



cartographic perspectives

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Number 14, Winter 1993

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messages

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MESSAGE FROM NACIS PRESIDENT

In the Fall of 1980 I attended a meeting in Gatlinburg Tennessee. Alan MacEachren, then at Virginia Tech, called and urged me to attend. Since it was within easy driving distance and just on the edge of Great Smokey Mountain National Park (one of my favorite places for hiking), I decided to go. I can't remember any of the papers that I heard, though I'm sure some must have been quite good, but I do remember that I enjoyed the atmosphere of the conference. It was intimate, I'd guess about fifty people were there, and it was exciting; I also remember that I never got a chance to go hiking.

The North American Cartographic Information Society was founded at a time when cartographic information was exploding. The promise of the computer, long talked of during the 1960's and 1970's, was being realized as the 1980's began. This explosion has both continued and accelerated and NACIS has grown with it, expanding not only as measured by the number of members but also in the strength of its outreach. The birth of *Cartographic Perspec-*

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tives, after a long gestation period as *Map Gap* and *Cartographic Information*, has secured a place for NACIS as both an important resource for and leader of the cartographic community.

The role that NACIS plays in the cartographic community is unique. While there are excellent organizations representing map librarians, academic cartographers, and commercial map makers, NACIS is the only professional organization that has at the heart of its mission the bringing of those groups together. The Society has come a long way since Gatlinburg, but the vitality and intimacy I experienced there is as strong and real as ever.

During the upcoming year the Society has committed itself to several goals:

- **Increase the membership.** As an organization we have always operated in the black; however, as the cost of publishing *Cartographic Perspectives* rises this is becoming an increasingly difficult task. A small increase in membership would go a long way toward guaranteeing the continued high quality of *CP* while insuring the vitality that "new blood" brings to any organization. The Society has always placed a high priority on bringing students into the organization and will continue to do so in the current membership drive.

- **Expand beyond our traditional heartland.** Planning has already begun for the 1994 Annual Meeting to be held in Ottawa, Canada. This represents the first time a NACIS meeting will be held outside of the United States. Ottawa is an important cartographic center and a delightful city.

- **Increase participation of the membership in the activities of the Society.** As NACIS is a relatively small professional organization, all voices are welcomed and important in determining the direction and nature of the Society. I hope all of you will consider serving on a committee, running for an office, presenting a paper at the annual meeting, or in some other fashion taking an active role in your Society.

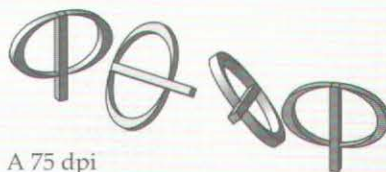
- **Preparation for the annual meeting.** One of the most important activities of the Officers and Board of Directors is the planning of the annual meeting. This year we will be meeting in Washington D.C. Charles Harrington serves as Program Chair and Fred Anderson as Local Arrangements Chair for what looks to be an exciting

meeting in an exciting city.

As President, I am grateful to Chris Baruth, Executive Director of NACIS for handling the day to day operations of the organization and for the commitment of the Board of Directors and Officers. I am also very appreciative of the tireless efforts of Sona Andrews in producing *Cartographic Perspectives*. Most importantly I am grateful for the support of the membership. I look forward to a great year and hope to see you all in Washington D.C. next October.

Jeffrey C. Patton
NACIS President

about the cover



A 75 dpi gray-scale TIFF scan of part of the USGS Ennis, Montana 1:62,500 quadrangle map was imported into Adobe Photoshop on the Macintosh. The scan was resized and then stylized using Photoshop's High Pass and Solarize filters. The logo was created in Aldus FreeHand, scanned and imported into a separate Photoshop file where Aldus Gallery Effect's Emboss Filter was applied. The portion of the background map image where the logo is placed was sampled using Photoshop's Rubber Stamp tool. The embossed logo was placed onto the map image, selected (10 pixel border/5 pixel feather) and filled with 60% grey to create the raised outline. The center portion of the logo was filled with the sampled portion of the background. The composite image was then retouched and resampled to 266 dpi.

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featured articles

On October 15, 1992, the horizontal geodetic reference system used for all aeronautical charts and chart-related products published by National Oceanic and Atmospheric Administration (NOAA)/National Ocean Service (NOS) changed from the North American Datum of 1927 (NAD 27) to the North American Datum of 1983 (NAD 83). The Global Positioning System (GPS) now allows satellites to define much more accurately geographic locations in terms of latitude and longitude, utilizing an earth centered reference system; the NAD 83 is based on this new technology. As a result, the latitude and longitude of almost all points in the National Airspace System (NAS) were revised. The greatest coordinate shifts were in Hawaii and Alaska where latitude moved by as much as 1200 feet and longitude by up to 950 feet. In the conterminous U.S., the largest changes were approximately 165 feet in latitude and 345 feet in longitude. The impact to aeronautical navigation in the U.S. of the datum shift from NAD 27 to NAD 83 was not limited to aeronautical charts and related publications. All Flight Management Systems (FMSs) and Air Traffic Control Systems (ATCs) had to be modified to accept and utilize the NAD 83 coordinates. The impact of the implementation of NAD 83 on aeronautical navigation in the United States was significant.

The Impact of the Implementation of The North American Datum of 1983 (NAD 83) on Aeronautical Navigation in the United States*

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On October 15, 1992, the horizontal geodetic reference system used for all aeronautical charts and chart related products published by National Oceanic and Atmospheric Administration (NOAA)/National Ocean Service (NOS) changed from the North American Datum of 1927 (NAD 27) to the North American Datum of 1983 (NAD 83). This change was mandated by the Congress of the United States. The latitude and longitude of almost all points in the National Airspace System (NAS) were revised (see Figure 1). The greatest coordinate shifts were in Hawaii and Alaska where latitude moved by as much as 1200 feet and longitude by up

INTRODUCTION

Differences Between NAD 83 and NAD 27

	CONTERMINOUS UNITED STATES				ALASKA				HAWAII				PUERTO RICO & VIRGIN ISLANDS			
	Range		Std. Dev.	Std. Dev.	Range		Std. Dev.	Std. Dev.	Range		Std. Dev.	Std. Dev.	Range		Std. Dev.	Std. Dev.
	Min.	Max.			Avg.	Min.			Max.	Avg.			Min.	Max.		
Latitude	-0.814	1.658	0.317	0.509	-6.014	0.595	-2.600	1.489	-20.251	3.523	-11.617	2.899	-7.279	-6.990	-7.128	0.079
Longitude <small>(arc seconds)</small>	-3.733	5.149	0.873	1.977	5.368	12.700	9.033	1.775	-10.261	-9.725	-9.993	0.114	-1.547	-1.305	-1.417	0.066
Latitude	-25.152	51.023	9.746	15.691	-185.828	18.432	-80.473	46.043	-622.975	-108.310	-357.282	89.223	-223.801	-214.887	-219.158	2.428
Longitude <small>(meters)</small>	-106.632	105.417	20.690	48.372	77.597	206.190	126.416	23.871	-294.455	-284.085	-289.432	2.622	-45.477	-38.181	-41.694	1.951

Figure 1: Latitude and longitude shifts as a result of the change to NAD 83 from NAD 27.

* Mention of a commercial company or product does not constitute an endorsement by the National Oceanic and Atmospheric Administration. Use for publicity or advertising purposes of information from this publication concerning proprietary products or the tests of such products is not authorized.

to 950 feet. In the conterminous United States, the largest changes were approximately 165 feet in latitude and 345 feet in longitude (See Figure 2 & Figure 3).

BACKGROUND

Why is NAD 83 going to be the official datum? What were the problems with NAD 27? What makes this new datum, NAD 83, preferable to use? These are good questions that were often asked because NAD 27 had been utilized for many years.

There are some fundamental reasons why the geodetic reference system for the United States required reconsideration. Increased accuracy requirements by the surveying community, the introduction of

improved and highly accurate electronic measuring systems, and the advent of satellite systems such as Doppler and the Global Positioning System (GPS) were all factors which contributed to the identification of weakness in NAD 27. Discrepancies between existing control systems and newly executed surveys utilizing improved technology dictated the establishment of an entirely new datum rather than a revision or repair of NAD 27. The NAD 27 control network was never completely adjusted and, as it grew, unpredictable errors and distortions were created (Schwarz et al. 1989). In summary, the use of NAD 27 became unacceptable (Dewhurst 1990) because of 1) an outmoded and obsolete mathematical representation of the Earth, i.e. the a and b axis were in error, 2) inconsistencies arising from partial adjustments of data on a regional basis, 3) limitations due to outdated survey instrumentation (Vogel 1986), and 4) use of a surface reference point in Kansas, Meades Ranch (MR), for the lower 48 states, Canada, and Alaska in the development of NAD 27 led to small errors in the vicinity of Meades Ranch but very large errors at greater distances away from the MR station. These factors led to inconsistencies that needed to be removed in order to provide an accurate and consistent datum reference system from coast to coast and between the nations within the North American Continent.

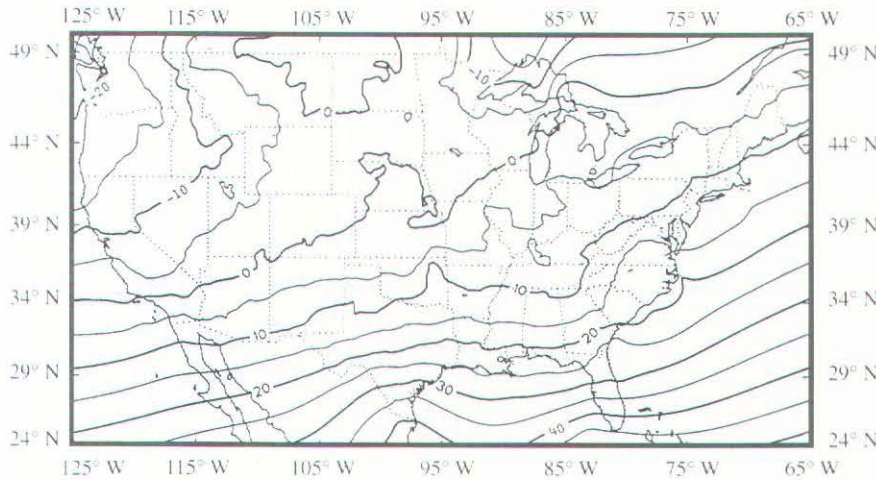


Figure 2: Latitude datum shift in the conterminous United States in meters (NAD 83 minus NAD 27) (from: Schwarz 1989).

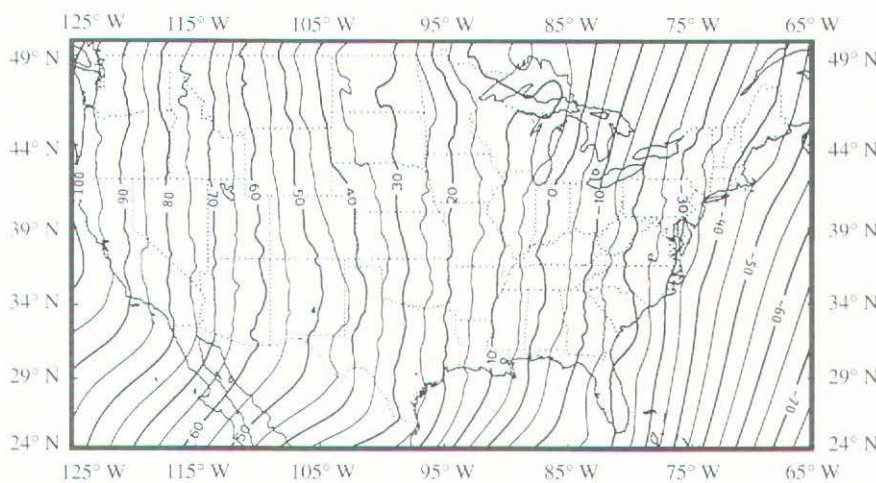


Figure 3: Longitude datum shift in the conterminous United States in meters (NAD 83 minus NAD 27) (from: Schwarz 1989).

NAD 83 was a significant improvement over NAD 27 (Wade 1985) for several reasons. The Geodetic Reference System of 1980 (GRS 80) was accepted as the reference system for NAD 83 and the ellipsoid of GRS 80 was adopted for use in defining NAD 83 (see Figure 4). Various observations using Doppler satellite systems had shown that this ellipsoid better defined the correct reference ellipsoid than did the Clarke Spheroid of 1866 which NAD 27 utilized. The GRS 80 earth model was recommended by the International Association of Geodesy (IAG) and accepted by the National Geodetic Survey (NGS) of the United States (Schwarz et al. 1989). Because NAD 83 utilizes a geocentric origin, it is compatible with satellite systems such as the Global Positioning System (Burgess 1991) and the military World Geodetic System (WGS 84).

NAD 83 does away with the problems caused by geodetic observations made by outdated survey instrumentation. Astronomic observations at more than 5,000 stations, Doppler positions at over 600 stations, and 100 Very Long Line Interferometry Baseline measurements¹ using advanced technology led to very high level accuracies in the NAD 27 to NAD 83 adjustments. Doppler tests show NAD 83 to be in agreement with Doppler observations; North-South residuals have an RMS value of .591 meters and East-West residual components have an RMS value of .744 meters (Schwarz et al. 1989).

Furthermore, the inconsistencies caused by partial adjustments on a regional basis were eliminated by utilizing a Helmert blocking strategy to adjust the whole NAD 83 geodetic network as a single system rather than a series of regional network solutions having no interconnection or interrelation. Thus, NAD 83 is a vast improvement over NAD 27 in terms of accuracy and compatibility with modern satellite technology for navigation (Skorupa 1990) and geodetic position determination.

The implementation impact of NAD 83 for aeronautical navigation was greater than expected due to the users it affects. Users of geodetic data can be grouped into three categories: primary users— geodesists and land surveyors who utilize and develop coordinate information directly; secondary users— those who employ the data produced by primary users in some manner such as mapping, charting and digital representations of the earth's surface; and tertiary users— those who use the work of secondary users in order to gain knowledge and insights. A pilot or navigator would be an example of a tertiary user. Typically, knowledge of surveying and geodetic datums decreases with each category of user. In fact, a tertiary user may have absolutely no concept of geodesy. However, it is critical for such a tertiary user, i.e. a pilot-navigator, to recognize a datum

DATUM IMPROVEMENTS

GEODETIC REFERENCE SYSTEM OF 1980 (GRS 80)

- Geocentric (Center of geoid Mass)
- Ellipsoid Parameters (GRS 80)

$a = 6,378,137$ meters (exactly)

$b = 6,356,752.3141$ meters

$1/f = 298.257222101$ (12 digits)

Note: Once NAD-83 is implemented, all software routines using the NAD-27 reference spheroid, Clarke Ellipsoid of 1866 (where $a = 6,378,206.4$ meters and $b = 6,356,538.8$ meters) will have to be altered to use GRS 80 parameters.

Figure 4: Characteristics of GRS 80.

