

IMPACT OF CARTOGRAPHY ON INTERNATIONAL RELATIONS

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Abstract

The factors affecting international cooperation in cartography and the role of the cartographer are discussed. Because the problems of charting involve the sea and shore, which encompass much of the earth's surface, and because they possess characteristics common to the maritime world, nautical cartography has been chosen to illustrate numerous areas of activity that require international cooperation. Organizations that are typically international in scope are identified; also, examples of cartography that are applied to products designed and produced for international uses are described. Of particular concern are the legal implications associated with charting coastal areas and the high seas. The paramount conclusion is that cartographers should be skilled in 1) maintaining high accuracy standards, 2) keeping the navigator fully informed of changes vital to safety, and 3) assisting military plans and operations experts, navigators,

maritime lawyers, diplomats, etc., with the assembly and presentation of information.

Introduction

At the United Nations it has been said that cartography, being technical and practical rather than political, is a field of endeavor eminently suited to international cooperation. This is believable judging by the number of international organizational meetings in which cartography plays a direct or supporting role. This is not to say, however, that cartographic results — including cartographic errors — have not been involved in political decisions. Witness, the major accomplishment by the American commissioners in 1782 at the signing of the peace treaty with the British, which by a cartographic accident resulted in enlarging the Old Northwest to include what became the state of Minnesota and reserved for posterity the then unknown Mesabi Iron Range.

More than most Americans realize, twentieth century cartography is now being applied to many of the problems that confront government and inter-governmental organizations to increase the speed and effectiveness of economic and social development. As pointed out in the United Nations Economic and Social Council's Resolution 131(VI), "... accurate maps are a prerequisite to the proper development of the world resources ... such maps facilitate international trade, promote safety of navigation ... and provide measures for peaceful adjustment and for the application of security measures ". It seems inevitable that, during 1966 and perhaps for the next decade, charts and maps will form such of the backup information for the series of many programs throughout the world in connection with ICY (International Cooperation Year), a world-wide project of the United Nations. The United States, led by President JOHNSON, is intensely concerned with international cooperation within the framework of the ICY objectives, with representation by more than 500 civic organizations, ninety corporations, eighty-nine educational institutions, and twenty-two federal agencies.

TIME magazine aptly describes maps as things that keep one from getting lost, that add an extra dimension to the story, locate economic wealth, mark a new frontier, pinpoint explosions in a crisis, trace the path of a satellite, a ship, or an expedition. This suggests (as Professor ROBINSON has stated) that almost any kind of information is mappable, ranging from the survey, topographic mapping, and nautical charting efforts of the national survey and military organizations to the applied and interpretative cartographic products compiled by the meteorologists, urban planners, geographers, historians, economists and others to communicate ideas. The climatic map, the synoptic chart, the agricultural map, the traffic flow map, the political map, and many others are all products that belong to this last group. Cartography, then, may be considered as the science of preparing all types of maps and charts, and includes every operation from original survey to final printing of maps.

Two years ago at the annual ACSM meeting a thorough report on the

progress of international cartography was presented by the former President of the American Congress on Surveying and Mapping, Vice Admiral H. Arnold KARO, who is now Deputy Director of the Environmental Science Services Administration (ESSA). He traced the development of all the leading international organizations dealing with various phases of cartography, especially since World War II, and summarized the status of basic geodetic control, mapping, and charting in broad areas of the world. He concluded that international cooperation in mapping involved 1) mutual acceptance of responsibility in the accomplishment of international mapping projects, 2) bilateral agreements for regional mapping without regard to national boundaries, 3) interchange of information on the development of methods and techniques, and 4) technical assistance which may be provided from international funds or by bilateral agreement between nations. With no intention of covering the same ground that Admiral KARO developed in his paper, the writer will attempt to discuss some interesting — and to a certain extent unresolved — factors affecting international cooperation in cartography and the role of the cartographer.

Because the problems of charting involve the sea and shore, which encompass much of the earth's surface, and because they possess characteristics common to the maritime world, the writer has selected nautical charting as a subject deserving of international attention. For purposes of this paper, the subject has been broken down into eight categories, each of which is capable of exerting considerable influence on the international scene.

Cartography as a Tool

The paramount thought that the cartographer should keep in mind at international cartographic or related conferences is that his product (maps, charts, supporting publications, etc.) — not himself — provide the principal instruments or tools for negotiation. The military or urban area planner, the marine navigator, the maritime lawyer, and the diplomat all need expert cartographic advice at some stage of discussion, but the cartographer should not assume the role of any of these professions unless specifically qualified. Dr. BOYLE at the Experimental Cartography Symposium at London in 1964, in speaking of automated cartography, expressed the point very succinctly when he said, " We are concerned with trying to give people results, not in deciding what results they want ".

