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Book Reviews

Science and the Canadian Arctic. A Century of Exploration 1818-1918.

By Trevor H. Levere
Cambridge University Press
xiv + 438 p., 1993, US $64.95, cloth

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The writing of scientific history involves a series of stages, if it is to be done properly. First of all, the research must be of adequate breadth and must be conducted with thoroughness and percipience. Secondly, the information thus derived must be organized and presented coherently, along with any necessary or desirable illustrations. Thirdly, the work must be documented through use of references to previous investigations. These, then, are all fundamental requirements. The fourth and, alas, most rarely fulfilled desideratum is that the scholar who has done all this work should be able to write well: to produce a text that is not merely comprehensible, but also enjoyable to read.

Dr. Levere's study of the growth of scientific knowledge of Canada's Arctic terrains, during the century in which these lands came to be known and mapped, passes all these tests with flying colours. The substratum of scholarship, exposed adequately by lucid footnotes, supports a text that is quite as readable as a good novel. Dr. Levere's assessments of the intellectual and practical scientific eqiupment of the explorers — only a very few were, in fact, trained scientists, even in contemporary terms — reveals his own great breadth of understanding and shows a commendable humanity in judgements. These are sometimes expressed in humorous terms, as in the several references to the Royal Navy's action-avoiding "Circumlocution Office" that did so much to slow progress in Arctic science.

The area of coverage is clearly defined (p. 12) as that north of the tree line, this being shown also on the endpaper maps. It is salutary to be reminded not only that 2.5 million square kilometres of Canada lie north of that line (p. 12), but also (p. 2-3) that there were not less than two hundred expeditions to that region between 1818 and 1919!

For geologists, it is good also to be reminded of the geological achievements of such neglected figures as Sir John Richardson (p. 109, 120), Samuel Haughton (p. 232-234), Henry W. Feilden (p. 282-286) and Per Schei (p. 368-371) and to have the better-known work of Robert Bell (p. 356-361) and Albert P. Low (p. 361, 371-376) put into proper context. The contribution of the great Swiss paleobotanist and paleoecologist Oswald Heer to the understanding of the Arctic flora is also lucidly set forth (p. 301-302). In contrast, the achievements of Joseph Dalton Hooker are shown (p. 297-299) to have been marred by his unduly harsh treatment of poor Feilden, a virtually forgotten episode in the career of the great Krew botanist. The author's judgement that, in the 19th century, geology was

> ... a science that sought to minimize the destructive effects of internecine theoretical debate (p. 169)

is one that deserves to be remembered by all who seek to understand the development of geological concepts.

At a time when Charles Babbage's contributions to computational science have earned him virtual deification, Dr. Levere's proper dismissal of Babbage's valuing of the physical sciences above natural history as a "partial and unreasonable judgement" (p. 143) is salutary. It is also salutary to remember the astronomer Sir George Airy's observation (quoted on p. 146) that

> ... a bad observation, or one that is given without the means of verification, is worse than no observation at all.

There are a few faults, of course, as is inevitable when so broad a canvas is being painted. Dr. Levere is uneasy in his handling of taxonomic terminology: for example (p. 74), while the initial capitalization of the trivial name of *Pleuropogon Sabinii* is arguably justifiable, it being based upon a personal name, that of *Parrya Arcitca* is altogether incorrect. So also are the failures to initially capitalize the generic names *Marganita* (p. 56) and *Clio* (p. 70), plus four generic names and one family name of plants on page 126. (Oddly, the capitalization of the taxa mentioned on the adjacent page 127 is quite correct!) The death of Captain James Cook occurred in the Sandwich, now the Hawaiian, Islands and not in the South Pacific, as stated on page 33. The caption to Figure 14 is incomplete, since it show several arthropods as well as the cephalopod *Rossia*.

The text has been meticulously checked and, in more than 400 pages, I noted only two misprints: "unsytematic" (p. 169) and "Amund Rignes Island", properly Ringnes (p. 364). Indeed, Dr. Levere's excellent history gives little to fault and very much to praise.

The work of the publishers, however, is somewhat less creditable. The choice of grey for the endpaper maps makes them much less easy to read; particularly to be faulted, in so expensive a book, is the poor quality of the paper. Not only does this affect adversely the reproduction of the excellently chosen illustrations, but it also allows a "bleed through" of the printed lines of the backing page, further marring the photographic plates (Fig. 39 on p. 410 is an example). So excellent a work merited

better paper and more generous handling.