IMPLEMENTATION IMPACT OF NAD 83 IN UNITED STATES AIRSPACE

¹ A major goal of the Very Long Line Interferometry Baseline measurements is to reduce the uncertainty in intercontinental baselines to the centimeter level. The measurements are based on vector separations between the antennas of two widely separated radio telescopes to produce an "interference" pattern.

inconsistency and be able to obtain and use coordinates in either datum with confidence and little problem. The tertiary users of coordinate data far outnumber primary and secondary users. Since the NAS of the United States is utilized, controlled, and described by such tertiary users of geodetic data—pilots, air traffic controllers, navigators, and aeronautical data specialists, the implementation of NAD 83 in the NAS has had a great impact and required careful planning.

In order to plan and implement the conversion from NAD 27 to NAD 83 in the National Airspace System, a committee was formed. The NOS, "The Nation's Aeronautical Chartmaker," the FAA and the National Geodetic Survey (NGS) had representatives on the committee. After a review of the conversion problem, the committee, chaired by Ronald M. Bolton (NOS), identified the following impacts (Bolton and Hoover 1986) to the regulators, FAA, and users of the NAS:

- Charts and Publications— all hard copy (both charts and publications) had to be revised in all areas that list or depict latitude and longitude.
- Digital Data— all digital data files with latitude and longitude fields had to be converted to NAD 83. This included air traffic control files, Flight Management Systems (airborne/ground based), and charting databases.
- Hard copy files— all documents containing latitude and longitude entries had to be marked to indicate that they were referenced to NAD 27 or NAD 83 (FAA and NOS identified over 1,000,000 such files or documents that must be properly labeled).
- Chart Graticule Shifts— most chart graticules were not affected because of the slight position change (usually less than .005 inches). However, 150 of 300 airport diagrams had their graticules shifted due to their large scales.

COORDINATE CONVERSION

To accomplish the coordinate conversion, a program, North American Data CONversion (NADCON), was developed by Warren Dewhurst of the NGS. The author recognized that a majority of users of coordinate data would not be geodesists and, therefore, developed a user friendly system that was very accurate (.15 to .5 meters) (Dewhurst 1990). The NGS and FAA distributed NADCON to all FAA activities and NAS users upon request. The conversion committee helped expedite the distribution and utilization of NADCON.

ANNOUNCEMENTS OF IMPLEMENTATION OF NAD 83 IN UNITED STATES NATIONAL AIRSPACE SYSTEM

The October 15, 1992 implementation of NAD 83 in the NAS was announced in several ways so as to reach the maximum number of interested parties.

- The Federal Register carried a notice.
- The Aircraft Owners and Pilots Association's Magazine carried a notice.
- FAA sent flyers to all regions and centers that announced the change, solicited questions, and requested recipients to return their "NADCON" software requirements to FAA HQ.
- NOAA/National Ocean Service sent out a notice to all chart sales agents and all subscribers to aeronautical charts and publications.

The NAD 83 implementation work of the FAA and the NOAA/NOS Aeronautical Chart Branch (ACB) began in the summer of 1991 and continued until October 15, 1992. The FAA and NOS Aeronautical Chart Branch published revised coordinates for every coordinate position used in the NAS. This effort involved the processing of billions of characters in the NOS/ACB and FAA data bases. Datum notes have been added to all paper files, charts and chart related products; this effort required the review of millions of computer and paper file records.

The conversion from NAD 27 to NAD 83 went smoothly considering the scope and complexity of the task. All FAA facilities were ready for the change over. All revisions to charts, chart related products, and aeronautical publications produced to support safe flight in the NAS were completed.

The NAD 83 implementation in the NAS allowed navigators and pilots to use the capabilities of the Global Positioning System (Wilkins 1992) and Loran-C² to their full potential. Puerto Rico, Hawaii, & Alaska were properly tied geodetically to the "Lower 48" (Conterminous U.S.) and Canada. The use of NAD 83 as the NAS reference datum also allowed international air carriers to use WGS 84 as they entered the US NAS without changing datum references systems, for the expected difference between the datums is small—less than a meter.

The long term impact of the conversion from NAD 27 to NAD 83 will be very beneficial because 1) NAD 83 will allow GPS satellites to be properly utilized for navigation in the U.S. NAS, 2) The conterminous U.S. will be geodetically tied correctly to Alaska, Hawaii, Puerto Rico and Canada, 3) Points in the conterminous U.S. will be defined more accurately and consistently, and 4) The U.S. NAS reference datum, NAD 83, will be consistent and compatible with the WGS 84.

In summary, the implementation of NAD 83 in the NAS improved aeronautical navigation in the United States. The massive datum conversion effort which was directed by FAA and NOAA will have a significant long-term beneficial impact on the aviation community.

² Loran C (LONG RANGE Navigation) is a system composed of ground-based transmitters called "chains" and airborne (or waterborne) receivers that derive the exact position, distance and bearing to a destination and the ground speed.

NAD 83 IMPLEMENTATION TASKS

BENEFITS FROM THE IMPLEMENTATION OF NAD 83

CONCLUSION

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RESUMEN

El 15 de octubre de 1992 el sistema horizontal de referencia geodética, usado para todos los diagramas aeronáuticos y publicado por la Administración Nacional Oceánica y Atmosférica (NOAA) y por el Servicio Nacional de Oceanos (NOS) fueron cambiados del Datum norteamericano de 1927 (NAD 27) al Datum norteamericano de 1983 (NAD 83). El Sistema de Posición Global (GPS) permite que los satélites definan las posiciones geográficas de manera más precisa, en términos de latitud y longitud, utilizando un sistema de referencia centralizado. El NAD 83 está basado en esta nueva tecnología. Como resultado, casi todas las latitudes y longitudes en el Sistema Nacional Aeroespacial (NAS) fueron revisadas. Los mayores cambios de coordenadas se produjeron en Hawai y Alaska donde la latitud se movió 1.200 pies y la longitud hasta 950 pies. En el resto de los Estados Unidos los cambios mayores fueron de aproximadamente 165 pies en latitud y 345 pies en longitud. El impacto para la navegación aeronáutica en los Estados Unidos del cambio de NAD 27 a NAD 83 no fue limitado a diagramas aeronáuticos. Todos los sistemas de vuelo (FMSs) y Sistemas de Control de Tráfico Aéreo (ATCs) tienen que ser modificados para aceptar y utilizar las coordenadas NAD 83. La implementación del NAD 83 en la navegación aeronáutica en los Estados Unidos es de mayor significancia.

Maritime Boundaries on National Ocean Service Nautical Charts

The National Ocean Service (NOS) is responsible for charting the Nation's coastal waters and, therefore, is the lead Agency for the portrayal of maritime limits of the United States of America. The 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone states "...the normal baseline for measuring the breadth of the territorial sea is the low waterline along the coast as marked on large-scale charts officially recognized by the coastal state." In 1976, NOS was requested to show various maritime limits on its regular issue of nautical charts. The paper presents the history of maritime boundaries on National Ocean Service (NOS) charts, methods used in constructing the various maritime limits, the definition of the limits, the push for lateral seaward boundaries, and the technical aspects of maritime limits.

Charles E. Harrington

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In the past two decades, there has been an increasing interest in coastal zone management, offshore oil and gas exploration, fisheries and maritime environmental conservation, and development of natural resources. These elements have placed pressure on Federal and State Governments to define their maritime limits. Many coastal states have not defined their maritime limits with their adjacent state or states. As of 1980, 10 out of 18 maritime coastal state boundaries, or portions thereof, remained unresolved. On the Federal level, "The United States may have to negotiate nearly 30 maritime boundaries that will account for approximately 10 percent of the total maritime boundaries of the world" (Smith 1981:397). As a result of the increased interest in the offshore areas of the United States, The National Ocean Service (NOS) has had to take a leading role in portraying maritime limits on its nautical charts.

INTRODUCTION

NOS began showing maritime limits on nautical charts in 1976. At the request of the Ad Hoc Committee on the Delimitation of the United States Coastline (commonly referred to as the Baseline Committee [BC]¹ and the U.S. Coast Guard, NOS began mapping the territorial sea and contiguous zone limits of "3-nautical miles" and "12-nautical miles" on its charts. The Territorial Sea is a band of sea adjacent to a state's coast, beyond its land territory and its internal waters, on which it has complete sovereignty. This sovereignty also extends to the air space over the territorial sea as well as to its bed and subsoil. This sovereignty is exercised subject to the provisions of the Conventions of the Law of the Sea adopted by the United Nation's Conference at Geneva, 1958, and to other rules of international law. The limit of the territorial sea for the United States is now 12 nautical miles. The Contiguous Zone is a zone of the high seas contiguous

HISTORY

¹ The BC was established in 1970 as a spin-off from the Law of the Sea Task Force to review questions relating to boundary demarcation of the United States, and to identify the baseline from which the offshore boundaries of the United States can be delineated. The BC consists of representatives from the DOC, Department of Interior, Department of Justice, Department of State (DOS), and the Department of Transportation. The BC meets on an as-needed basis. Since its inception, the BC has met an average of 6 times a year.

to the territorial sea of a state. The coastal state may exercise control to: 1) prevent infringement of its customs, fiscal, immigration, or sanitary regulations within its territory or territorial sea; and/or 2) punish infringement of the above regulations committed within its territory or territorial

sea. The contiguous zone limit is 12-nautical miles from the baseline from which the breadth of the territorial sea is measured.

From 1970 to 1976, NOS was portraying the 3- and 12-nautical mile limits on black-and-white 50 percent reductions of its nautical charts (see Figure 1). The changeover to portray the limits on the regular issue charts was not immediate. The limits were added to nautical charts as they came up

for printing on their normal printing schedules. The printing schedules varied from 6 months for charts covering the busier and ever-changing harbors to 12 years for those charts on the North Slope of Alaska. After nearly 16 years, all the 50 percent reductions have been phased out.

The 200-nautical mile limit began appearing on NOS nautical charts around 1977 after the enactment of the Fishery Conservation and Management Act (FCMA) of 1976, which took effect March 1, 1977. The limit was originally labeled on the charts as the Fishery Conservation Zone (FCZ). Shortly after President Reagan signed the Exclusive Economic

Zone Proclamation of March 10, 1983, the 200-nautical mile limit label was changed to the Fishery Conservation Zone-Exclusive Economic Zone (EEZ). The EEZ is a zone of the high seas contiguous to the high seas over which a coastal state may assert certain sovereign rights over natural resources. This limit is 200 nautical miles from the baseline from which the breadth of the territorial sea is measured (see Figure 2).

The change in labeling was done at the request of the National Marine Fisheries Service (NMFS) because so many of the current regulations were written under the title of the FCMA. Since then, the

regulations have been revised and the FCZ label is being removed, with just the EEZ label being shown.

In 1982, NMFS requested NOS to depict a 3-marine league Natural Resources Limit (see Figure 3) for domestic fishery enforcement purposes on its nautical charts. The Natural Resources Limit is an area extending seaward from the U.S. coastline in which Puerto Rico, Texas, and Florida (Gulf of Mexico side only) are entitled to all lands, minerals, and other natural resources. The limit of this area is 3-marine leagues (9-nautical miles) from the baseline from which the breadth of the territorial sea is measured. The request was passed down to NOS, and was brought before the BC for discussion. Although the issue is completely under the



Figure 1: 3- and 12-nautical mile limits on a black-and-white 50 percent reduction nautical chart. (Lines have been widened and darkened for illustration purposes.)

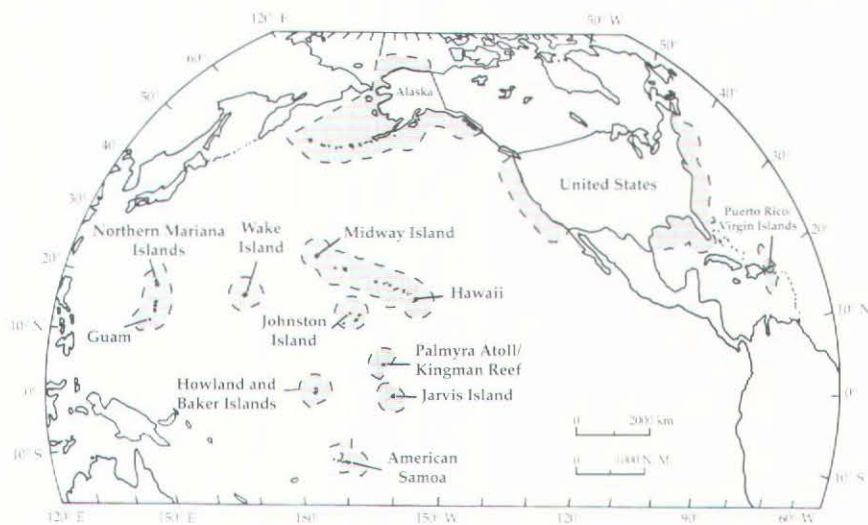


Figure 2: Fishery Conservation Zone-Exclusive Economic Zone (EEZ) 200-nautical mile limit.

jurisdiction of NOS, the BC does take an interest in all maritime limits depicted on U.S. charts.

The 3- and 12-nautical mile limits were originally placed on NOS charts by The Geographer's Office, DOS, in the late 1960's. The arcs were penciled in manually by The Geographer and presented to the BC for approval. They were then forwarded to NOS where the lines were transferred in ink to another copy of the chart. Both copies were returned to The Geographer and the BC for final approval. The penciled copies were retained by The Geographer, and the inked versions were returned to NOS. NOS was responsible for printing and distributing the 50 percent black-and-white reductions. At this stage, a caution note was added stating that the chart was not to be used for navigation, along with an explanation regarding the preparation and function of the territorial sea and contiguous zone limits (see Figure 4). This process involved 160 of the 975 nautical charts issued by NOS. The limits are shown on only one chart scale covering an area. On the East and Gulf coasts, the limits are shown on a continuous series of charts at 1:80,000 scale. For the West coast, Alaska, Hawaii, and U.S. territories and possessions, the chart coverage varies from 1:50,000 to 1:1,023,188 scale.

The 200-nautical mile limit was compiled mathematically utilizing NOS computer equipment. Geodetic software was modified to allow the NOS geographer to compute geodetic points (at a specified interval, e.g., 30 minutes of one degree of an arc) on an arc 200 nautical miles from a salient baseline point. At various chart scales, connecting these points provided a smooth arc with a radius of 200 nautical miles. Required input for each arc included a baseline point geographic coordinate, a beginning and ending azimuth, a specified interval for points along the arc, and the distance from the baseline point. The output for the computation of each arc was a punch card with latitude and longitude, azimuth, and an identification designator. The cards and magnetic tape were submitted to the NOS computer facility with a program to convert the points into a plotter format for each nautical chart. The lateral boundaries between the United States and adjacent nations were provided by DOS as published in the Federal Register. A total of 56 NOS nautical charts portray portions of the EEZ limit.