Many conferences are strictly cartographic in nature, whereas others require graphic support or other kinds of mapping, charting, or geodetic assistance in order to illustrate significant data or events. For the latter type of meeting, the prudent member should provide himself, of course, with cartographic advice before or during the session. For example, the Americans in 1782 came to the conference table using a 1755 map (MITCHELL's) and without realizing what they had accomplished enlarged the boundary of the Old Northwest as already noted. The line was described as running from the most northwestern point of the Lake of the Woods due west to the Mississippi. No such line would strike that great river for,

as later exploration revealed, the source of the Mississippi lay 151 miles to the south of the Lake of the Woods. The Britisher VAUGHAN alerted his colleague SHELburnE to this probable map defect and suggested substituting in the treaty words which described the "shortest course from Lake of the Woods for reaching" or a "due south course to" the Mississippi. For some reason the article was not changed in the definitive peace treaty unless it was because the British expected to secure free access to American markets in the West.

Cartographers must also be skilled at assisting in drafting and re-drafting proposals and counterproposals dealing with policies and issues based on or utilizing cartographic materials and principles. At times, such as in United Nations cartographic resolutions or NATO chart standardization agreements, it may be necessary to dismember the draft almost completely and then salvage the most essential fragments, and build a new structure. Blueprints for well conceived, practical charting policies and programs for the future comprise essential outputs of the senior cartographer representing his agency and the United States. In addition to sound design which holds the nuts and bolts together, energy and knowledge must be applied intelligently in follow-up actions to overcome natural inertia which sometimes sets in after conferences, with their noble sounding resolutions, are ended.

Perhaps the greatest challenge to cartographers on the international scene is the ever-widening use of graphics as a communications tool and the impact of the technical revolution in cartography. Geodetic control and photo maps by satellites, computer-programmed automatic cartographic instruments, non-cartographic formatted information on magnetic tape for rapid retrieval, etc., are all within the state-of-the-art although costs are presently formidable. The tasks involve striving to reduce costs to place such systems and the benefits within reach of technically less advanced nations.

Bilateral Agreements

The reasons for making bilateral cartographic arrangements with another country are manifold: (1) Organize or improve survey and chart production capacity of agencies within the native government; (2) Obtain required charting data as soon as practicable for mariners' use; and (3) Ensure a continuous exchange of cartographic technical knowledge, enhanced by personal contacts with local professional personnel. The U.S. Naval Oceanographic Office, for example, has made hydrographic surveys of many foreign ports and coastlines, with the result that copies of the detailed surveys are delivered to the host government, vastly improved charts are produced for all mariners, and valuable on-board training is provided to foreign student surveyors.

Bilateral chart reproduction exchange agreements have also been made by the United States with a number of International Hydrographic Bureau States Members from Asia, the Americas, and Europe. These agreements are reciprocal in nature and allow modification, reproduction, and sale of

United States charts. Analyses of the distribution of foreign chart sales agents, chart price comparisons, military priority, and studies of the frequency of port calls by United States ships are made by cartographers before submitting proposals. The preliminary views of each foreign hydrographic office are also determined relative to their interest in making charts available sooner to all mariners by reproducing each other's charts. All such arrangements, which are cleared by the Department of State, require mature cartographic judgment in preparing and implementing survey and chart reproduction operations in accordance with specific agreements.

Training Programs and Technical Assistance

Cartographic training centers exist in many areas of the world as a result of the United Nations, regional organizations, and in various countries like the German Federal Republic, Switzerland, Italy, and the United States. Many foreign students, for example, are trained in surveying and chart-making theories and techniques at either the U.S. Naval Oceanographic Office or the Coast & Geodetic Survey for periods up to one year. And, in Germany an excellent course entitled "Photogrammetric Weeks" is conducted annually at München.

The technical assistance provided to developing areas normally entails the loan of technical personnel or equipment to perform the necessary surveys and publish the final charts. From the U.S. Naval Oceanographic Office, efforts at any given time may be devoted to supplying guidance on harbor surveys in Latin America or occasionally, to providing consulting services to newly organized foreign hydrographic offices. Both the training and technical assistance programs permit the establishment of lasting personal contacts which probably contribute more to good international relationships than any other program.

