lems confronting the country today; his call is not for optimism but for determination.

Altogether this volume is the witness of a remarkable man. One may hope that his counterpart is in the wings today should the times cry out for him.

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The North of Canada

Science, History and Hudson Bay. C. S. BEALS, Ed. Design and preparation by D. A. Shenstone. Department of Energy, Mines and Resources, Ottawa, Ontario, 1968 (available from the Queen's Printer, Ottawa). 2 vols. xxii, 1058 pp., illus., + maps. $16 Canadian.

The discovery of vast petroleum deposits on the north slope has once again focused attention on the arctic regions of North America. *Science, History and Hudson Bay* examines the nature of Canada's Hudson Bay region and asks what the future holds for its development. It is for this reason a timely work and should satisfy the curiosity of anyone, specialist or otherwise, interested in the north.

This monumental, and basically encyclopedic, work was prepared for the Centennial of Confederation (1967) and was conceived primarily as a point of departure for future studies. It contains the contributions of 56 scholars and scientists, including among others physicists, geologists, geographers, historians, and anthropologists. Volume 1 consists of eight chapters, subdivided into a number of subsections. It covers the prehistory and history of the region, its people, geography, climate, water and ice conditions, marine life, flora, and fauna. Among its contributors are members of the National Museum of Canada, the Meteorological Service, the Marine Sciences Branch, the Fisheries Research Board, the Canadian Wildlife Service, and several universities. Volume 2, with seven chapters and subsections, focuses on the geology, and summarizes geophysical studies, upper atmosphere research, transportation and communication, defense, economic possibilities, and theories of origin. Its contributors are drawn from the Geological Survey, the Dominion Observatory, the Hydrographic Service, and other Canadian institutions and organizations. Illustrations, which are profusely exhibited throughout the two volumes, are good, and there are some useful maps. Each chapter contains a fairly comprehensive bibliography, and the index is thorough.

Hudson Bay was discovered in the 17th century in the course of the search for the Northwest Passage. Although the grim experience of Henry Hudson is firmly implanted in the imagination of every Canadian schoolboy—at least it was a few generations ago—the region and its icy waters have not played a very positive role in Canadian life and development. Sending its chilly blasts of air southward into the lower Great Lakes region and St. Lawrence Valley, the Bay (and the sinister Greenland ice cap to the northeast) have pushed vegetation, soil, and agricultural belts to the south. Possibilities for agriculture in the Bay region itself—apart from the raising of caribou—are limited by the short frost-free period of from about 2 to 2½ months. Only in the southern part may potatoes be grown successfully.

Still, the resource potential of the region remains substantial. This is especially true of the fisheries, increased output of which apparently depends on the use of more and better boats. The extensive forest wealth could, if tapped, provide pulp and paper for Western Europe, conditioned of course by the navigation season, which extends over some three months or more. Other than low-grade nickel, exploration of the west shore of the Bay has not revealed any mineral deposits of economic significance. The east shore, however, is rather more promising. Considerable search has revealed a number of occurrences of low-grade iron ore; a number of industrial minerals, such as gypsum and asbestos; and a good possibility of petroleum or natural gas, or both, within the environs of the Bay.

Perhaps the most promising statement that may be made for the Bay region is that the arctic or subarctic environment has not been found to be a serious obstacle to economic development. It will simply be for the future to determine what path that development will take.

Though the topical organization of the work leaves something to be desired and one wishes that the editor had included a synthetic chapter, this remains an impressive assemblage of facts not readily found elsewhere.

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On Plant Morphogenesis

Cellular Differentiation in Plants and Other Essays. C. W. WARDLAW. Manchester University Press, Manchester, and Barnes and Noble, New York, 1970. vi, 162 pp. $6.50.

The development of the beautifully coordinated complexity of the higher plant body from the single cell of the fertilized egg has fascinated botanists for centuries. The earliest students of this process were the anatomists who carefully observed and completely chronicled the structure of the final body, as well as the innumerable stages that intervene between the one cell of fairly simple structure and the many cells of so many different structures and functions. Later came the experimental morphogeneticists who prodded, wounded, and dismembered plants, and especially their growing points, in order to see what unexpressed potentialities for the development of form and structure existed in plants, and to discover how versatile the plant could be in overcoming or circumventing obstacles placed in the path of normal development. Still later came the physiologists and biochemists and their chemical control of such processes as root initiation, bud formation, and the inception of floral primordia. The last to burst upon the scene have been the molecular biologists, with their emphasis on selective gene repression and derepression as an explanation of differentiation within the context of a demonstrated identical genome in all cells.

Claude Wardlaw, an emeritus professor of botany in the University of Manchester and a distinguished contributor to experimental plant morphogenesis, especially of fern apices, freed at last from the duties of his academic position and unrestrained by the necessity of pleasing colleagues or students, has written this book, as he has written others, to permit himself some freedom of expression, to muse aloud, and to share with readers his hopes, his misgivings, and his predictions concerning the future of his field. In a day when scientific writing, especially in journals, has become so stylized as to eradicate the personality of the author, it is a luxury and a distinct change of pace to read such a book. I found it relaxing, if at times a little precious. The book contains only a few new insights into plant developmental processes. Anyone at all acquainted with the field knows that there are many more unknowns and mysteries than there are knowns