METHODS

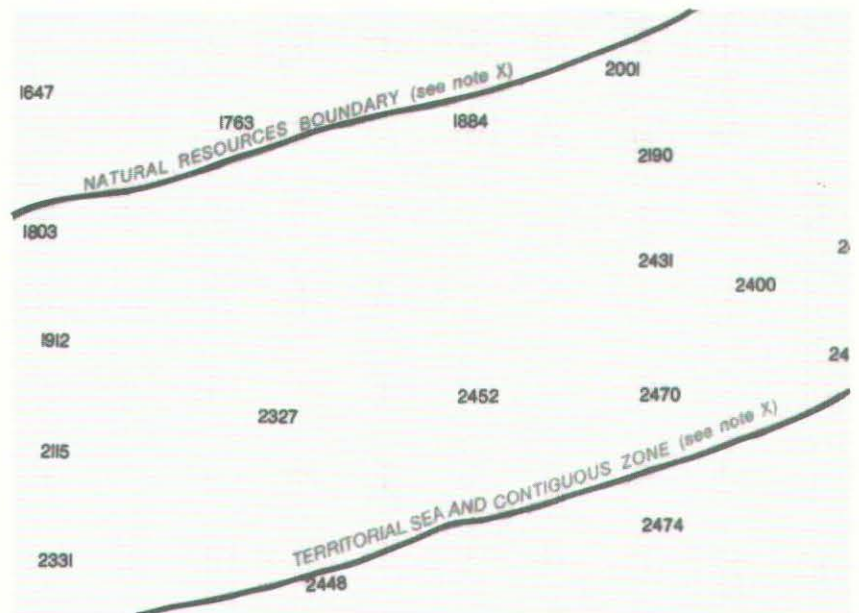


Figure 3: Natural Resources Boundary and Territorial Sea and Contiguous Zone depicted on a nautical chart. (Lines have been widened and darkened for illustration purposes.)

CAUTION

THIS DOCUMENT IS NOT FOR USE IN NAVIGATION

The lines drawn on this document delimit provisionally the territorial sea, contiguous zone, and certain internal waters of the United States. They have been prepared by an interdepartmental committee and represents its interpretation of relevant legal principles as applied to the geographical information shown on a Coast and Geodetic Survey nautical chart which has been used as a base. These lines are subject to revision whenever it is required by amplification or correction of the information shown on the chart by reinterpretation of the legal principles involved. This document does not attempt to delineate international boundaries and is not to be understood as asserting or implying where they are located.

Figure 4: Caution note appearing on black-and-white 50 percent reduction nautical charts.

Under the Submerged Lands Act (67 Stat. 29), the natural resources limit was granted to Florida (Gulf of Mexico coast only-420 U.S. 531), Texas (394 U.S. 836), and Puerto Rico (Public Law 96-205, 1980). These limits are placed on the charts manually in the same manner and follow the same approval procedures as the territorial sea and contiguous zone limits. A total of 29 nautical charts covering these 3 areas show the 3-league limit (Puerto Rico 4, Texas 9, and Florida 16).

CURRENT PROCEDURES

The 1958 Geneva Convention on the Territorial Sea and Contiguous Zone states "...the normal baseline for measuring the breadth of the territorial sea is the low water line along the coast as marked on large-scale charts officially recognized by the coastal State." The purpose here is not to expound on the methods used to develop the low water line, but to point out that it is a line in constant change and, therefore, the 3- and 12-nautical mile limits must be changed accordingly.

The process of change begins at the chart compilation level. The cartographers apply various sources to the chart drawing.² These sources may include NOS hydrographic surveys, shoreline manuscripts (which are compiled from tide-coordinated aerial photographs), U.S. Army Corps of Engineers channel surveys, and other Federal, State, or private sources. After the cartographer corrects the low water line or the shoreline from which the 3- and 12-nautical mile limits are constructed, a copy of the drawing is made and sent to the NOS geographer. The geographer, in turn, manually constructs 3- and 12-nautical mile arcs or bay closing lines using the corrected low water line. The corrected drawing and a paper copy of a current edition of the nautical chart are sent to DOS where the Special Assistant for Ocean Affairs and Policy Planning reviews the work. The Special Assistant then writes a memorandum describing the changes and submits it to the Chairman of the BC. The Chairman notifies the BC members about charts that need to be reviewed, along with any other related issues that need to be discussed.

TECHNICAL ASPECTS

The 3-, 9-, and 12-nautical mile limits are placed on the nautical charts manually. Previous discussion described the procedures used to establish the limits on NOS nautical charts. Because the low water line is constantly changing, the maritime limits will also change.

As a chart nears the reprinting cycle, it is examined for changes in the low water line or any shoreline change that may cause the limits to move. A copy is sent to the NOS geographer's office for examination, where corrections are manually penciled on the updated chart drawing. Because the charts are legal documents, the accuracy of the limits is an essential factor. In September 1983, the BC decided as a "rule of thumb" that a new edition would be issued if the change was at least one-half the width of the line on the chart. The line weight on the chart is .5 millimeter (.020 inches). At a scale of 1:80,000, the width of the line is equal to 40 meters on the surface. If the line moves as little as 20 meters, a new line is constructed. No consideration was given to the various chart scales used. For example, at 1:500,000 scale, the line weight would equal 250 meters at half a line weight which measures only .25 millimeter on the chart. The majority of charts portraying the 3-, 9-, and 12- nautical mile limits are at scales ranging from 1:80,000 to 1:200,000.

Within NOS, discussions have been held regarding the placement of 3-, 9-, and 12-nautical mile maritime limits in the automated database for

²The chart drawing is a mylar copy of the chart on which the cartographers apply corrections. The drawing is sent to the Reproduction Section for negative engraving.

nautical charts. The method for accomplishing this has not been resolved. Basically, two methods have been considered: digitizing the lines off the chart drawings and incorporating software into the system to compute the limits from salient points on the low water line. Many questions remain to be answered before going too far: 1) How will the limits be maintained? 2) How will the bay closing lines be drawn? 3) Who will maintain the limits? 4) Can the BC be assured of the accuracy of the limits? and 5) Can NOS continue to adhere to the principles and policies used by the BC? The BC has already accepted use of the computer in the determination and application of the 200-nautical mile limit. This should open the door for NOS to incorporate the remaining maritime limits in digital form and instill some confidence in the BC that it may be an acceptable process.

"As a consequence of 200-nautical mile maritime claims, every coastal country in the world will eventually have to negotiate at least one maritime boundary with at least one neighboring country" (Smith 1981). Thirty maritime boundaries may have to be negotiated by the United States; ten off one or more of the 50 states, and 20 located off the coast of the American territories. "Nine of the 10 boundaries off the fifty states will involve five different foreign neighbors; Canada, Cuba, Mexico, the former Soviet Union, and The Bahamas. At the beginning of 1981, the United States had reached agreements or understandings for some kind of maritime boundary with Canada, Cuba, Mexico, and former Soviet Union. No boundary talks were held with The Bahamas" (Smith 1981). NOS has provided consultation, computation, and charts to DOS in most, if not all, of these agreements. In the Gulf of Maine case involving Canada, NOS detailed one of its cartographers to DOS for approximately 6 months. The cartographer also went to Europe with a team of U.S. attorneys handling the case before the International Court of Justice.

There have been numerous cases involving Federal vs. States' rights in the past decade. In Kotzebue Sound, Alaska, a low-water feature affected a 24-nautical mile bay closing line. As a result, the Territorial Sea Boundary was changed (see Figure 5). Examples of other cases involve: 1) Massachusetts, regarding the closing lines of Nantucket Sound; 2) Alaska, regarding the closing lines and islands of the North Slope; 3) Mississippi, Alabama and Louisiana, regarding the closing lines of the Mississippi Sound; and 4) low water features off the coast of South Carolina that put a sunken wreck either just inside or just outside the 3-nautical mile limit. Several coastal states are in negotiations over their lateral seaward boundaries. Some, such as Maine-New Hampshire and Georgia-Florida, have recently settled on positions for their lateral seaward boundaries. Others, such as California-Oregon and New York-Rhode Island, have been settled

LATERAL SEAWARD BOUNDARIES

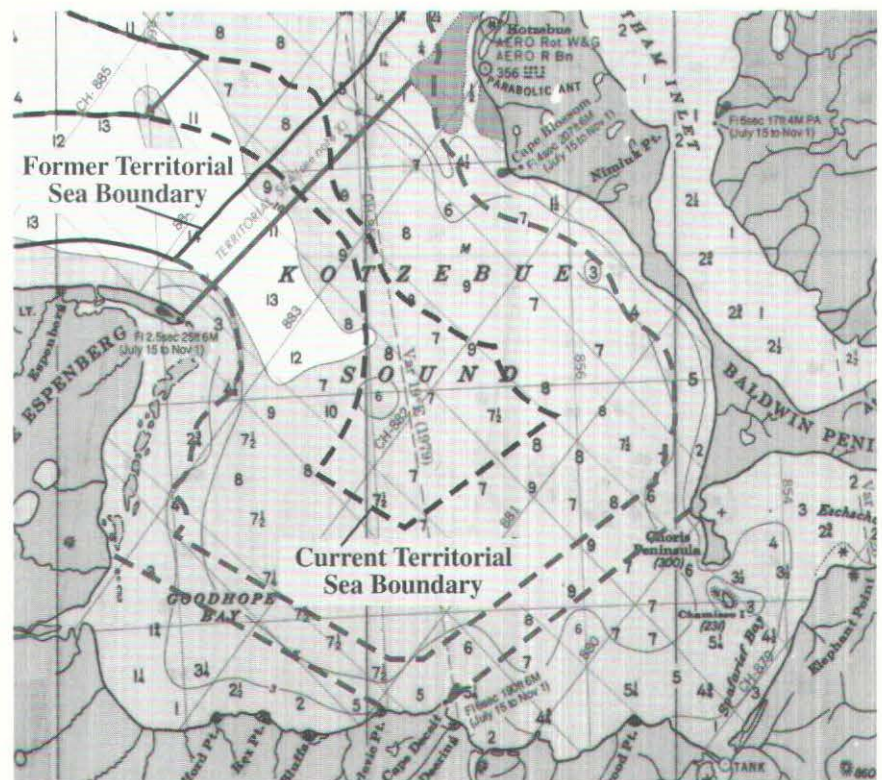


Figure 5: The former (black solid line) and current (black dashed line) Territorial Sea Boundaries are both drawn on this figure to illustrate the effect of the limit change. The former bay closing line and 12 mile limit (gray solid lines) and current bay closing line and 24 mile limit (gray dashed lines) are also shown. (Lines have been widened and darkened for illustration purposes.)

for a number of years. Georgia and South Carolina are settling on the boundary in the Savannah River with assistance from the NOS.

Generally, NOS does not show the lateral boundaries between the states on its nautical charts. The states of Maine and New Hampshire did

request the addition of the adjudicated limit from Portsmouth Harbor to the Isle of Shoals. NOS complied, and the limits are shown on three nautical charts (see Figure 6). In the opinion of the NOS geographer, this type of boundary is not a major problem to show on the charts. However, there may not be a major push to show them. In almost 180 years, there have been only two other cases where NOS was asked to show a maritime boundary between two states. The states of Maryland and Virginia had some differences of opinion in the Chesapeake Bay over oyster beds, and California and Nevada had

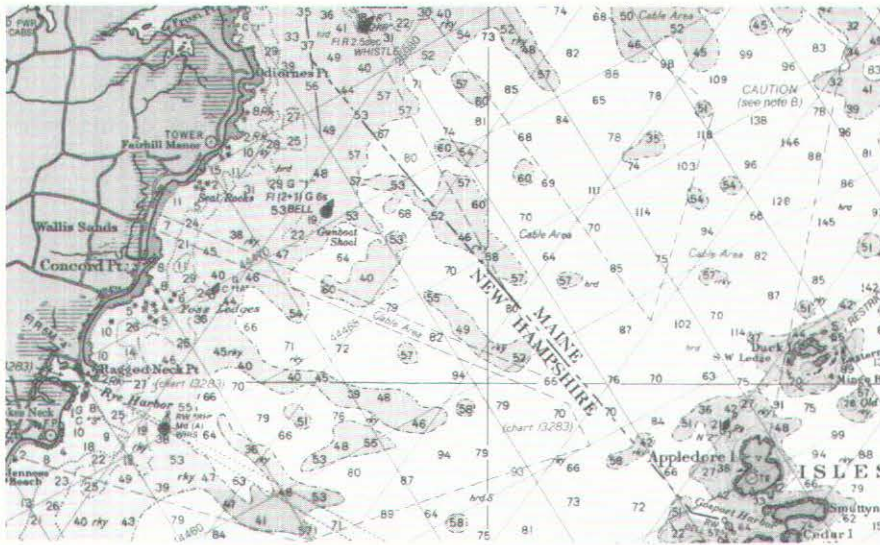


Figure 6: One of the nautical charts that includes the adjudicated boundary between two states (Maine and New Hampshire).

some difficulty as to where the state boundary in Lake Tahoe was located. NOS now shows both boundaries on the charts covering those two areas.

During the period of 1908 to 1930 our nautical charts portrayed the "A-B" line in the Dixon Entrance (a body of water separating the United States and Canada on the west coast of North America). The Canadians claim that the tribunal decision in the 1903 Arbitral Award gave them a maritime limit, whereas the United States contends the "A-B" line represents a hypothetical line defining the territories, not the maritime areas. The placement of the "A-B" line would prevent the U.S. islands of Dall, Prince of Wales, and other territory north of the line from enjoying a territorial sea or contiguous zone south of the "A-B" line. In 1929 the Department of State requested our agency to remove the line from the nautical charts. Canadian charts still show the "A-B" line, and U.S. charts show an equidistant line in Dixon Entrance which leaves another boundary to be resolved.

In 1990, NOS assisted the Department of State in developing the United States-USSR maritime boundary in the Bering Sea. That new boundary now appears on NOS nautical and aeronautical charts.

CONCLUSIONS

Fifteen years ago, NOS charts rarely depicted a maritime boundary of any type. With today's ever-expanding culture, the Federal Government, coastal states, ocean research groups, and private and public organizations want to know more precisely the limits of areas of potential economic value. The development of more sophisticated surveying and positioning equipment, along with increased controls on national resources and the environment, have brought on the need to know the boundary of an area being regulated, as well as who has jurisdiction over the area. NOS has the mandate to produce and maintain accurate, up-to-date, oceanographic products, continue collecting data, continue building digital databases, and to do whatever it can to serve those involved in the oceanographic and coastal environments.

At the time this paper was written there were at least two pieces of legislation in our Congress to give the states more jurisdiction as well as

addition revenue. One was a follow-up to the Presidential Proclamation giving the United States a 12-nautical mile territorial sea and, in turn, to extend the states jurisdiction to 12-nautical miles as well. The other was the Ocean and Coastal Resources Enhancement Act, which would establish two funds: (1) an ocean and coastal resources enhancement fund and (2) a coastal zone impact assistance fund. Both would be administered by the Secretary of Commerce. Basically, this legislation would give the coastal state and the local communities a portion of any revenue generated within 200-nautical miles of the U.S. coast. One of the requirements of this bill would be for the states to have an extended seaward lateral boundary out to 200-nautical miles. Many of the states have had difficulty working out a seaward three-nautical mile lateral limit, so one can imagine what problems a 200-nautical mile line might create.