International Organizations

There is a growing awareness of the need for all countries to have adequate and comparable data and of the requirement to coordinate effort by various organizations concerned with map and chart making. The demands for more data have become acute as a result of the emphasis currently given by Governments to preinvestment and development plans. According to United Nations reports new techniques for exploration and utilization of natural resources also require increasing and better cartographic data. Cartographers in various specialized fields have ample opportunities to collaborate, stimulate, and coordinate mapping activities on a regional and international scale in such organizations as :

- International Hydrographic Bureau (IHB)
- International Cartographic Association (ICA) (Affiliate of
International Geographical Union (IGU) (US member :
American Congress on Surveying and Mapping (ACSM)

International Civil Aviation Organization (ICAO)
 International Society of Photogrammetry (ISP)
 (US member : American Society of Photogrammetry)
 International Union of Geodesy and Geophysics (IUGG)
 Federation Internationale des Geometres (FIG)
 Pan American Institute of Geography and History (PAIGH)
 Inter American Geodetic Survey (IAGS)
 NATO, CENTO, SEATO Geographic Conferences
 General Secretariat of the Organization of American States (OAS)
 United Nations Cartographic Office
 International Map of the World (IMW)
 Regional Cartographic Conferences and Seminars
 United Nations Intergovernmental Oceanographic Commission
 (IOC).

International Hydrographic Bureau

Nautical cartography has exerted great influence on the international level through the organization known as the International Hydrographic Bureau (IHB) at Monaco. This organization, which was established in 1921 and which comprises 40 Member States, adheres to the policy of encouraging international cooperation and coordination. The work of the Bureau is continuously brought to the notice of States Members through reports, circular letters, periodicals, and special technical publications. The latter embrace works on Harmonic Constants for Tide Predictions, Glossary of Cartographic Terms, Manual of Symbols and Abbreviations used by States Members, Hydrographic Dictionary, General Bathymetric Chart of the Oceans, and Catalog of World Coastal Geographic Positions (four volumes). In 1953, the IHB issued the 3rd edition of a publication entitled "Limits of Oceans and Seas" which has been of considerable value to organizations such as various Hydrographic Offices when compiling Sailing Directions and Notice to Mariners. Career cartographers find the publications of this organization an excellent outlet for expressing original work covering various parts of the spectrum of hydrographic surveying and nautical chart activities.

International Application of Cartography

The shared mapping efforts in Antarctica provide a significant example of modern internationalized cartography. Each year since the launching of the International Geophysical Year (IGY) in 1957, nations have been exchanging maps, charts, and other scientific data in a truly international data collection and exchange program with all information unclassified and territorial claims absent. United States effort is carried out largely in support of scientific, logistic, and related resupply operations, a program officially designated as Operation "Deep Freeze". In support of "Deep Freeze", the Naval Oceanographic Office produces revised charts annually including

charts showing the status of the various bases occupied (or unoccupied) by various nationalities.

Selected important charting products, designed for international use, are described briefly in the following paragraphs.

NEMEDRI Charts

Since World War II, mine-free swept areas for safe ship passage have existed in the North Sea, Baltic, Mediterranean, and Black Seas. Danger areas, routes, and instructions are described in the text of the NEMEDRI publication and shown on various nations' charts. (NEMEDRI is the acronym for Northern Europe-Mediterranean Routing Instructions and is published in London by the Hydrographic Department, Ministry of Defence).

North Sea Fisheries Charts

An interesting example of international cartographic impact on economic development of natural resources is the new series of North Sea Fisheries Charts. These charts, on a scale of 1/300 000, are designed to show all essential detail boldly and simply, including Decca navigation lattices, to meet the special needs of fishermen. Publication is a joint venture of the hydrographic offices of Great Britain, Denmark, The Federal Republic of Germany, Netherlands, and Norway.

General Bathymetric Chart of the Oceans (GEBCO)

Several States Members under the aegis of the International Hydrographic Bureau (IHB) are engaged in compiling sounding track plotting sheets at 1/1 million scale for various assigned blocs of the world oceans. Copies of sheets are available at IHB, including some of the bathymetric chart series at 1/10 million scale. It is also planned that the nautical charts of the Indian Ocean (28 000 000 square miles covering 14 per cent of the earth's surface) will be improved through the efforts of participants in the recent International Indian Ocean Expedition. Thousands of miles of sounding track and other data collected by forty-five ships from twenty-five nations are now being processed.

