legal and descriptive history of over sixty early Prairie reserves, the other being the original surveyors' plans, now divided between NMC and EMR. Some of Nelson's items pre-date NMC's listings for particular reserves by as much as twenty years. This is, unhappily, not a minor quibble for it means that the catalogue does not relieve researchers reconstructing a particular reserve's history of the job of finding and extracting maps from up to five different record groups in three different places. One can only hope that this will be remedied at some point soon.

None of the above is intended to detract from the credit due to the NMC for undertaking the series in the face of the considerable obstacles described. The present volume will remain useful as an introduction to reserve cartography for beginning researchers, as a stepping-off point for more intensive projects and perhaps as an incentive for federal cartographic records managers to begin co-ordination of their scattered holdings for the benefit of all concerned.

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Concepts in the History of Cartography, A Review and Perspective. M.J. Blakemore and J.B. Harley. A special issue of *Cartographica,* Volume 17, no. 4, Winter 1980, Monograph 26, 120 p., illus. IBBN 0-919870-26-0.

Maps, atlases and globes have not been the favoured documents of archivists and librarians. Awkwardness of physical form mitigates against ease of handling and storage, and they consume, for their weight and mass, excessive space in usually confined environments. And their special combination of spatial, chronological and topical content ensures that they do not fall under the usual cataloguing rules applied to most other materials. Moreover, relatively few practitioners have been trained, especially in a program on cartographic archives or map librarianship. Fewer still are educated as cartographers or historians of cartography.

Yet, this has been altering as public interest has grown apace in "earlier" maps' storehouse of information on particular places and times, in their antiquarian and decorative values, in their own intrinsic qualities as scientific and cultural artifacts, and in their significance as a language in the communication process. As a result, archivists and librarians are learning, and even enjoying, coping with maps' eccentricities, and are increasingly aware of their potential research value. This latter capacity has been impressed upon them to no small degree by the quantity and diversity of research undertaken by devotees of that still-emerging, and some might say inexact, discipline, the history of cartography.

This study under review is not one catering to the uninitiated reader. It is first and foremost a landmark review, evaluation and definition of a profession which, the authors assert, has generated for itself the role of examining "the development of maps . . . as formal systems for the communication of spatial information, and it focusses on the nature, structure, distribution, and significance of cartographic language within past societies," or as the authors say more simply, it "considers early maps as independent objects worthy of study in their own right." In fact, it is a prescriptive guide by two cartographic historians for themselves and for their own colleagues, in a profession which has produced much of substance on early maps over the years, but is still in the throes of crystallizing its own philosophical and methodological fundamentals.

Although there are some 191 items listed in the bibliography, which the authors consider pertinent to their definitional task, 86 percent were written since 1960, and in this group, two thirds have been prepared after 1970. What is even more cogent is that only three previous

studies can be stated clearly to be seminal attempts to evaluate the basis of the whole or larger part of this field. Most academics prescribing readings for their students would have placed the following at the head of their lists: J.B. Harley's outreach toward a methodology for evaluating early maps (1968); R.A. Skelton's historical survey of map study and collecting (1972); and D. Woodward's suggested framework for the study of the history of cartography (1974). The last was, in fact, the first and most complete structuring essay into the disciplinary core of cartographic history.

The idea that maps are a language, a unique, spatially-oriented system within the totality of human communication is neither novel, nor the invention of the authors. For several decades cartographers have been expressing in diverse ways, through various communication models, the concept of cartography as a cognitive science. The two basic achievements of the authors are to apply the linguistic construct fully as the disciplinary focus of the history of cartography, and to weave this distinctive strand into the fuller fabric of the communication paradigm, which infuses all other humanistic disciplines as literature, anthropology, history of art and other historical sciences. This is orchestrated in a well-ordered manner through six chapter-essays, which culminate in the seventh, their exposition that the linguistic model is the most relevant theme for an "historical appreciation of maps as a record of the human intellect."

In 'Definitions' the authors summarize the past usage of two seemingly similar terms, history of cartography and historical cartography, which are interdependent, but not interchangeable. It may be noted that the difference is not merely one of semantics. The former is a discipline with emerging philosophical and methodological principles, and with a corpus of scholars similarly concerned with the historical development of maps as such. The latter term applies to a discrete area of research pursued by specialists from disparate disciplines, who turn to maps with specific questions, and who attempt to elicit answers through a congeries of techniques. Blakemore and Harley successfully refine this distinction, to produce a personal definition of their discipline, although they succeed in spite of their reliance upon Skelton's often-quoted, but unfortunately imprecise, statement on this matter.