Public Law 96-205, Title VI, No. 606(a). 94 stat. 91, as amended Mar. 12, 1980.

Smith, Robert W. 1981. *The Maritime Boundaries of the United States*. *Geographical Review*. 71 (Oct):395-410.

Submerged Lands Act, No. 5, 43 USCA No. 1313.3. Submerged Lands Act, No. 2(c), 67 stat. 29, 43 USC No. 1301(c).

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El Servicio Nacional de Oceanos (NOS) es responsable por la diagramación de las aguas costeras nacionales y por lo tanto, es la agencia encargada de marcar los límites marítimos de los Estados Unidos de América. La Convención de 1958 en Ginebra sobre mares territoriales y el estado de las Zonas Contiguas "... la línea normal para medir la distancia de los mares territoriales es la línea baja del agua a través de la costa, así como se marca en los diagrams de gran escala oficialmente reconocidos por el estado costero. En 1976 se requirió que NOS publicara varios límites marítimos en su edición regular de diagramas náuticos. El trabajo presenta la historia de los límites marítimos en los diagramas del Servicio Nacional de Oceanos (NOS), métodos usados en la construcción de varios límites marítimos, la definición de los límites, límites laterales con relación al mar, y los aspectos técnicos de los límites marítimos.

RESUMEN

cartography bulletin board

POSTSCRIPT MICRO-COMPUTER CARTOGRAPHY: Trends and Possibilities

by Brad Javenkoski
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Regional Planning Commission

Postscript microcomputer cartography is a topic which has been presented on numerous occasions in this journal. The following provides the results of a survey of cartographic laboratories regarding their knowledge, use and perceptions of Postscript microcomputer (hereafter referred to as "desktop") cartographic tools. The survey was initiated in September of 1991 as an integral part of a Master's thesis dealing with large format desktop cartography. Although the survey was designed to ascertain as much information as possible about the use of large format desktop techniques, it provided some engaging detail regarding generalized desktop knowledge and use. The survey provided overwhelming evidence that desktop tools are ubiquitously desired and accepted by cartographers as an alternative to conventional cartographic tools.

Survey Structure: The survey was sent to 30 cartographic laboratories associated with universities in North America. Seventy-three percent (73%) of the solicited labs returned the survey. The questions were designed to determine who was producing large format desktop projects and to measure cartographers' familiarity with, perception of, and willingness to work with new tools and to determine why or why not they favored exclusive use of desktop tools.

Survey Results and Analysis: The survey results have been

divided into a number of topic-oriented Tables and Figures. Discussion and analysis comments are presented in conjunction with the Tables. It is important to remember that these results were recorded in September of 1991.

All 21 university cartographers (100%) responding to the survey employed desktop techniques in their respective labs. This figure is significant in that it emphasizes the widespread acceptance of a relatively new cartographic tool and suggests that the new tool provides comparable, if not greater, quality, project control and ease of use (i.e. factors which would influence use).

Eighty one percent (81%) of the cartographic labs are aware of the

large format possibilities with the desktop technology. Although only 14% of the cartographic labs had experimented with large format desktop techniques, 66% of them produce conventional large format maps. This suggests that a need certainly exists for the further definition and development of large format desktop cartographic technique.

Table I provides a survey-wide breakdown of cartographic production. Standard deviation was included in this table to provide the reader with a description of data value distribution. The majority work load of each lab involved the production of publication-size maps (in addition to the table, it is helpful to review

Cartographic Production Methods	Minimum Production	Maximum Production	Mean	Standard Deviation
Total Publication-size Projects	60%	100%	91.8%	10.8%
Desktop Publication-size Projects	2%	100%	51.7%	36.3%
Total Large Format Projects	0%	40%	8.2%	10.8%
Desktop Large Format Projects	0%	100%	10%	26.1%

Table I: Aggregate Workload Percentages

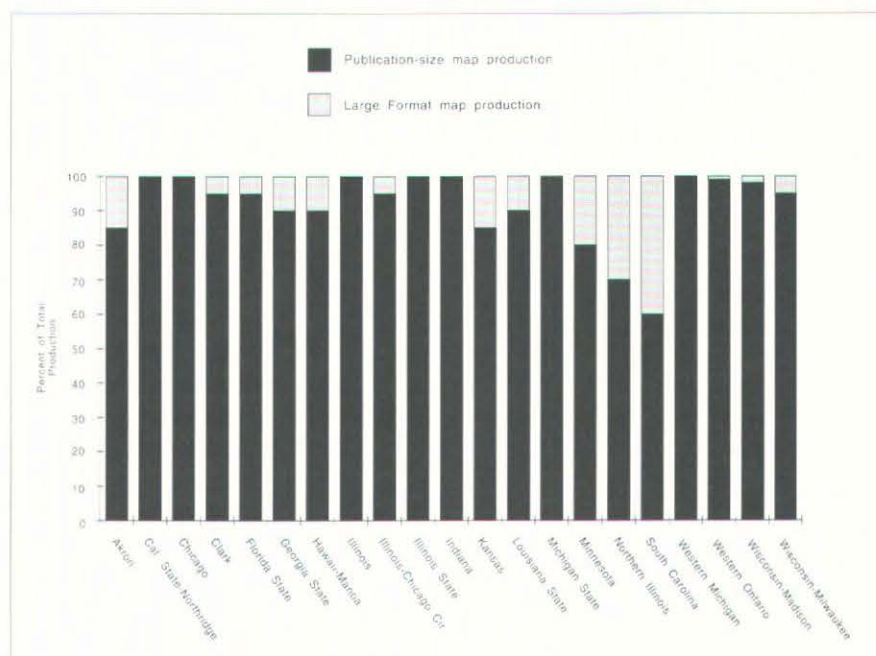


Figure 1: Total map production per lab

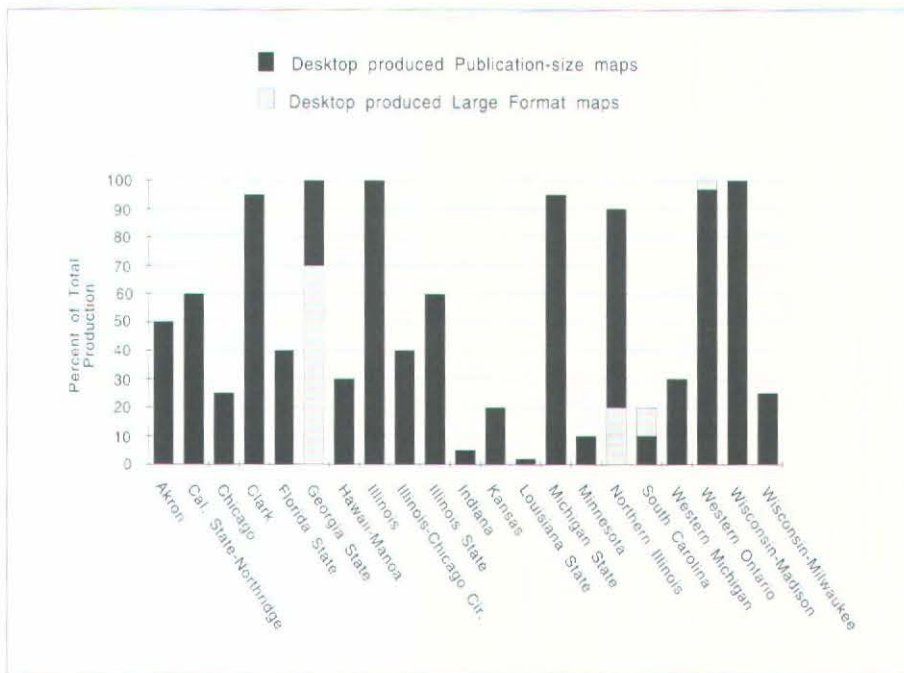


Figure 2: Desktop production per lab

Figures 1 and 2 for specific survey-wide information). The table also defines the publication-size work load further by determining the percentage of the total publication-size work load which is produced using desktop techniques. The minimum/maximum range is much wider (i.e. 2% to 100%) and the mean is quite low with a high standard deviation. It is interesting to note, however, that 29% of the responding labs make exclusive use of the desktop to produce publication-size maps (see Figure 2 for specific percentages by laboratory).

The survey-wide range of total large format project percentages is correspondingly low compared to the total publication-size work load (i.e. 0% to 40%). This mean of 8.24% demonstrates the low survey-wide large format output. Only 10% (survey-wide mean value) of the total large format output is produced using desktop techniques, compared to 51.7% for publication-size maps. This emphasizes the present increased difficulty in processing large format versus publication-size projects with the desktop and substantiates the rationale for solving large

format production problems so that cartographers can more easily apply desktop techniques to any project.

The "mean" and "standard deviation" data values for desktop large format projects are somewhat exaggerated due to the 100% value listed as the "maximum." One cartographic lab from the survey produced their sole large format map with the desktop thereby skewing the "maximum" value.

Table II provides an index of user preferences regarding both the microcomputer platform and the associated Postscript illustra-

tion software. The Macintosh platform is preferred for both publication-size and large format desktop production. Three of the four laboratories experimenting with large format desktop techniques use the Macintosh. This preference may be partially explained by the illustration software of choice: Aldus Freehand (i.e. 38% of users). At the time of this survey, Freehand was unique to the Macintosh platform in offering integrated layering and also offered a large practical work or drawing area and an abundance of tools (Freehand became available on the DOS platform shortly after this survey was conducted). Additionally, the Macintosh platform offered many sophisticated graphics software packages before to the DOS platform, resulting in the Macintosh becoming the early "default" standard for graphics.

The final table of survey data contains perhaps the most important information regarding cartographers' perceptions of desktop and particularly, large format desktop cartographic technique. Table III shows that 67% of those surveyed use an imagesetter to output their cartographic products. This statistic implies that the clear majority of desktop users surveyed are already experienced with the complexities and issues associated with laser imagesetter output. It is also very noteworthy

Categories	Percentages
Microcomputer Platform Used for Desktop Cartography	PC = 24.0% Macintosh = 52.0% Both = 24.0%
Most Used Illustration Software for Desktop Cartography	Corel Draw = 10.0% Micrographics = 19.0% Aldus Freehand = 38.0% Adobe Illustrator = 24.0% Other = 9.0%

Table II: User Preferences

that 10% of the laboratories surveyed have invested in imagesetters. The purchase price and upkeep cost of this equipment is significant; however, ownership shows that labs realize the control this equipment affords them in both quality and production efficiency. Sixty-seven percent (67%) of the labs indicated that they would be purchasing new hardware or software specifically for desktop cartography within the following fiscal year.

Cartographic Laboratories Which:	Percent
Use Laser Imagesetters	67.0%
Own Laser Imagesetter	10.0%
Plan Desktop hardware or software purchases in the next fiscal year	67.0%
Based upon availability, would be willing to produce all cartographic products using the Desktop	48.0%

Table III: User Sophistication

Forty eight percent of those surveyed stated that they would phase-out conventional cartographic production as the development of large format desktop techniques continued. Considering that at the time of this survey only 14% of the labs were experimenting with desktop large format techniques, the figure of 48% is significant. Apparently, many of the cartographic labs are very satisfied with the methods and output of publication-size desktop and want to expand their desktop productivity. Since 66% of the of the labs are presently producing some form of large format cartographic products, the 48% rate may be conservative.

Conclusion: By generalizing the survey results to the entire cartographic community, it is apparent that desktop cartographic technique has gained great accep-

tance and is perceived as a viable, desirable method for producing maps and graphics. Additionally, the cartographic community seems poised for the continued development of large format desktop techniques and continued expansion of the desktop for both large format and publication-size production (i.e. 67% were planning purchases).

Although the results of this survey may not be particularly surprising, they do provide an empirical framework from which to gauge the importance of the desktop in today's cartographic workplace. The desktop provides a cost-effective, quality-oriented cartographic alternative to proprietary systems.

map library bulletin board

ESRI AND ARL LAUNCH GIS LITERACY PROJECT

by James Minton
University of Tennessee

The Environmental Systems Research Institute (ESRI) of Redlands, California and the Association of Research Libraries (ARL) of Washington, DC have joined forces to introduce Geographic Information Systems technology to staff and faculty at major research university libraries across the United States and Canada. After several months of negotiation, ARL and ESRI staff agreed to mutually support a *GIS Literacy Project*. ESRI agreed in January (1992) to provide software, training, and technical support as well as access to the ESRI annual User Conference. ARL agreed to coordinate a multi-phased project to introduce, educate, and equip librarians with skills to provide access to spatially referenced data

and provide effective access to selected federal electronic information resources in depository collections.

In March 1992, ARL mailed a "Request for Participation" to all ARL member libraries. The announcement identified the objectives, resources, equipment requirements, and project schedule. Each of the ARL libraries interested in participating were asked to respond by 1 April 1992. Prue Adler (ARL), Joe Boisse (UC-Santa Barbara), and Paula Kaufman (University of Tennessee) served as the ARL subcommittee overseeing the project. In April 1992, thirty libraries were selected as Phase I participants from approximately fifty six proposals. Each of these libraries were to identify staff who would serve as the local ARL-GIS Project coordinators, support their travel to California for training, and select and acquire the necessary hardware to support the project. The following goals of the project were identified by ARL:

- Introduce GIS to a variety of libraries to address diverse user information needs with an initial focus on access to Census information.
- Develop a team of GIS professionals in the research library community to lend time and expertise to applications, user training, and education programs related to GIS.
- Stimulate and encourage the connections between federal, state, and local GIS users and information.
- Promote research, education, and the public right to know through improved access to government information.
- Initiate library projects to explore new applications of spatially referenced data and evaluate the introduction of these services in research libraries.

ESRI has been a world leader in the development and support of GIS technology for many years. They have developed GIS-based software that can be adapted to a variety of levels of sophistication and application, ranging from personal computers to mainframes. Their users have included university teaching faculty, researchers, and cartographers working in government agencies (including local, state, regional, and national). ESRI produces a wide variety of mapping and GIS products including ARC/INFO, PC ARC/INFO, and ArcView. ESRI also offers a variety of ArcData products. All Phase I, ARL-GIS Literacy Project participants received copies of ArcView software as part of the project. In addition to the software, ESRI has committed itself to providing training, technical support, and fee waiver to its annual Users Conference. Participating ARL libraries sent staff to a two-day training workshop which was conducted by ESRI on June 6-7, 1992 in Palm Springs, California. The training coincided with the ESRI Users Conference and allowed ARL-GIS Literacy Project members a chance to meet and discuss GIS applications with users and ESRI staff. The 2 day ArcView Seminar consisted of an introduction to GIS development history and fundamentals by Duane Marble of Ohio State University followed by an introduction to and hands on experience with the ArcView program. Following the Palm Springs experience, members returned home to begin the long task of identifying and ordering hardware, configuring work space, developing goals and objectives, and the learning of ArcView in earnest. In order to facilitate the project and to allow project members to share their experiences, ARL established a BITNET/INTERNET LISTSERV account. As the project has developed, the

number of messages has increased dramatically. Members have shared their experiences in selecting equipment, technical difficulties in using ArcView, and conducted discussions concerning public service implications and more. On November 9-10, 1992, thirty five libraries identified as ARL-GIS Literacy Project, Phase II Participants attended a two-day training workshop at ESRI headquarters in Redlands, California. This will bring the total ARL-GIS library participants to 66.

