (p. 221). It was retained, although never so ruthlessly wielded, by his son George and his son's widow Mabel, until well into the second half of this century. Verily Harvard's museum has been "the Agassiz Museum."

Mary Winsor's account of the Museum's evolution is meticulous and excellently researched; yet I am not altogether happy with her interpretations. In particular, I feel her account of Louis Agassiz is unduly unsympathetic, not through any desire for iconoclasm, but because she has not understood the European intellectual inheritance he brought with him to Harvard. In Louis's time in Europe, students were expected to sit at the feet of their academic masters and to be grateful for the small or large coinage of wisdom intermittently thrown to them. Louis was, for his generation, exceptionally kind and generous to his students; indeed (as Ms. Winsor shows), interested enough in them to treat them as an ideal father of that time treated his children. If they undertook researches under his aegis, were not the results his intellectual property? Was it not through his generosity that they were permitted to work on his material and learn therefrom? Why, then, should they cavil if their results were published under his name? Was it not unduly egotistical of them to wish to claim credit for that work? As for this pernicious doctrine of Darwinism, was it not his duty to set their ideas right? They should be listening to him with respect. They should not, until much older and more mature, have the temerity to be airing their own views!

Yes, it is easy to misunderstand such proprietorial attitudes as Louis's. Indeed, to North Americans, this concept of the professor as leader and the student as mere humble follower has become quite alien. Yet those attitudes were prevalent in the United States when he arrived at Harvard and, in Europe, they have persisted almost up to the present time. In Germany, for example, academic posts were for long not advertised; they could be gained only upon the professor's verbal or written recommendation to his colleagues at other institutions. That recommendation would never be given if the student had not been properly respectful, subservient and an industrious follower of guidelines set for him. Moreover, the results of the research belonged to the professor, not to the student. I can even recall a specific instance form the late 1960s where a junior colleague at a German university had undertaken all the research, written a paper, and prepared the plates while his professor was far away in another country, yet was not given co-authorship and gained only a one-line acknowledgement in a substantial text!

These viewpoints on the academic hierarchy and the "ownership" of research results were at their strongest in Europe when Louis Agassiz came to North America. He was more flexible in outlook than most European scientists and accommodated to his changed circumstances remarkably well, initially at least, as his early successes so clearly indicate. It is not to be wondered at that, when ageing and so much overworked, Louis Agassiz failed to adjust to a changing and even more liberal intellectual environment. That failure merits more understanding and sympathy than it has here received.

Is it true that, as Ms. Winsor states, "even the most carefully documented museum must be stuck somewhere near the bottom of the ladder of scientific prestige" (p. 270)? I trust that is not so in the academic world, for the collections of such museums are as fundamental to research in natural history and paleontology as are books to literary scholars. Yet I fear it is true in terms of public perception. Have we not seen the researchers at the once-properly-revered British Museum (Natural History) so savagely decimated that many formerly vigorous lineages of scientific enquiry are now extinct in Britain, with the retitled Natural History Museum viewed merely as a place for public entertainment and money-making? Perhaps Louis Agassiz's concepts of classification of organisms are no longer acceptable. However, if we could find a contemporary individual as capable as he was of convincing the rich and powerful of the value of such museums, what a blessing to science it would be!

Yet I shall not end on a sour note. Scientific historians and museologists alike should read this work for the lucid picture it presents of the development

and the vicissitudes of a great scientific institution. If their conclusions, like mine, differ from the author's, well, we should be grateful for the data so carefully organized and presented to us, for they have surely been stimulating to our thinking.

