trial Expansion, Indian and Northern Affairs, Surveys and Mapping Branch, Canadian Hydrographic Service, Compusave Inc., the Canadian Institute of Surveying and the Canadian Cartographic Association.

As Director of the technical program, Wellar partitioned the conference theme: *Automated Cartography: International Perspectives on Achievements and Challenges*, into five theme tracks, plus *Special Sessions*. These tracks were: *Applications, Education, Research and Development, Problem Analysis*, and *Integrated Systems*. In all, 175 papers were accepted for Auto-Carto Six, and 110 were received in the required camera-ready format and in time to be published in the conference proceedings. The *Proceedings*, edited by Wellar in two volumes and containing the papers and abstracts, were available on the opening day of the conference.

The scope and subject matter of papers presented at Auto-Carto Six as with all of the previous Auto-Carto conferences, was vast and stretched far beyond the traditional realms of cartography. Notably, there were many papers that discuss bureaucratic concerns of systems acquisition, implementation, and responses of organizations to the new capabilities, and the changes in production power. The technical subject matter, too, reached far into the realms of other disciplines including cartography's sister disciplines of geodesy, remote sensing, photogrammetry, surveying, geography, and the more peripheral relatives that use maps, such as geology, hydrography, planning, forestry and meteorology.

The purpose of this issue of *Cartographica* is to bring to the readership a selection of papers from Auto-Carto Six, representing, but limited to, the spectrum of specifically cartographic concerns. Beyond subject matter, the papers were chosen on the basis of being written in a straightforward, relatively jargon-free style. The twenty-two papers, preceded by the keynote address by Dr. F.J. Ormeling, President of the International Cartographic Association, are grouped into four themes representing major concerns of modern cartography. These are:

1 *Computer cartography's contribution to problem analysis and institutional decision-making;*
2 *Issues and problems relating to cartographic data use, exchange and transfer;*
3 *The merger of computer data and thematic mapping; and*
4 *Mathematical, algorithmic, and data-structure issues.*

The contribution of computer cartography to institutional decision-making in this decade represents the most recognized impact of computer cartography on society as a whole, and it has taken place in Canada within governments at all levels. The papers selected for this theme reflect a uniquely Canadian character in its propensity for local innovation and independence of approach. The unrestrained enthusiasm which the first four papers exude is only slightly dampened with the thoughtful remarks by Stein Bie of Norway on the impact of this technology on the technicians who must work with it. If government, business and industry are all going to be generating and using digital data for cartography and geographic information processing, there will be a parallel increase in demand for mechanisms to exchange cartographic data from one institution to another, but the problems of exchange are far from simple. In theme section two,

four papers demonstrate the scope, depth and range of the problem, at a variety of intellectual levels. The problems of exchange are all too easy to discount when others who must deal with them complain of having them, but the most serious consequence of failing to deal with this topic with rigourous scientific thinking is in opportunities lost for new and expanded uses of digital cartographic data.

Cartography is a graphic science. Computerized cartography has not changed this. It is the captivating, speedily-produced graphics that have attracted much attention to the field. The merger of the science of managing statistical data banks, a science that has long since reached maturity, with the exciting capabilities of computer cartography is fascinating. But whenever there is enormous untapped potential to be exploited there are problems. For example, after many years of exhausting tests, the celebrated U.S. Government Domestic Information Display System (DIDS) was characterized by David Cowen as 'isolated, expensive and restrictive'. Beginning with a paper on the 'next generation' of graphics with the new devices the section on thematic mapping reviews the 'state of the art' in thematic cartography.

Perhaps the most interesting aspect of all of the applications of computers to cartography has been the forced development of a new 'science' within cartography which is introduced in the section on thematic mapping. Hundreds of operations done in manual cartography are only partially specified at best, and are dealt with on the basis of the intuition of trained cartographers. To coax a machine to replicate many of these functions is forcing a major rethinking of what, exactly, is being done in cartography and how it is being done. Precise definition of operations based on intuition is difficult, but the results expressed in the form of the computer 'algorithm', and in the structuring of data, represent major scientific contributions to the field on a purely intellectual basis. The application of these algorithms and data structures in widely available machinery is the major expression of progress in cartography in this past quarter century. In fact, the statement of algorithms and descriptions of data structure have been reliable forecasters of ten-year developments in the field for the past twenty-five years. It is expected that the papers in the last theme section will also fill a role of diviner for the next decade or more. They portray a number of very likely futures.

Three papers in this issue of *Cartographica* did not appear in the Auto-Carto Six *Proceedings*, and we are fortunate to have them. Others have been considerably modified, and all have had editorial revisions. Except as mentioned above, these papers appeared in the *Proceedings* of Auto-Carto Six which were edited by Barry S. Wellar. They have been incorporated in this special issue of *Cartographica* by kind permission of Dr. Wellar, and the Steering Committee of Auto-Carto Six.

DAVID H. DOUGLAS
*University of Ottawa/Ottawa/Canada*
*July 1984*