After library staff at these institutions have acquired the necessary hardware and have become fully trained in using ArcView, university faculty, researchers, and students will be

able to access a variety of spatially referenced data. The ARL-GIS Literacy Project should allow university librarians to forge new relationships with their faculty and students. As this new technology is applied in a library setting, map and documents staff must develop clearly defined mission statements, policies, and procedures that define the roles, services, and resources provided by the university library as contrasted to cartography labs, geography departments, and GIS labs. The ability to provide access to and manipulation of digital spatial data should signal a rebirth and continuance of map libraries and cartographic information centers.

ARL-GIS LIBRARY PARTICIPANTS

University of Arizona	University of Minnesota
Boston Public Library	University of Missouri
Brown University	University of Nebraska
UC-Berkeley	University of Nevada-Reno
UC-Riverside	University of New Mexico
UC-Santa Barbara	SUNY-Albany
University of Chicago	SUNY-Buffalo
University of Colorado	New York Public Library
Columbia University	New York State Library
University of Connecticut	New York University
Cornell University	North Carolina State Univ.
Dartmouth University	Oklahoma State University
Duke University	University of Oregon
Emory University	Penn State University
University of Florida	Purdue University
Georgetown University	Ohio State University
University of Georgia	Rice University
University of Guelph	University of South Carolina
Harvard College	Univ. of Southern California
University of Houston	Univ. of Southern Illinois
University of Illinois	Temple University
Indiana University	Tulane University
University of Iowa	University of Tennessee
Iowa State University	University of Utah
Johns Hopkins University	State Library of Vermont
University of Kansas	University of Virginia
University of Kentucky	University of Washington
Louisiana State University	Washington State University
University of Massachusetts	University of Wisconsin
Mass. Institute of Technology	Library of Congress Geog. & Map Division
University of Maine	Colorado State University
University of Michigan	Virginia Polytechnic Institute
Michigan State University	Montana State Library

reviews

BOOK REVIEW

Pictorial Maps

Nigel Holmes. New York: Watson-Guptill Publications, 1991. 192 pp, maps. \$39.95 hardcover. (ISBN 0-8230-4013-5).

Reviewed by Charles P. Rader
Department of Geography
Michigan State University

In his third book on information graphics, *Time* magazine's graphics director, Nigel Holmes, explores pictorial maps. Pictorial maps, like thematic maps, present a specific message, however, pictorial maps usually rely on pictorial symbols to highlight their message. This category of maps is exceptionally loose and includes maps used in advertisements, postcards, travel and news magazines, and the high art of Jo Mora, Richard Edes Harrison, Robert Chapin, and Erwin Raisz. In many ways, these maps escape the traditional planimetric flatland of conventional cartography.

The book is bold, glossy, and colorful with over 250 examples that excite the eye and tickle the imagination. The reproductions are quite good and illustrate well the themes about which Holmes writes. Because they are fun, pictorial maps are a genre that has received relatively little attention in cartographic literature. By concentrating on these maps, Holmes has produced an imaginative and fun examination.

Pictorial maps are introduced and contrasted to atlas (reference) maps in the first chapter. In this chapter, Holmes also outlines his hopes for the book. Helping professionals avoid "run-of-the-mill locators" (p. 15), rekindling an

interest in geography, and providing viewing enjoyment for others are his goals. He concludes with a summary of why we find maps interesting and discusses the cartographic license that we allow conventional maps.

Chapter two presents an uneven and idiosyncratic history of cartography that briefly covers the period from the clay tablet maps of Gazur (2300 B.C.) to the works of Mercator (1569 A.D.). The author then leaps 350 years to the 20th century; he acknowledges this leap, but offers no explanation for it. Despite the gaps and the broad brush strokes, Holmes identifies some important themes and questions in the history of cartography (that also help to prove his point that pictorial symbols are often more than frivolous decoration), e.g., Wilma George's thesis that maybe elephants did "occupy land where there were no towns" rather than provide cartographic filler for the "pesky blank spaces" (p. 23) assumed to be terra incognita. Other topics include the work of Eratosthenes, Ptolemy and three world views from the middle ages: the rediscovery of Ptolemy, portolan charts, and the medieval mappaemundi. He introduces the 20th century with a discussion of Jo Mora's pictorial maps.

In the third and fourth chapters, Holmes presents maps of America and the world and discusses the iconography of these images. While many examples in these chapters are drawn from advertisements that use the shape of the United States or world to aid in making a point about a product, some interesting pictorial maps, such as Anna Walker's bas-relief maps and illustrated maps are also included in these chapters. In addition, examples of city maps that contain some of the best perspective images of New York, such as Constantine Anderson's midtown Manhattan, are repre-

sented. In the captions, Holmes illuminates the innovative techniques used in the construction of these examples, e.g., the widening of the streets in Anderson's map (p. 77). Maps of foreign cities are drawn from *Condé Nast Traveler* and historical works. A variety of postcard maps are displayed in both chapters.

News maps are the subject for chapter five. War, elections, and weather are the major themes. Unfortunately, war has been a major news item for the better part of this century, and this theme dominates the chapter. Holmes' own work on recent conflicts—the Falklands War, Grenada, and the Persian Gulf War, and Robert Chapin's work for *Time* during World War II are represented. Elections are covered briefly, but the main purpose of this section is to rebut Tufte's comment that embellished graphics are chart-junk. Holmes retorts, "Call it over-decorated chart-junk if you will, but watch your readers disappear as you preach from an ivory tower." (p. 130). Holmes approaches the graphics from the perspective of business, and in this realm style and presentation are often emphasized over content. Weather maps, as illustrated by *USA Today's* map, are discussed in relation to the problems of available data. Here, Holmes questions Wurman's suggestion of using a comparative comfort index rather than raw weather data because the index relies on the availability of good data. This section ends with images of weather from satellites and computer simulations.

"Doing it" is the topic of the sixth chapter. Projections, relief, symbols, computers, scale, and distortion are covered. The problems of projecting a spherical object onto a plane and the major classes of projections are examined. He includes the debate over the appropriateness of particular projections, e.g., Mercator's, Gall-

Peter's, and Robinson's. A review of relief representation discusses mountain drawing, hillocks, hachures, contours, shading, and the role of exaggeration in representing landforms. A section on symbols offers advice on choosing and designing pictorial symbols. The computer's role in revolutionizing map production is examined with an eye toward both the benefits and the horrors of the technology. Vehicle navigation systems and scientific visualization are tacked on as further expansions of computer technology. Scale is approached in a very practical manner; the goal is to make the scale of a problem comprehensible by placing the information in the context of something known. Finally, distortions, such as cartograms, are discussed as means of altering views of information.

The seventh chapter concludes Holmes' examination of pictorial maps with metaphors, directions for friends, and cartographic jokes. The Gerrymander and other satiric maps are examples of metaphorical maps. Directions for friends are exemplified by sketch maps, and cartographic jokes are covered by several joke postcard maps and cartoons. A list of map sources, a partial bibliography, map credits, and an index complete the book.

Holmes writes in a conversational style and covers topics broadly. Most people would find his book easy to read and informative. The broad brush strokes may disturb trained cartographers, and from an academic perspective this book would be easy to criticize for lack of substance and detail. However, Holmes accomplishes his goals, and he makes no pretense of academic rigor. Simply, he takes a fun look at fun maps. The book's main value lies in its examples and in Holmes' discussion of pictorial map design. The book is meant to be looked at and here lies its appeal. It is copiously

illustrated in color and gives one a great deal to explore. To fit the number of illustrations in this book, they are often small; however, as examples of the themes, the maps are well chosen and are large enough to illustrate the point.

Few, if any, books are perfect. Other than a few typographic errors and two instances of misplaced graphics, the only conceptual error is a bungled description of Kitiro Tanaka's illuminated contour method (p. 151). Tanaka's (1950) method does not employ hachures between the contours, but instead uses a medium background with light and dark contours of systematically varied width to represent, respectively, the lighted and shaded sides of the land surface. The remainder of his discussion of this method is accurate. These are minor deficiencies and do not significantly detract from the book's impact.

The subject, pictorial maps, overlaps slightly with several other books; e.g., Monmonier's *Maps with the News*, Tufte's books *The Visual Display of Quantitative Information* and *Envisioning Information*, and Wurman's *Information Anxiety*; however, these are different books written with different purposes in mind. This is the only book that examines a very different genre of cartographic material and is therefore one of the few sources that sees the role of maps in a broader context of commercial art and design. This book shuns typically sterile approaches taken toward maps, and the book in its own right is not meant to be taken entirely seriously. It has much to offer visually and would be a good source of inspiration for cartographers and information graphics artists, for a cartographic design class, or for anyone with an interest in maps. *Pictorial Maps* is a book to be looked at, and in looking, we might learn to escape the flatland of conventional cartography.

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Tanaka, K. 1950. The relief contour method of representing topography on maps. *The Geographical Review*. 40(3): 444-456.

ATLAS REVIEW

The New State of the World Atlas, 4th edition

Michael Kidron and Ronald Segal, London: Simon and Schuster, 1991. 159 pp, maps. \$15.00 paper. (ISBN:0-671-745-565)

*Reviewed by Ellen R. White
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This edition updates and revises a volume first published by Pan Books in 1981. As in previous editions, the atlas shows that while much has changed in the world, much remains the same.

The atlas is composed of 50 world maps (including 12 cartograms) divided into the following sections—The Scene, Economy, Society, Government, Holds on the Mind, Business, Labour, Arms and the State, and Environment. Each map occupies a two page spread and frequently contains a smaller world map and/or a graphic on a related topic. Insets are included where appropriate and generally cover the areas of Europe or the Middle East. All of the map topics relate to current issues, e.g., population growth, food production and distribution, health and disease, government influence, international corporations, or military presence. A set of explanatory notes discusses each map in terms of the data used to create it, sources, reliability, and brief remarks on interpreting what is shown. A table of basic data for each country is also included.

The authors provide very little information in this current edition as to their intentions, however, perusing the introductions of past editions gives insight not only into the purpose, but also the evolution of the content of the atlases over the past decade. Rather than compile a standard reference work, *The State of the World Atlas* is intended to be a work of cartojournalism and provides a frame of reference for the interpretation of events. The events involve issues of an international scale and the maps are often cross-referenced to one another. For example, notes for the map on global warming refer the reader back to maps on national income and unproductive labor. It also appears that the selections of topics in the atlas have also evolved over time, reflecting changing concerns in the world at large. Less emphasis is paid to nuclear threats (featured heavily in earlier editions) and more space is given economic and social domination by multinational corporations and large governments.

A major shift in the atlas production techniques has taken place since 1981. Originally, many of the maps were hand colored or used transfer patterns. Today's edition is computer-generated and, in a cartographic sense, a much finer product. Overall, the graphics are clever and well executed. A few of the color scales left me confused due to their color sequencing (e.g., *Mostly Down*, pg. 91; and *Diplomacy*, pg. 14) yet the somewhat unconventional use of color communicates well. The atlas, as a whole, is largely free of typographic and other production errors, although the notes for the first map, *The World of States*, refer to states in red and green where orange and beige appear on the map itself.

Overall, I found the atlas to be much more interesting than I had expected, a reflection on my

ignorance. Each plate is full of information that really only becomes apparent upon close study and a careful reading of the associated notes. I would recommend this publication to anyone

curious about our relationships within a global society.

(An interview with the designers and producers of The State of the World Atlas appears on page 28-31 in this issue of Cartographic Perspectives.)

SOFTWARE REVIEW: ATLAS*PRO and ATLAS*GIS

Reviewed by Robert Werner

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A considerable amount of cartographic work is done with commercial software instead of specialized programs attentive to the needs of cartographers. This is true both for cartographic production and education. Examples of such commercial software are ATLAS*PRO and ATLAS*GIS. These programs will accomplish some of the needs of cartographic production and education, but have important limitations. Cartographers continually review many mapping and analysis programs, needing to evaluate them for their functionality and educational quality. This review is meant to contribute to this ongoing task.

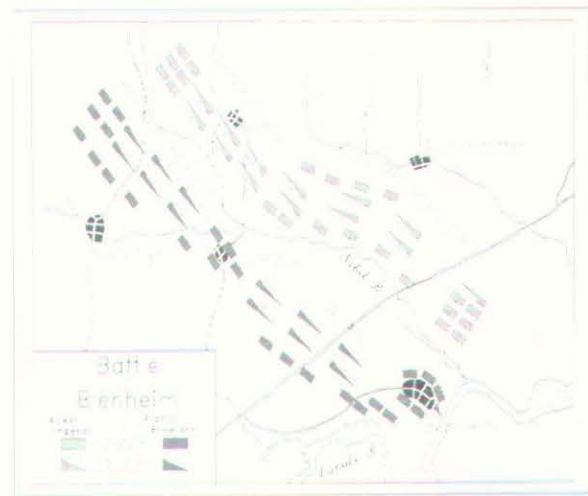
ATLAS*PRO is a vector-based mapping program; ATLAS*GIS is both a vector-based mapping and GIS program. Both programs are designed to run on an IBM PC or compatible, and there is a version of ATLAS*PRO for Macintosh. ATLAS*PRO is a subset of ATLAS*GIS; in other words, ATLAS*PRO and ATLAS*GIS are the same programs and have the same functions and user interface, except that 1) ATLAS*GIS has some GIS functionality, including union and intersection overlays, address matching, and buffering, and 2) ATLAS*GIS supports digitizing tables. All comments below apply to both programs, with those two exceptions. Separate comments at the end address ATLAS*GIS.

HARDWARE REQUIREMENTS

Minimum requirements are an IBM PC-compatible, 80286 or above, with at least 640 Kb of RAM and 2 Mb hard disk, VGA or EGA graphics, and DOS 3.0 or later. My recommendation would be for an 80386 with a math co-processor, 1 Mb or more of expanded memory, and a much larger hard disk.

TYPES OF MAPS PRODUCED

The programs are capable of producing choropleth, graduated symbol, dot, line symbol, point symbol, and other area-shaded maps.



*An example of a map created in ATLAS*GIS*

SPATIAL DATA

Available with the program. With purchase of ATLAS, you receive spatial data files of the world, U.S. states, all 3,141 U.S. counties, locations of 938 U.S. cities, interstate highways, M.S.A.s, 3-digit ZIP codes, 5-digit ZIP centroids, urban market areas (within TV broadcasting distances), and telephone area codes. These offerings change from time to time, so check with Strategic Mapping (the makers of ATLAS products) for current offerings.