Science in the Subarctic. Trappers, Traders and the Smithsonian Institution

By Debra Lindsay
Foreword by William W. Fitzhugh
Smithsonian Institution Press
Washington, DC
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To set the scene for this review, it is appropriate to quote from William Fitzhugh's foreword (p. x, xi):

> Baird's field collecting method emphasized the collection of large numbers of carefully documented "voucher" specimens from a given region; such specimens, with later description and analysis, established a firm empirical basis for scientific classification. With analysis of field documentation and careful comparison of specimens, the method supported classification studies that, at higher levels of abstraction, revealed geographic, evolutionary, and historical relationships. The method applied equally to species of animals and plants, to languages, and to ethnographic studies. As the study region was gradually expanded, larger patterns developed that provided solutions to major problems of biological and cultural classification. Baird was particularly aware of the pristine conditions for collecting in northwestern Canada, the Northwest Coast, the Russian America. The prospects of expanding such analyses toward the Northwest, into Alaska, and eventually across Bering Strait into Asia were the larger vision that inspired Baird's labors as a research organizer in northwestern North America. [Robert] Kennicott's later Alaskan work as leader of the Western Union Telegraphy survey became the Smithsonian's entrée into Russian America, influenced the purchase of Alaska, and resulted in the training of the first generation of America's Alaskan scientists, including William Healey Dall, Henry Wood Elliott, and others...
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> One of the most important innovations of Kennicott's Mackenzie program was the involvement of native collectors. Roderick MacFarlane, a Hudson's Bay Company agent, used native people extensively and to great advantage, making important collections of animals, birds, and ethnographic objects during the winter season when post managers and most naturalists were not out and about. The use of native collectors also provided other advantages, including the acquisition of native names, terminology, and observations on animal behaviour, on biological phase changes, and on ethnographic data.

The theme of this book, then, is potentially a very interesting one and it is clear, from the sources she quotes, that Ms. Lindsay undertook very extensive researches before writing it. There are three troubles with it. First, the title is misleading, suggesting a much fuller survey of the Smithsonian's connections with the subarctic than is actually presented. Second, the text is too brief for any in-depth examination of her themes, a mere 130 pages, forcing too much to be epitomized or cited without sufficiently full quotation. Third, as I shall illustrate below, she is not a good writer. A fourth objection for readers of this journal is that she is a historian, with interest in biology but not in geology. Although Baird indirectly, and Kennicott directly, made appreciable contributions to our knowledge of the geology of subarctic Canada, rocks, fossils and geology gain only the most passing of mentions (on pages 30, 31, 101, 113 and 185).

Problems for the reader are numerous. There are irritating duplications: the oologist Thomas Brewer is introduced on page 25 and again on page 33; the comments on Kennicott on pages 46-48 are repetitious; and Kennicott's view of egg-collecting as "glorious sport" (p. 70) unnecessarily prefaces a long quotation — one of very few — which included that phrase. There are phraseological awkwardnesses: "Fort Anderson did not drain into the Mackenzie River System" (p. 61) and "Their activities were similarly precipitated by scientific visitors" (p. 43). There are unexplained contradictions, as when page 105 informs us that Kennicott "had always intended on going to Russian America" whereas page 106 tells us how very hard it was for Western Union to persuade him to do so!

Kennicott is called "the mysterious 'Bugs' Kennicott" on page 49, but we are told neither why he was considered mysterious nor how he gained that nickname. On the whole, the author shows a surprising hostility to Kennicott (p. 113 and earlier), yet her eventual comments on his childishness and physical frailty (p. 116) were not presaged in her earlier text, and his death, probably by suicide, comes to the reader as a shock of unreality.

Do the virtues of this book compensate for these problems? I do not think so, yet it has its importance in stressing how much the attainments of early field naturalists rested upon the work — sometimes voluntary, more often paid — of their assistants (native Americans in particular). For that reason alone, perhaps it deserves to be read until a better study, with fuller documentation by direct quotation from the original sources, is available.

From Stone to Star. A View of Modern Geology

By Claude Allègre
Translated from French by
Deborah Kurmes Van Dam
Harvard University Press
US $16.95, paper

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A first requirement of a scientific text, surely, is that it should be accurately titled. In that regard, this title begins well, but ends ill. It is a history of how the investigations of scientists extended from the consideration of the rocks of this earth to the spectrum of stars and the constitution of the Universe: thus, *From Stone to Star* is accurate enough. However, it is *not* a view of modern geology. On the one hand, the account ranges far beyond geology into physics and astronomy, so that the subtitle is not broad enough. On the other hand, only