In "Chronological and Spatial Frameworks" their aim is to chart the path of previous research, that is, to identify those periods and areas of greatest emphasis, dominant ideas which have gripped the interest of writers, and major research lacunae which are only now receiving some attention. The first obvious lack is an all-encompassing general history of cartography to which one may turn for insight into all facets of map history, and in which one may see portents of such future research trends. Existing syntheses and journal articles have emphasized "biography, bibliography and navigation themes", and have concentrated on European and East Mediterranean cartography and on maps produced previous to the late nineteenth century, that is, previous to the major technical permutations and the map user revolution of more recent times. These tendencies are natural and understandable since the discipline and the larger share of research are occidental. Moreover, the numerous cartographic treasure troves of European nations have provided, and still do offer, a breeding ground for studies of the pre-printing era, of the early centuries of map printing, of the Discovery epoch, of the cartographic golden ages of West European nations such as the Netherlands, of the Reformation of cartography in France, and for the antiquarian, collecting, 'the old is beautiful' urges which have been a dominant thread in the orientation toward earlier maps. The powerful national forces which patterned the political landscape of Europe, and their outbreak into colonial exploration, discovery, occupation and exploitation across the world, are chronicled in maps, and thus have offered fertile ground for cartographic historians. Curiosity about the mapping of one's own homeland and opportunities to assuage such interests have obviously occurred earlier and more often within Europe. It has also led to the more recent trend for Europeans to mine European holdings for maps for their colonial research, and for the citizens of the younger nations to undertake research upon national themes from the richness of their own archives and libraries. It is quite

true as the authors assert that many topics, such as the history of portolan charts or eighteenth century military cartography, must transcend political boundaries in order that they be adequately comprehended. It must be borne in mind, however, that larger themes require the smaller building blocks of more localized information. The time may not be ripe, in fact possible, for certain transcendental writings, for example, the history of North American fur trade cartography. Such studies must await the nearly-completed exposition of Hudson's Bay Company cartography and the emergent analysis of North West Company trader-exploration maps before they can be linked with the depiction of the Astor fur trade, the American free-booters on the Great Plains and Rockies, and others of the same ilk. Happily, such themes within different geographical precincts are being investigated, although too slowly for the authors' satisfaction in the cartography of the early Chinese and Japanese, Muslim cartography, and the cartography of non- or pre-literate societies, with notable reference to North American native abilities.

Early maps were conceived, designed, surveyed for, compiled, draughted, processed, printed, published, distributed, sold, stored, listed, and retrieved by a host of people. The third chapter asks who they were, what did they do, how much did they do, when did they do it, where did they do it, why did they do it, where are extant early maps located, and how may some of them be viewed by a wider public? These questions are subsumed within the heading "Bio-bibliographical and Facsimile Trends in the Literature," and are of particular interest to archivists and librarians. Biographies, bibliographies, cartobibliographies and facsimile reproductions are absolute necessities in the history of cartography and historical cartography, and much of this literature is the research product of these specialists. Some are the output of antiquarians, collectors and dealers in early maps, and others emanated from archivists and librarians, who have prepared them as aids to research, guides to collections, and catalogues of exhibitions.

The authors warn that although biographical research on individuals and groups is bound to remain a dominant element in scholarly research because of the nature of the subject, the writing of the history of the cartography of a period or a region must not be presented, as it has too often been in the past, merely as biographical beads strung together with map descriptions. Caution is also requested in ascribing too great an influence on cartographic history to the 'great men' in the past, without careful analysis of the social and institutional context of their times. An admonition is given that continued emphasis on the work and worth of individual cartographers will lead to an unbalanced view of their significance among the variety of other craftsmen, businessmen, institutions, societies, departments and bureaus in the cartographic fraternity.

Bibliographies range from mere hand lists to scholarly assessments of collections, or of themes, and are indispensable for cartographic analysis. More highly crafted reference bibliographies, using Karrow's definition, are looked for, and especially that genre which is exemplified by Dahl *et al.* on Québec City, Nagy on Ottawa, and the forthcoming thorough inventory of printed maps of Upper Canada by Winearls. But, if is Karrow's second classification, cartobibliography, which has become symptomatic of the more rigorous search by cartographic historians for origins of and inter-relationships among maps. Principles and techniques have been codified and applied, principally by Verner, to the printing history of engraved copperplate sheet maps. As yet, the authors acknowledge, similarly intensive experimentation has not been devoted to the descriptive study of the geneological links between manuscript maps, the printing history of woodcut or lithographed maps, or maps drawn on media other than paper, for example.

Maps, atlases, and globes, spatial messengers, are among the most numerous, intriguing, and useful artifacts to be devised by man. Chapter four draws the reader's attention to the physical attributes of the map, that is to its form. Interestingly, although much has been written on the data gathering, publishing and distribution processes by map historians, there

has been less notice taken of the intermediate stage, that is, the processing of the information. The character and operation of workshops, the tools of the trade, the technical practices, and the materials involved have had few investigators. Even less has analytical evaluation of the cartographic design of early maps been a normal element in historical studies. It is likely so because most of the historians in the past have not themselves been cartographers, neither interested or trained in the intricacies of symbolization, nor in colour conventions, generalization, lettering styles or line weight and balance. This is changing, fortunately, as more cartographers enter the discipline; and what is more, cartography itself has become much more concerned with stylistic change and the relationship of good design to clearer communication.