The tutorials and data sets are oriented toward business applications. It would be helpful if some data set and tutorial instructions were included that walked a user through a natural resource GIS problem.

Created by the user. The user has several options to get spatial data. You can buy data files from Strategic Mapping, you can digitize it using ATLAS*GIS, or you can buy the separate ATLAS Import/Export program to read DXF, Etak, TIGER, DIME, and comma- and tab-delimited ASCII files. ATLAS*PRO for the PC does not support digitizing table input. ATLAS*GIS does. (The old ATLAS*DRAW program has been redesigned and integrated into ATLAS*GIS). Both ATLAS*PRO and ATLAS*GIS do support screen digitizing of an already-existing file.

The user cannot access the format of geographic data. If users want to write a digitizing program or convert some old spatial data files (like POLYVRT or a user's homegrown format) into a form useful in ATLAS, they will have to work via some intermediate format like DXF, then use ATLAS Import/Export to get the data into ATLAS.

Support of digitizing tables. Again, ATLAS*PRO for the PC does **not** support digitizing tables. ATLAS*GIS **does**, and comes with drivers for over 40 digitizing tables. If a user needs a new driver, Strategic Mapping will supply it for free. This is a strong plus for the ATLAS programs, since none of us know what peripherals we will be using in the future. Users can expect excellent support of peripherals from Strategic Mapping.

Import to/export from other programs. ATLAS*PRO and ATLAS*GIS by themselves are weak in this regard. The separate program, ATLAS Import/Export, needs to be purchased in order to have much import/export power. By themselves, ATLAS*PRO and ATLAS*GIS import only old ATLAS*GRAPHICS boundary files or ATLAS*DRAW files. (ATLAS*GRAPHICS was the precursor to ATLAS*PRO, and ATLAS*DRAW was Strategic Mapping's old digitizing program).

File size. Any one polygon can have 4,000 vertices or line segments. Some cartographers will find this to be a limitation. The upper limit of layers is 1,000 in the latest update of the software.

Edit spatial data files. The user can edit spatial data files within the program on the screen, or use ATLAS Import/Export to export, for example, to a DXF format, and edit spatial data in the CAD environment.

Clipping and tiling. Clipping (cutting off areas outside of a user-selected area) and tiling (merging of adjoining map sheets into one) are both possible. A variety of options are available for clipping. Any option used for selecting data can be used for clipping, including a user-defined window, box, circle, or polygon, polygons that border on other polygons, or entities inside, touching, or near other entities.

Coordinate systems support. Coordinate systems supported include

latitude-longitude, UTM, State Plane, and arbitrary user-defined coordinate systems, such as digitizer inches.

ATTRIBUTE DATA (non-spatial data)

Available with the program. Attribute data files to match some of the spatial data files come with the purchase of ATLAS, viz., 18 general demographic variables for all U.S. counties, FIPS codes and names for 36 U.S. states and 16 U.S. cities, and assorted attribute files for a few of the other spatial data files. Some of these data files are used in the tutorials, so the user does not have to prepare any data to learn how the program works.

Examples of Geographic and Data Files

- *Census Tracts*
- *Census Block Groups*
- *Business data - 10.1 million locations*
- *Business data - by employee count or SIC code*
- *International demographics*
- *Major world cities*
- *Education and occupation statistics*
- *Purchase power index*
- *Shopping center data*
- *Bank locations and data*
- *Street maps*

Examples of some of the Geographic Files and Data currently available from Strategic Mapping.

Created by the user. Attribute data files can be created using the ATLAS database management system (DBMS), any D-Base compatible DBMS, or ASCII files. Version 2.0 will also support spreadsheet files. Of course, ID fields must be present in attribute data files that match the IDs in the geographic files, in order for ATLAS or any program to match attribute data with geography. Fortunately, conventional geographic ID codes are in the data files, such as FIPS codes and zip-code centroids, so users can add their own data easily.

Calculations within the program. Any D-Base compatible expression can be used to perform calculations on attribute data. Thus, a wide range of calculations is available.

Import to/export from other programs. Full compatibility with D-Base types of programs allows straightforward import and export from DBMS programs. ATLAS will also import old ATLAS*GRAPHICS files, comma- and tab-delimited ASCII files, and files with or without CR-LF characters. Version 2.0 will import data from spreadsheets: Microsoft Excel, Lotus 1-2-3, and Symphony.

EVALUATION OF PROGRAM FEATURES

Ease of operation. ATLAS is menu-driven like LOTUS 1-2-3, where the screen shows the next subset of commands available if a user chooses any one particular command. With almost 400 commands in ATLAS, the arrangement of commands is a major concern. ATLAS has done an excellent job organizing the commands into logical groups, and with just several hours of using the tutorials, a user will be able to run the whole program. Because the second line below the top command line shows the user the next set of options they will encounter if they choose any one particular command, it is easy to apprehend the arrangement of the commands. Also, the help facility is always available at the touch of F1, in case the user forgets some terminology or just needs a brief reminder of what a command does.

There is some inconsistency with standard cartographic terminology. ATLAS calls point-symbol maps "PIN" maps. What cartographers understand as a user-defined or an idiomatic method of setting class limits

in choropleth maps, ATLAS calls "discontinuous" and "continuous," which is a mistake because choropleth maps require discrete data. What is usually referred to as areas or polygons, ATLAS calls "regions."

Manual. The organization of the manuals is readily comprehensible. The contents of the manuals are quite complete. There is an index of suitable detail to find what you need quickly. A glossary would be helpful, especially because in the world of rapid software development, there are sometimes a proliferation of cartographic terms that mean the same thing, e.g. a line segment can be called a vector, segment, line, string, chain, arc, link, or 1-cell. The technical appendices of the manuals are reasonably good. All-in-all, the manuals are well-organized, thorough, and easy to use.

Tutorials. The tutorials are excellent. A user can easily learn the basics of ATLAS in about a day, using a series of 16 lessons in the tutorials. The ATLAS*PRO tutorials are the same as ATLAS*GIS, except that GIS has an extra chapter walking the user through GIS functionality. Sample data files are provided for the tutorials, viz., New York City with the geography of zip codes. The quality of the tutorials and ease of learning ATLAS is a strong plus, both for the software itself and for using it in the educational environment.

Screens. The screens are laid out well and resemble a CAD program, with a main drawing area, two command lines at the top, and data on the right side about files that are open, features that are currently selected, x,y coordinates of the screen crosshairs, and the scale of the drawing. The clarity of screen messages is good, once the user becomes familiar with a few nuances of ATLAS vocabulary.

Help screens. The help screens are always available with the F1 key. The help screens are context-sensitive. In other words, a help request at one place in the program will return help relevant to that place. The content of the help screens is printed in the manuals, but screen help is still a quick way to familiarize yourself with a detail. When help is invoked, the main map is saved by a screen-save routine, so that the map does not take long to be redrawn after help is sought. Help is not given in nested levels of detail, like in WordPerfect, where a user can go to successively deeper levels of help on some item. In ATLAS, help functions more as a reminder than a source of information that will tell you how to do something.

Error handling. Error messages are usually informative. Sometimes, however, they can be obscure or incomplete. For example, if a user tries to load a mapfile (a file of parameters previously used to make a map), but the geographic and/or attribute file is not where the mapfile expects them, the program returns a series of messages saying that it is simply unable to use the geographic file, and the obscure message 'error reading token block file Geo,' which is difficult to decipher.

Design flexibility. The design flexibility is quite good, and represents a quantum leap forward from ATLAS*GRAPHICS. Fine-screen shading patterns are available, with density under complete control of the user. The choice of point symbols is good, with 95 symbols to choose from. There are 10 basic line styles (each has variable width), twelve colors can be chosen, and the percentage of fill for each color can range from 0 to 100. There are 16 area fill patterns, like cross-hatch, marsh, wave, and others.

A user can easily learn the basics of ATLAS in about a day.

*The design flexibility is quite good, and represents a quantum leap forward from ATLAS*GRAPHICS.*

The program will produce or transform geographic coordinates into eight different map projections.

The map can be placed anywhere on the page, and be sized in any way. This is also true of other page elements, including the lettering, legends, and scale bar. This is tremendous cartographic flexibility. An inset can easily be created (as long as the inset is from the same geographic file as the map). A scale bar can be sized and designed in a variety of ways. The symbol library includes north arrows, or they can be created freehand. Neatlines can be turned on and off, and there are even choices as to line styles for neatlines. Text is infinitely sizable, and a variety of fonts are available. The program will produce or transform geographic coordinates into eight different map projections, including Robinson, Albers, all state plane projections, and UTM. A user must select a map projection from the set of supported projections and cannot enter the equations of other projections. Fortunately, though Mercator is one of the supported projections, the default world projection is Robinson.

A user can make a map inset (as long as the same spatial data file is used for both the map and the inset), but cannot carry labels to both the map and the inset. It is easy enough to switch the map and the inset, so labels can be on either, but labels can't be on both.

There is a little-known program that comes with ATLAS called Symbol Maker. It allows the user to screen-digitize a symbol, such as a line drawing of a logo, and store it in the symbol library. The symbol can then be accessed when the user is in ATLAS.

Hard copy. ATLAS supports a great range of output devices. Drivers come with the purchase of the program. As with input drivers, if a user buys a new output device, Strategic Mapping will supply new drivers free of charge. One hundred drivers come with the program, but because you can easily get any other, ATLAS supports virtually all output devices. ATLAS will also output HPGL and Postscript files. The program will also print reports of attribute data.

Choropleth map options. Nine choropleth classification algorithms are available. They include Jenk's optimal classifier, quintiles, standard deviations, user-defined class breaks, equal interval, and others. The default classification algorithm is equal numbers of data values in each class. Unfortunately, ATLAS calls this "quantiles," which is mistaken terminology when there are not five classes. The default classification method should probably be Jenk's optimal, so that users who are not sensitive to the data frequency distribution will get a classification that maximizes between-class variance and minimizes within-class variance.

The program does not produce data histograms, so the user cannot visually tell what class breaks to use. In this regard, ATLAS*PRO and ATLAS*GIS's predecessor, ATLAS*GRAPHICS, was better. A user must export the attribute data and import it into a spreadsheet or graphics program in order to see a histogram. This should be changed.

Ideally, all choropleth maps would contain a frequency distribution of the data. That way, the map reader would have a good idea just how the cartographer set the class limits, and how much some data varies from the central tendency. It would be ideal to be able to import a frequency distribution into a graphics box in the map, but ATLAS does not allow this (and very few other mapping and GIS programs do either).

ATLAS will produce two-variable choropleth maps. One variable might be represented with a fill pattern and density, and the other by colors.

The default colors for choropleth maps are hierarchical. Many users don't know about the need for color and shading hierarchies, so good

defaults are necessary. It is still better to set the default colors to one color, say, red, and to shade areas by varying the percentage of fill. The colors available are the usual 12 color output of a PC monitor. It is difficult to design a color hierarchy with these colors. It is easier in one color, because the percentage of fill can be the hierarchy of shading.

ATLAS*GIS does everything ATLAS*PRO does, plus some GIS functionality, and support of digitizing tables. Like ATLAS*PRO, ATLAS*GIS uses the same user interface, plus a D-Base compatible file (or its own database) for attribute data. ATLAS*GIS will perform union and intersection overlays, address matching, and buffers.

Examples of ATLAS*GIS functionality include the following. 1) Attribute data can be aggregated inside of an area, to produce output to a larger area in a different layer. For example, census tracts could be aggregated into counties. 2) Buffers can be created around points, lines and areas. If a buffer is around a point, the shape is a circle; if the buffer is around a line, the shape is a corridor. A buffer can be created around an area by first converting the outside perimeter of the area into lines. Overlapping buffers inside an area of interest often have to be dissolved. Buffers can be created around more than one type of feature, e.g. a buffer around lines and points. Buffer width can be proportional to some attribute data value, e.g. wider buffers for streams with more flow. 3) Point-in-polygon operations can be performed to assign area data to points inside an area, or to carry attribute data associated with a point over to an area. 4) Overlay unions can be performed, combining points, lines, or areas into other features. 5) ATLAS*GIS will perform overlay intersections, splitting lines or areas by other lines or areas. 6) For either unions or intersections, two methods of data aggregation and disaggregation are available: copying data from one feature to another (like carrying a name or an average data value from the input layer to the output layer), and proportional transfer (like splitting an area by one-third and carrying one-third of a total data value to the output layer). 7) ATLAS*GIS will perform address matching, like taking a file of house addresses and matching them to a street segment file so you could map the houses.

- Upgrade for ATLAS*GIS costs \$295 (and \$149 for ATLAS*PRO)
- Import from spreadsheets: Microsoft Excel, Lotus 1-2-3, and Symphony
- Support of indexing by the database
- More options for address matching
- Faster screen re-draw (the company claims twice the speed) and sorting
- Automated routine for point dispersal (even distribution only, around, e.g., a point,)
- Freehand objects can be anchored to the screen map or the page map
- New fonts and drivers
- ATLAS Script is available (a macro language and interface customization program)
- Line generalization
- Improved options for designing the layer legend
- Improved label options on map features

In general, ATLAS is a very user-friendly program that is easy to learn. This is especially an achievement because the program is relatively powerful. Screens and command hierarchy are well thought-out and easy for a user to assimilate. With almost 400 commands, design of the user interface is especially good. The tutorials are excellent, and the data that comes with them is satisfactory.

ATLAS*GIS

THE NEW VERSIONS: 2.0

CONCLUSIONS

ATLAS supports a wide range of input and output devices, and if a user needs a new one, Strategic Mapping will send one for free. Support of various spatial data formats is good once the user has purchased ATLAS Import/Export for \$495, however, a user must stick to a common spatial data format (DXF, Etak, TIGER, DIME, and comma or tab-delimited ASCII files), because Strategic Mapping uses a protected file format, for which the user does not have access. Support of attribute data formats is excellent, given that ATLAS interfaces with D-Base-compatible databases and the new versions import and export to spreadsheets.

Map design flexibility is quite good. Fine-screen shading patterns are available, as well as a wide range of point and line symbols. There is complete control of map elements, such as the map, inset, legends, lettering, and cartographic orientation.

A final criticism is that ATLAS does not always use standard cartographic terminology. What cartographers know as point-symbol mapping will be called "PIN" mapping. Idiomatic, or user-defined choropleth classification methods are called "discontinuous" and "continuous." This is a misnomer, since a requirement of choropleth maps is that data be discrete. "Quantiles," for the case of equal numbers of data values in a class, is odd terminology when there are not five classes. Other terminology could also be more standardized, like area or polygon instead of "region." This is not just a problem for ATLAS, though; consider that a line segment can be called a vector, arc, line, segment, string, chain, or one-cell.