Legal Implications

Charts made by nautical cartographers often become the basis for recognizing or disputing claims involving the limits of the territorial sea, contiguous zones, boundaries, danger and warning areas, etc. In addition, the Federal Tort Claims Act of 1947 and the interpretations placed on it by the courts in various maritime situations, emphasize the responsibility of

the cartographer for maintaining high accuracy standards and for keeping the navigator fully informed of changes vital to safety. The act waives sovereign immunity of the United States from suits in court and permits claims for injury "caused by the negligent or wrongful act or omission of any employee of the Government while acting within the scope of his office or employment, under circumstances where the United States, if a private person, would be liable to the claimant for such damage, loss, injury, or death in accordance with the law of the place where the act or omission occurred".

The waiver of immunity called "discretionary function exception" provides that the Tort Claims Act does not apply in cases of negligence when a claim is based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty on the part of a federal agency. No yardstick exists for determining what a discretionary function is; consequently, the delicate line of immunity from liability is difficult to draw in the complex scale of governmental operations. The discretionary function exception appears to depend on the fact that one who undertakes to warn the public of danger and thereby induces reliance must perform his 'good Samaritan' task carefully. For example, the Coast Guard did not have to undertake the lighthouse service. Once started, however, the Coast Guard is further obligated to use due care when maintaining specific light aids and to give warning when they are not functioning.

For federal charting agencies, recent Supreme Court decisions raise some interesting questions. The trend seems to be to hold government agencies, particularly those that deal with the safeguard and control of marine and air commerce, to a stricter accountability for acts of negligence that result in injury to the public. Therefore, cartographers who are involved in the publication of nautical charts and related data — from survey to the final printing — where matters of judgment and discretion arise, must be aware of these new responsibilities both in the exercise of greater care on the operational level and in the matter of timely warning the public of potential dangers.

United Nations Conferences on the Law of the Sea

Since 1947, when the International Law Commission (ILC) was established under the United Nations' General Assembly Resolution 174(II), the Commission has been charged with the codification and development of the international law of the sea. It is interesting to note the extent of cartographic support contained in the ILC's 1956 report and in the 1958-60 UN Conferences at Geneva on the Law of the Sea. These conferences were convened for the purpose of acting on the ILC draft rules and were attended by representatives of 86 countries. Although principal issues such as the breadth of the territorial sea and fishing rights within a contiguous zone were left unresolved, other conflicting interests were widely discussed and areas of agreement achieved on such substantive matters as the right to the use of the high seas, the right of passage through international straits and territorial waters, and the right of each coastal nation to exploit the resources

of its continental shelf. Cartographic applications were reflected in the adoption of rules for defining the limits of inland waters, for the drawing of baselines, for delineating the outer limits of the territorial sea and boundaries through the territorial sea and the high seas, and for rights of innocent passage. Charts, in fact, serve as a fundamental instrument to both determine and portray the low water line, seaward limit of territorial and of interior waters, roadsteads and anchorages, danger and warning areas, pipelines and cables, defense restricted areas, and superadjacent waters and airspace.

Conclusions

The desire and endeavors of lesser developed countries and territories to benefit from the technical progress and economic capacity of the rest of the world impose a moral obligation upon the latter to make available their economic potential, knowledge, and experience. In the field of cartography, typical international products are charts and related publications embodying multilateral agreements on specifications and utilization; or special projects with individual countries which involve delegation of experts, preparation of specifications, loan of equipment, conduct of surveys and production of maps and charts, practical and theoretical training, invitations to study groups, etc. Technical developments have a tendency to compel new approaches in international relations.

The economic and practical value of accurate maps and charts to the national economy of a country — particularly for planning and implementing projects — is not always fully appreciated. Fortunately, through the efforts of the United Nations, international organizations with cartographic interests, private industry, and individual cartographers, progress is being made in alerting the world to these most useful tools.

Cartography, as a form of graphic communication, serves a growing industry of new users reflecting the work and expressive needs of scientists, economists, and historians. The nautical cartographer, for example, who prepares computer programs, operates automatic plotting, photogrammetric, and type-placement equipments, has entered into a new and dynamic environment. Not only does he continue to improve existing conventional charts, but, also, he strives to interpret and display multi-dimensional data in graphic form to support special work being done in surveying, navigation, oceanography, gravity, magnetism, geography, and numerous other fields.

Nautical Charts not only reflect boundaries and navigational data as defined in international agreements and treaties, but may also serve as evidence in claims against the Government. Chart production agencies must recognize the responsibility of the cartographer for maintaining high accuracy standards and for keeping the navigator informed of changes vital to safety.

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