Accuracy, one would consider, is a cartographic *sine qua non,* since, after all, location is a cardinal geographical trait. In chapter five Blakemore and Harley disclose that accuracy is far more complex than it appears, and has exercised the interest and ingenuity of many scholars. There is more than geodetic and planimetric accuracy involved. They examine "chronometric" and "topographical" accuracy also, and invite us to consider that within a single map several or all types are usually embodied. Concern over the accurate dating of the creation of a map, dating of its multi-levelled geographical content, the "cartometric" measurement of its astronomical control framework and the qualitative and quantitative analysis of its landscape features has spawned a multitude of approaches designed by, or adapted by, cartographic historians. To such persons accuracy is a relative matter. One has to consider the map as a whole and in its parts; one has to ask whether, to its creator, certain types of accuracy were important at that time to the purpose of the map; one has to enquire how significant is accuracy, or what kinds of accuracy are required to answer specific questions. To a cartographic historian, in effect, accuracy is a many-splendoured thing.

The total message embodied in a map is far more intricate than the general user, and in fact the map historian, has heretofore realized. We are indebted to art history "iconographers" for this growing awareness, and chapter six details this obligation. Art historians have long concerned themselves with the meaning of works of art, that is, the metaphorical, poetic or symbolic meanings, or, stated more generally, the cultural meaning of an art object. The authors apply borrowed principles to their own discipline. They urge their fellow workers to focus more research on original meanings, in order to afford them greater insight into the early map's message in light of contemporary social circumstances. Such a study of map images may help to counteract our tendency automatically to equate the objectives of earlier cartography with the utilitarian purposes of much of our recent mapping. It should encourage us to view all features of the map as carriers of meaning, and to realize that we are producing maps now which will be carriers of the images important to our present society to map readers of later centuries.

This study was prepared because the authors believe that the history of cartography is at a significant juncture when the clear exposition of an underlying structure is required, and is justified by the trends which they discern in the development of this discipline. They declare this unifying structure to be the concept of "maps as language." It relates this field of study more cogently within the communications paradigm, which permeates sister disciplines, such as cartography, art history, literature and anthropology. It unites form and content; it is more profound than artifact and image. It supplies a cohesive bond between those research approaches which have become, or are becoming, so pervasive in the discipline: the biographical, bibliographical, artefactual, mathematical, topographical and iconographical. Similarly, it promotes a greater understanding of the pragmatic and technical, and the ideational and humanistic elements of earlier map making and historical map evaluation. This essay is certain to become for some time the template against which further developments are

patterned, and the indispensable text to which cartographic historians and other interested persons will turn for guidance and rationality in this discipline.

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Archivists and Machine-Readable Records. Edited by CAROLYN L. GEDA, ERIK W. AUSTIN, FRANCIS X. BLOUIN, Jr. Chicago: Society of American Archivists, 1980. 248 p. (Proceedings of the Conference on Archival Management of Machine-Readable Records, February 7-10, 1979, Ann Arbor, Mi.) ISBN 0 931828 19 8, $7.00 Members, $10.00 Non-Members pa. (Available only from SAA, 330 S. Wells St., Suite 810, Chicago, Ill. 60606, U.S.A.)

Books dealing with the impact of the computer and of records generated by electronic data processing upon archives and archivists are suddenly rising into sharp focus. And a good thing too, for archivists have generally brushed both aside in the last decade – with one or two important exceptions. Computers seemed too complex, too unsuited to the subtleties of archival variations. Too many scare stories from early computer applications in libraries nourished the aversion which so many archivists seemed to feel. There was the argument, also, that computerisation was beyond most archives' budgets and that EDP records could not be properly serviced, in storage or use, by most archives. Even more fundamentally, most archivists felt ignorant of the whole new dimension of appraising or using a record generated in a machine-readable form. Lacking professional education in any case, archivists had nothing to cling to but traditional practice or at best a feverish optimism that somehow they could cope.

Ignorance and indifference, fed from whatever source, are thankfully slipping away as market pressures on the archivist increase dramatically and a few brave colleagues have struck out a path to attract attention. *Archivists and Machine-Readable Records* and *Archives and the Computer* may well be already outdated so fast are methodologies, applications and technical breakthroughs appearing. Nevertheless, for an archivist who has less than a smattering of knowledge on these critical issues, both books are to be recommended for their survey of the field and explanation of problems – though Lawrence McCrank's more recent edition of papers given at a similar conference to that at Ann Arbor is even better, partly because of Frank Burke's contributions, while Michael Cook's run-through of selected computer systems may seem insufficient for a real understanding of application possibilities. These reservations aside, Geda *et al.* should be read to digest their broad scan of the issues facing the archivist who has to appraise, store, retrieve and make available records which are illegible without electronic conversion and manipulation. Cook nicely demonstrates how the archivist might use electronic circuitry to take the strain out of housekeeping. They both confirm that it is now professionally impossible for an archivist, especially one working with public or corporate records, to ignore the machine-readable record and that it is virtually inconceivable that an archivist anywhere can continue to resist the enticements of automation.

Cook approaches the computer as it should be treated, as a device or tool for controlling systems cheaply, expeditiously and comprehensively. As ever, he is practical, down-to-earth and specific. He makes no grand claims. Indeed, his preface is a model of precision which is carried through the unfolding of each chapter: to whit – "after a general discussion of automated systems, and their relation to manual ones, a select group of important systems is described in as much detail as may be needed for a reasonably secure understanding of their