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interview

The following interview with Malcolm Swanston, of Swanston Publishing, the designers and producers of the State of the World Atlas was conducted in February of 1992 by Andrew J. Skinner of the University of Derby, UK. A review of the fourth edition of The State of the World Atlas appears in this issue of Cartographic Perspectives (pages 21-22).

MALCOLM SWANSTON AND THE STATE OF THE WORLD ATLAS : PUTTING DERBY ON THE MAP

*by Andrew J. Skinner
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In 1981 Michael Kidron and Ronald Segal, in association with Pluto Press in London, published the *State of the World Atlas*, a political atlas that in its own words tried to be "truly international, not only in showing the world wide incidence of this or that condition or event, but in associating that incidence with an underlying structure." Editorially it was unusual in taking a political stance ("It is our contention that the destructive aspects of the state have come crucially to exceed the constructive ones"). Graphically it was dramatic, using saturated colors and bold symbols on a standardized projection (Winkels Tripel), mixed with cartograms and graphics.

Contemporary reviews were mixed. David Fairbairn in the *Journal of the British Cartographic Society* (1981) describes it as "a refreshing change from conventional atlases," but complains that "...cartographers were not chosen to meet the challenge of mapping

such diverse and intricate data. It is only by attempting important projects such as this that cartographers will be able to convince the public of their increasing usefulness in recording the changing world scene." Robin Kinross in the *Information Design Journal* (1982) praises the "vast amount of relevant information" but is more critical of the graphic presentation (although he describes the cartograms as "the most interesting and potentially effective graphic experiment...a simplification of the form of each state into an abstract rectilinear shape").

I have always been impressed by the look of the atlas, and colleagues who use it have very favorable opinions. It has been well received by the market, and it has been interesting to watch the publishers develop the theme into a number of companion atlases (also to see the number of imitations that have appeared on the scene).

It seemed to catch the cartographic world by surprise, not least because the design and production was done by a small and virtually unknown company with no cartographic 'track record.' The company was called Swanston and Associates, and was based in the British city of Derby (pronounced *Darby*), which has a strong printing industry but no traditional cartographic links.

In February of 1992 Malcolm Swanston agreed to talk to me about the origins of the *State of the World Atlas* and subsequent publications.

I first visited Swanston and Associates (now Swanston Publishing) in the early eighties when they occupied a number of small rooms in an old Georgian building in the center of Derby. It seemed remarkable to me at the time that such a notable publication had such humble beginnings. Now they are in more spacious accommodation half a mile away, and as

with so many similar establishments the drawing boards have been replaced by microcomputers.

Malcolm Swanston admits that setting up in the provinces gave him some pleasure. He trained at the Derby School of Art, and then went into advertising in Nottingham, London and Brighton before returning to Derby to work with the drawing office of Rolls Royce (Aero Engines). About 15 years ago he decided to set up his own business.

Swanston: *I had a deep interest in Geography and History as well as in Art and Design, so I wanted to try and find a way of combining all of those interests into one. The first thing I did was to talk to the publishing industry, the greatest consumer of illustrated and cartographic products as I understood at that time. I struck up a relationship with Pluto Press, and we undertook to design and produce the first State of the World Atlas. On top of that I made contact with other publishers and worked on a commission basis on their titles. By 1985 Swanston and Associates had grown to such an extent that I could consider forming my own publishing company. I had a series of titles that I had developed which I took to the Frankfurt Book Fair and the American Booksellers Convention and sold as packages.*

All of this work was in the field of Cartography and Information Graphics using the design capabilities in Derby. When Pluto Press came onto the market in 1988, he bought the titles originally produced by Swanston and Associates, and now owns the whole series.

I was particularly interested in who had originated the design concept of *State of the World Atlas*. Malcolm Swanston was quick to emphasize the cooperative nature of the venture.

Swanston: *The authors came up with fairly novel concepts, and then novel titles for expressing these concepts, which were passed to a*

designer in London and our team in Derby. I've always encouraged people to express their ideas and everyone in the Company was invited to criticize the map design. There were a lot of sparks flying.

Having studied the original *State of the World Atlas* again, I feel that two maps in particular are disappointing: 'The Longer Reach' compared newsprint consumption with telephone usage (a connection that I do not fully accept) and employed a visually disturbing hatch-symbol scheme. 'Fouling the Nest' depicted pollution using what appeared to be a crayoned shading that clashed with the design of the rest of the Atlas (Kinross describes this map as "a joy to encounter after laboring through most of the fifty-two previous spreads").

Both had the feeling of experiments that had not worked, and both were substantially revised in the second edition. I asked how far experimentation was seen as part of the design process, and Malcolm Swanston agreed that there was a little bit of this.

Swanston: *We were looking at things from a different perspective, and were willing to try out some novel ways of expressing and understanding them. In all new products there are some parts that do not work so well, but you have to let them go first then stand back and see if they work or not. At the same time you have to be aware of subjectivity—what works for some people does not work for others, so you have to try and take that on board as well. We also have a lot of feedback from the market—people write to us all of the time—and we have various bodies and individuals that advise us. We always look at these letters and documents and try to react to them.*

I was interested in whether the authors had envisaged a series of atlases from the beginning, or whether the success of the first had encouraged them to look at new ideas. Swanston felt that it was a bit of both. There was the

hope that there might be a series, but also some caution. When the *State of the World Atlas* did take off they felt that they wanted to take advantage of the success, and the established design concept was relatively easy to adapt to new titles such as *The War Atlas*.

One of the surprising (and possibly disturbing) things about the first edition of the *State of the World Atlas* was that cartographers were not involved in the production (although unlike Fairbairn I have doubts as to whether the cartographic establishment at that time would have been capable of anything as radical as this). Swanston had talked to cartographers, but was aware that in coming from a design background he wanted a different look to the one usually produced by cartographers.

Swanston: *Some of them were pro and some anti, but I was aware that we were upsetting a lot of people at the time. I'm gratified now that after several years the ones that were most upset now seem to be most for us.*

Was the success of the *State of the World Atlas* because of or despite of the lack of 'cartographic' involvement?

Swanston: *I think because my training was to bring a message to the public as quickly and as cleverly as possible—that's what graphic design is all about—I wanted to apply those same rules to a map. I think to a degree we were successful, but having worked with cartographers almost continuously since, I see that we did some naive as well as some innovative things. What I've tried to do is 'iron out' the naiveté and increase the readability and sophistication of the series without losing the initial 'verve'.*

I put to him a view that has bothered me for some time—that Cartography needs the fresh ideas coming from graphic designers far more than Graphic Design needs the input from cartographers. The success of the Pluto Press series seemed to support this view.

Swanston: *I would have agreed with that at the time I was working on the first edition, but since then I have changed my views. There were some things I didn't appreciate then—use of different projections and scales that apply to mapping the surface of the planet and making it's story accessible and understandable, so I wouldn't now say that it is completely one-sided. After fifteen years in this game I've come to appreciate cartography more, and I wouldn't make the same mistakes. If you have to take sides I don't think either has got the story entirely right.*

The first project I was involved in was the Times Atlas of World History, and we are working on the fifth edition now (it is being converted to digital form). In revising it we are applying some fairly basic cartographic principles which we ignored as graphic designers. Of all the books I have worked on, that one deserves the most criticism, but because of the different scales and use of perspective it was always going to be open to attack. It was innovative in its day, sold a million copies worldwide and still sells well. People understand it and enjoy it, which is the point of what we are doing. I now want to improve it graphically and cartographically.

People like information books, and if they can access the information in a user-friendly way then they will keep buying them. Sales of the State of the World Atlas in the USA were 25,000 for the first publication, and have been creeping up by 2-3000 every year since. The initial print run for the new edition is 35,000, and we expect to reprint before the year is out.

Swanston envisages being involved in the same sort of work for the foreseeable future, and recent events in Eastern Europe and the USSR have proved how ephemeral the map can be. He takes this a point further...

Swanston: *In a sense political frontiers don't change very often, but governments change and populations flee across frontiers. The big changes*

like those of the former USSR always attract a lot of attention, but there is a lot of subliminal change as well and this is reflected in the Pluto Press series. We map change and different evaluations of the change to help the perception of what is happening in the World and how to deal with it.

Looking back at the Pluto Press series it is perhaps surprising that the 4th edition of the *New State of the World Atlas* is the first to use computer technology in its design and production. The two-dimensional look, use of a single map projection and heavy reliance on pictorial symbols give even the early editions a computer-produced appearance.

Swanston: *The first State of the World Atlas was produced manually—we drew the coastlines, copied them to film and cut pantone for color. From the second edition until now we have done linework only and provided the printer with color specifications. The 1991 edition is the first produced entirely by computer, and it's a natural. We have built a global database so that we can change colors at the touch of a key and delete, replace and move symbols. At the moment we are working on a reprint of the New State of the World Atlas for Germany, and we are adding the former republics of the USSR.*

While we talked I was sitting alongside the film (less the typography) for a Japanese version of *New State of the World Atlas*. I was shown a previous Japanese edition which was completed using a larger page format to accommodate the typography, to be added later in Japan. The first edition sold well, and they expect big things of the new edition as the Japanese "become more aware of the global situation than they were twenty years ago."

The system in use is Apple Macintosh based, and most of the work is done with Adobe Illustrator 3. Malcolm Swanston describes the software as having been 'tweaked' to their requirements,

but won't give any more details! Output is via a Linotronic 300 Imagesetter onto film or bromide.

How much time do they expect to take compiling and producing an Atlas (given that previous thematic atlases have contained information that is sometimes years out of date at the time of printing)?

Swanston: *It can vary, but we are aiming for a twelve month turnaround on all titles. At the moment it is about once every two years, although reprints will include some updating. We want to try and cut the time lag from data collection to interpretation and printing as much as possible, and I would like to be in a position where the New State of the World Atlas is seen as something like the Statesman's Yearbook in visual form. The computer system allows us to be more up to date. We can keep the map open to the last possible moment and include lots of things that otherwise we are not capable of doing.*

Swanston Publishing envisages staying with Apple Macintosh systems for the immediate future. They have invested about £100 000 in the system and expect to spend a further £20 000 this year introducing new software and installing new workstations. They also have a person working full-time on multimedia developments, with support from their agent in New York, and expect to be in the Compact Disc market within twelve to eighteen months.

Swanston: *What I would like to do is get the framework of the book out, and let the purchaser be involved themselves in annual updating. We also want to get into the educational market which is expected to grow rapidly in the UK over the next few years, and we want to look at the interactive aspect, allowing users to compare two aspects simultaneously on a base like the State of the World Atlas. We are entering this market with enthusiasm, but a certain amount of wariness.*

Alongside this the more con-

ventional work continues. Due to follow the latest edition of the *New State of the World Atlas* in the next two years are companion volumes on World Religions and World Health. A *State of the United States* is about to go into production with a projected publication date of 1994.

Swanston Publishing appears to have found its niche in the cartographic market. They now have control over their own work, design of the series of atlases has been tightened up and lots of new ideas are in the pipeline. Their move into computer based production would seem to have been late, but they now have full capability and are ready to move into the multimedia market if its predicted expansion happens.

The innovative style of the series has had an impact on cartographic design despite the reservations expressed at the time, and the success of the company has proved that a market exists for creative thematic cartography in atlas as well as newspaper publishing.

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announcements

Sixth Annual Geographic Information Systems Conference

The Department of Geography and Environmental Planning at Towson State University, along with over 10 professional organizations, are sponsoring the *Sixth Annual Geographic Information Systems Conference (TSU/GIS '93)* from Wednesday, March 24 through Saturday, March 27, 1993. The theme of TSU/GIS '93 is "GIS Applications for the 1990s." In addition to plenary and concurrent paper sessions, the conference will feature an exhibit area, job mart, pre-conference and post-conference workshops, and a meeting of the Maryland Geographic Information Systems Committee (MDGIS). For more information contact Dr. John M. Morgan, III, Department of Geography and Environmental Planning, Towson State University, Baltimore, Maryland 21204-7097, U.S.A., (410) 830-2964 (voice) and (410) 830-3482 (FAX).

The Power of Maps

Over 300 historic and contemporary maps dating from 1500 B.C. to the present will be on view at Cooper-Hewitt, National Museum of Design, Smithsonian Institution, 2 East 91st Street, New York, NY 10128, from October 6, 1992, through March 7, 1993.

The Power of Maps is the first exhibition to examine the significance of maps as instruments of communication, persuasion and authority. *The Power of Maps* demonstrates all maps—whether rare or familiar, old or new, Western or non-Western—are more than simply guides to help you find your way. Like advertisements and other forms of graphic design, maps express particular viewpoints in support of specific

interests. Depending on their function and purpose, all maps present information selectively, shaping our view of the world and our place in it. *The Power of Maps* presents a wide variety of maps from around the world, ranging from a 1500 B.C. clay tablet from Mesopotamia and a 19th-century Sioux map, to a 6-foot diameter rotating globe and a contemporary supercomputer map of the ozone hole over Antarctica. Highlights also include a 13th-century world map on vellum; a 1513 map documenting the voyages of Columbus to the New World; a 1701 chart of Earth's magnetic variations by Edmund Halley; a 1784 map from Captain Cook's voyage to the Pacific Ocean; a Native American star chart from the Pawnee tribe; a contemporary topographical map of the Great Sphinx in Egypt; and a global "hotspots" map used to develop ecosystem conservation strategies.

The Power of Maps also encourages audience participation with interactive computer stations set up for visitors to work with state-of-the-art geographic information systems software. It is accompanied by an educational program including lectures, seminars, workshops and tours, as well as programs designed for schools, teachers and families. A publication by co-curator Denis Wood, *The Power of Maps*, has been published by The Guilford Press to coincide with the opening of the exhibition. The illustrated, 256-page, softcover book sells for \$15.95. For further information on the book, contact Rahel Crowley at The Guilford Press (212) 431-9800. For more information on the exhibit contact: Philippa Polskin/Betsy Ennis, Arts & Communications Counselors, (212) 593-6488/(212) 715-1540. Gwen Loeffler, Public Affairs, Cooper-Hewitt, National Museum of Design, Smithsonian Institution, (212) 860-6894.

Geodysey Environmental GIS Research Grants Initiative

ESRI and Autodesk, Inc. announced at the 17th Congress of the ISPRS (International Society for Photogrammetry and Remote Sensing) the inception of a jointly supported international research grants program called the *Geodysey Environmental GIS Research Grants Initiative*. The program is based on the view, held by both companies, that new desktop computer technology has wide application in the field of environmental research and management, and that GIS, in conjunction with CAD technology, will increasingly be found on the desktop. The grant program, which has an approximate value of \$1 million, is being sponsored and administered by the IGIF (International Geographic Information Foundation). The Geodysey program is designed to further the use of desktop GIS and CAD tools in understanding and managing a wide variety of environmental issues around the globe. Under the program, 100 awards of ArcCAD and AutoCAD software and training will be made to academic and research-based individuals and organizations over the next year. Also included with each award is a copy of ArcView for Windows. Geodysey application guidelines and more information regarding the program can be obtained by calling the IGIF at 301-493-0290, or by faxing at 301-493-0208.