For indeed this *is* an excellent work, surely destined to become a classic reference in the history of polar science. I cannot recommend it too highly, not only for its scholarly precision, but also for the sense of excitement (and, at times, of frustration) so well conveyed in the telling of a fascinating story.

Scenes from Deep Time. Early Pictorial Representations of the Prehistoric World

By Martin J.S. Rudwick
University of Chicago Press
280 p., 106 figs., $45.00 (cloth)

Reviewed by David A.E. Spalding
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Scientific historian Martin Rudwick has previously drawn attention to "the excessively textual orientation of scholarly work in all branches of the history of science, and ... urged the need for greater analytical attention to pictorial sources." In this work, he has splendidly redressed that imbalance by bringing together a wonderful series of illustrations from geological works of the early to mid-19th century, accompanied by contemporary texts and his own illuminating commentary. The book will be of particular interest to anyone interested in the development of paleontology and scientific illustration, but can be enjoyed by anyone involved in the sciences and their development, and presents fascinating sidelights in many other fields.

Intriguingly, Rudwick's starting point is with biblical illustration, where early attempts to create a visual commentary on the creation, flood and Garden of Eden stories of Genesis provided a precedent for those who later attempted more scientific visual interpretations of events and ecologies that had never been witnessed by humankind. Johann Jacob Scheuchzer (whose supposed fossil man is a familiar figure in paleontological history) provides the earliest picture (1709), but the bulk of the illustrations are drawn from the first six decades of the 19th century. Here a rapidly developing science is visually served by Conybeare's delightful conceit of William Buckland crawling into a den of still living hyenas (1821), while De la Beche's cartoon of life in "a more ancient Dorset" (1830) initiates the tradition of ancient beasts in dramatic confrontation. In 1852, Austrian botanist Franz Unger published the first continuous sequence of scenes from different periods. A fascinating chapter gives the background to Waterhouse Hawkin's well-known sculptures for the Crystal Palace — the first life-sized, three-dimensional restorations of prehistoric animals — and reproduces Hawkin's posters, but not, alas, his miniature model, ancestor to the millions of plastic dinosaurs of today.

Another intriguing section presents illustrations used in geologist Pierre Boitard's fictional treatment of the past in *Paris Before Men* (1862), which appears (although Rudwick does not say so) to be the first "time travel" science fiction story. With Guillaume Figuier's *Earth Before the Deluge* (1863), the genre of illustrations of scenes of the past is fully established, and Rudwick reproduces a full series of plates from this important work of scientific popularization. (As the book ends in the 1860s, there is no exploration of the Canadian use of such illustrations; it is interesting to note that J.W. Dawson was using one of Waterhouse Hawkins' illustrations at the end of the century.) A variety of other illustrations includes restorations of skeletons and individual animals, and even *Punch* cartoons. A useful summary chapter, detailed notes, sources of illustrations, bibliography and index complete the work.

The text develops some interesting sub-themes. For instance, some geologists had doubts about the scientific propriety of imaginative visual reconstructions in case their work be regarded as "too popular" and thus suspect. The underwater viewpoint often used by modern artists did not develop until the aquarium became popular, and illustrations of Adam- and Eve-like first humans were only abandoned in the second edition of Figuier, after the discovery of a human jaw in the Somme gravels.

Although some of the illustrations are familiar, most will be new to most readers. They are well reproduced, all in black and white except the colour version of "ancient Dorset" on the cover. (Most originals were presumably monochrome, but we are not always told.) The accompanying texts are generally well laid out, although the effort to relate illustration, contemporary text, and the author's continuous commentary sometimes creates an awkward flow. One of the most valuable features of the work is inclusion of the contemporary texts, which allows the original author's interpretation of the illustrations to be appreciated.

It is unfortunate that the artists are not discussed much except where they were themselves geologists. In some instances, the information is perhaps not available, but it would be interesting to have more information about their experience in nature art, and their relationship to the material and the authors of the publications they illustrated. Such information would have allowed discussion of the relationship of scenes of past ecology to the developing tradition of landscape illustration of living animals, and perhaps the relationship of prehistoric animals to the iconography of animals in general; vivid depictions of animal conflict, for instance, date back at least to Roman times.

These comments are not so much criticisms as indications of the wide range of possibilities opened up by this engrossing work. And indeed, its importance is apparent when one looks for other works discussing later developments in the field. Until one comes to the fine study of the 20th century work of Charles Knight, there is no comparable work.

REFERENCE

Czerkas, S.M. and Glut, D.F., 1982. Dinosaurs, Mammoths and Cavemen. The Art of Charles R. Knight: E.P. Dutton, New York, 120 p.