Spatial Data Transfer Standard

On July 29, 1992, the Secretary of Commerce approved the Spatial Data Transfer Standard (SDTS) as Federal Information Processing Standard (FIPS) Publication 173. The SDTS provides specifications for the organization and structure of digital spatial data transfer, definitions of spatial features and attributes, and data transfer

encoding. The SDTS promotes and facilitates the transfer of digital data between dissimilar computer systems.

The FIPS Publication 173, the SDTS, is effective February 15, 1993; use of the FIPS SDTS is mandatory for Federal agencies 1 year from this date. As a FIPS, the SDTS will serve as the national spatial data transfer mechanism for all Federal agencies. The SDTS is available to State and local governments, the private sector and to academic organizations.

As the designated maintenance authority for the SDTS, the U.S. Geological Survey (USGS) will promote acceptance of the SDTS and coordinate the use of the SDTS among Federal agencies. The USGS has embarked on a program that includes activities such as SDTS maintenance, program coordination, profile development, user guide development, workshops and training, software development and spatial feature and attribute dictionary development. The USGS is also developing a spatial data transfer processor that will enable the exchange of USGS digital data products in the SDTS. For additional information about the SDTS program, contact the SDTS Task Force Manager, U.S. Geological Survey, 526 National Center, Reston, VA 22092. FIPS publications are available from the National Technical Information Service, U.S. Department of Commerce, (703)487-4600.

Automated Cartographic Information Center

The University of Minnesota has been awarded a Research and Demonstration Grant under the U.S. Department of Education College Library Technology and Cooperation Grants Program to establish a model Automated Cartographic Information Center within the John R. Borchert Map Library. Brent Allison, Associate

Librarian and Head of the Borchert Map Library, will serve as Project Director. The Automated Cartographic Information Center (ACIC) will be dedicated to developing innovative approaches to providing library users with direct access to locally owned and remotely accessed digital cartographic and spatial information. For more information contact Brent Allison, S76 Wilson Library, 309 19th Avenue South, Minneapolis, Minnesota 55455, (612)624-4549.

New GEODEX service

It has long been the desire at the American Geographical Society Collection to provide periodic updates to GEODEX data files, and they are pleased to announce that they have now developed such a system. Included in the system are all the quadrangular series of the U.S. Government received on deposit, the various Canadian topographic map series, and the PAIGH 1:250,000 map of the Americas.



The system has the following components:

- All **GEODEX files** are maintained in an FTP (file transfer protocol) site on a campus mainframe. On the first of the month, any file updated during the previous month is updated in the FTP site. All data files have their holding's field set to zero, and are compressed using the standard

PKZIP utility. Zipping accomplishes two things: the computer space required to maintain the files is greatly reduced and all four files comprising a GEODEX datafile are combined into one unit. The result is a simpler and faster file transfer from their computer to yours. The PKUNZIP.EXE program required to decompress the files is also available at the FTP site. An index to the files included (**Index.doc**) is included.

- **Monthly update files** consisting of all Geological Survey quadrangles, nautical and aeronautical charts, forest service quadrangle, Canadian topographic quadrangles and the PAIGH series sheets added during a month are also posted to the FTP site at the first of the month. These files are in a special format that contains all the usual sheet level data, but also information as to the series into which they are to be included.

- A special **program module** designed to do the following:

- 1) *List the series included in the monthly update file.*
- 2) *Reverse the subfields in the title field (most sheets are represented by both a name and a number. Some collections file the sheets in a given series by name while others will use the number. GEODEX provides the option.)*
- 3) *Produce a printout of the sheets included. Output can be sent to the screen, a printer or a file.*
- 4) *Reconcile the new listings with your holdings. The program proceeds sheet by sheet, series by series and gives you the option to enter holdings or delete the entry.*
- 5) *Add the new listings to your GEODEX datafiles.*
- 6) *Re-index augmented datafiles.*

7) Backup the augmented datafile.

The file designations in the update file are numeric (each file has a unique number). A control file is used to customize the update to your collection. A line is entered in the control file for each series you wish to have updated. A typical line would appear as follows:

```
156\C:YRFILNME\United States
1:100,000\r
```

Where **156** is the number assigned to this particular series, **C:YRFILNME** is the drive, directory and name you have assigned to this series, and **r** indicates that the subfields are to be reversed since AGS files this series by number and you may prefer to file it by sheet name.

The program, instructions on its use, and a control file ready for editing are also available from the FTP site under the name **gxupdate.zip**. The FTP site designation is **convex.csd.uwm.edu**. Log in as **anonymous** and give your e-mail address as the password. To enter the GEODEX directory, enter (after ftp>) **cd ~ftp/pub/geodex**. To transfer zipped or program files, be sure to enter the **binary** mode. If you have questions or problems, feel free to contact Christopher Baruth, American Geographical Society Collection, University of Wisconsin-Milwaukee at **cmb@csd4.csd.uwm.edu** or at (800) 558-8993.

recent publications

MAPPING

The University of Chicago Press has announced two new publications: *Monarchs, Ministers, and Maps* by David Buisseret (ISBN 0-226-07987-2) and *The Cadastral*

Map in the Service of the State by Roger J. P. Kain and Elizabeth Baigent (ISBN 0-226-42261-5). *Monarchs, Ministers, and Maps* is a detailed look at the technology and political conditions between 1400 and 1600 in Italy, France, England, Poland, Austria, and Spain that answers a number of questions: When did monarchs and ministers begin to perceive that maps could be useful in governments? For what purposes were maps commissioned? How accurate and useful were they? How did cartographic knowledge strengthen the hand of government? *The Cadastral Map in the Service of the State* traces the development and application of rural property mapping in Europe from the Renaissance through the nineteenth century. Specifically, cadastral maps of the Netherlands, France, England, Scandinavia, the German lands, the territories of the Austrian Habsburgs, and the European colonies.

ATLASES

A number of thematic atlases have been published by Macmillan Reference. These include: *Atlas of the 1990 Census* by Mark T. Mattson (ISBN 0-02-897302-X), *Atlas of American Sport* by John F. Rooney, Jr. and Richard Pillsbury (ISBN 0-02-897351-8), *China: A Provincial Atlas* by Chiao-min Hsieh and Jean Kan Hsieh (ISBN 0-02-897184-1), and *Disease and Medical Care in the United States: A Medical Atlas of the Twentieth Century* by Gary W. Shannon and Gerald F. Pyle (ISBN 0-02-897371-2).

MAPPING SOFTWARE

Geocart is a map drawing program for Macintosh computers. It offers over 100 different map projections, each of which can be

customized in hundreds of ways. It also includes a database of the world coastlines, rivers, lakes, international boundaries, provinces, and U.S. states and counties. Maps can be exported in PICT, EPS, or Adobe Illustrator 1.1 format. For more information contact Terra Data, Inc., Bramblebush, Croton-on Hudson, New York 10520.

GIS

The *1993 International GIS Sourcebook* is now available from *GIS World*. The sourcebook has profiles for more than 430 GIS industry vendors, detailed charts comparing 281 GIS software packages, GIS course offerings from nearly 200 colleges and universities worldwide, a lexicon of GIS terms with citations and sources, industry directories on GIS hardware, software vendors, spatial data sources, consultants, etc., and articles by international experts on how GIS is used in 13 major application areas. For more information call *GIS World* (303)223-4848.

cartographic events

EVENTS CALENDAR 1993

February 15-18: **ACSM/ASPRS Annual Convention**. New Orleans, LA. Contact: ACSM, 5410 Grosvenor Lane, Bethesda, MD 20814; (301) 493-0200, fax (301) 493-8245.

February 15-18: **7th Annual Symposium on Geographic Information Systems in Forestry, Environmental and Natural Resources Management**.

Vancouver, British Columbia, Canada. Contact GIS 93 Symposium Office, Suite 305, 1040 Hamilton Street, Vancouver, British Columbia, Canada, V6B 2R9; (604) 688-0188, fax (604) 688-1573.

March 24-27: **Sixth Annual Geographic Information Systems Conference**. Baltimore, Maryland. Contact Dr. John M. Morgan, III, Department of Geography and Environmental Planning, Towson State University, Baltimore, Maryland 21204-7097, U.S.A., (410) 830-2964 (voice) and (410) 830-3482 (FAX).

May 3-9: **16th International Cartographic Conference - ICC '93**. Cologne, Germany. Contact: conference Secretariat, AKM Congress Service, Clarastrasse 57, GH - 4005 Basel, Germany.

May 5-8: **Geotechnica, the International Fair and Congress for Geosciences and Technology**. Cologne, Germany. Contact: KolnMesse U.S. Representative Office, German American Chamber of Commerce Inc., 666 Fifth Avenue, 21st Floor, New York, NY 10103-0165; (212) 974-8836, fax (212) 974-8838.

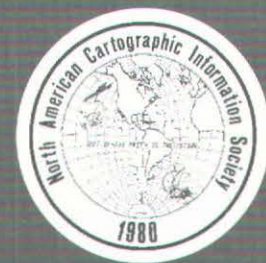
April 6-9: **Association of American Geographers Annual Meeting**. Atlanta, GA. Contact: Kevin Klug, AAG, 1710 16th St. N.W., Washington, D.C. 20009-3198; (202) 234-1450.

June 2-6: **1993 Canadian Cartographic Association Conference**. Winnipeg, Manitoba, Canada. Contact Dr. Marcia Faurer, Chair, Conference Organizing Committee, Department of Geography, The University of Winnipeg, 515 Portage Avenue, Winnipeg, Manitoba, Canada, R3B 2E9, (204)786-9481, fax (204)786-1824.

June 5-10: **84th Annual Conference of the Geography and Map Division Special Libraries Association**. Cincinnati, OH. Contact: Ms. Alice C. Hudson, Chief, Map Division, N.Y.P.L., 5th Avenue and 42nd Street, New York, NY 10018; (212) 930-0588.

June 21-25: **XVth International Conference on the History of Cartography**. Newberry Library, Chicago, Illinois.

November 2-4: **GIS/LIS '93**. Minneapolis, Minnesota. Contact GIS/LIS '93, 5410 Grovenor Lane, Ste. 100, Bethesda, MD 20814-2122; (301)493-0200



October 20-23

*North American
Cartographic
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XIII Annual Meeting

Washington, DC.

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NACIS news

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1993 Dues Renewal

All NACIS members should have received their 1993 dues renewal forms by now. You need to renew your membership if you wish to continue to receive *Cartographic Perspectives*. Please make sure that along with your address that you include your phone number, fax number, and e-mail address. The Executive Director has taken responsibility for maintaining the membership database and this is an excellent time to ensure we have the necessary information. If you neglected to include this information on your membership renewal you can e-mail, fax, phone, or write to the Executive Director at his address listed on this page.

Minutes of the NACIS Board Conference Call August 5, 1992

The following members of The Board participated in the conference call: J. Dodd, J. Patton, C. Remington, E. Hall, F. Fryman, R. Bolton, W. Fontanez, H. McLean, J. Minton, R. Rowles, J. Sutherland, Executive Officer C. Baruth, Local Program Chair G. Chu and CP Editor S. Andrews.

The meeting was called to order at 1:02 P.M. Minutes from the Winter Board meeting were approved with corrections.

Treasures Report

Ed Hall reported a balance of \$24,758.13 in the NACIS account, which included interest earnings of \$116.00. The problem of interest dividends paid at the rate of 3.2% along with a cap on the number of checks which may be dispersed from the account has brought Hall to search for other financial institutions to hold the account. Hall reports the possibility of having to file a 990 form with the I.R.S. as the account nears \$25,000. Membership totals were reported as: 244 individual, 43 student and 55 institutional.

NACIS XII

Jeff Patton reviewed the status of the preliminary program. This included the replacement of Session J with the new topic, "Map Librarians and Digital Data", to be organized by Sutherland, Minton and Pat McGlamery. Upon the suggestion of Mike Peterson, Session A will be dedicated to the memory of NACIS member Barbara Bartz Petchenik. The Board found it appropriate to dedicate Session J to the memory of NACIS member John Schroder. The Board waived the registration fee for three local conference participants as our invited guests. All session chairs were assigned. Jim Anderson will be contacted to chair a session on Atlases. Final arrangements for local field trips are not available for the preliminary program. Printing and distribution of the program will be completed by the first week of September. Information on hotel registration should be

available for the mailing.

Concerning workshops, fees were established as follows: \$75 for Macintosh Animated Cartography, \$70 for IBM Animated Cartography and \$50 for automated map design. These fees are applicable to NACIS members. Rooms and transportation arrangements are being finalized.

The Board approved the payment of air fare, an honorarium and one nights lodging for invited speaker, Authur Robinson.

Cartographic Perspectives

Andrews reports that the Fall issue of CP is ready for press pending any changes necessitated by this meeting. U. of W.- Milwaukee will bulk mail the 36 page edition. Andrews reports a smooth transition as new Editor. The Editorial Board (formerly the Publications Committee) promises a feature article for the Winter issue. The size and terms of the Editorial Board will be addressed at the St. Paul meeting.

Nominations and Elections

Fryman solicited suggestions from the Board to fill the ballot for our October elections. Drawing from Milwaukee area members, a Tellers Committee will be established to oversee the election.

NACIS XIII

Bolton reports that Fred Anderson and Susan Nelson have been contacted and have agreed to help in local arrangements. Final contractual arrangements with the Quality Hotel in Silver Springs, Maryland are pending. October 20-23, 1993 will be the dates for our meeting. Room rates have been quoted as \$69 single and \$77 double.

NACIS XIV

A preliminary survey of possible sites in Ottawa has begun. Dodd will contact by letter Canadian members who might help in local arrangements. A final decision on the suitability of Ottawa will be made at our St. Paul meeting.

Other Business

Dodd notes that as of August 31 his phone number will become 751-3404. Sutherland adds that the Athens, Georgia area code has changed to 706.

The Boards final business was to announce that Ruth Rowles will serve as Chair of the Membership Growth Committee and the meeting adjourned at 2:40 p.m.

Craig Remington, Secretary

Minutes of the NACIS Board Meeting October 14, 1992 St. Paul, MN

The following members of the Board were present: F. Fryman, J. Sutherland, J. Anderson, R. Bolton, W. Fontanez, J. Minton, E. Hall, J. Dodd, J. Patton, C. Remington, H. McLean, Executive Officer C. Baruth, CP Editor S. Andrews, Local Arrangements Chair G. Chu, and Editorial Board Chair M. Peterson.

The meeting was called to order at 2:40 p.m. Minutes from the teleconference Board meeting of August 5, 1992 were approved with corrections.

Treasures Report

Ed Hall reported a balance of \$14,079.73 in the NACIS account. Accepted by the Board was a cash flow report for the 1992 fiscal year. In order to solve the problem of limits on checking transactions, the Board approved the transfer of the account from a commercial bank to a trust company. Consideration of placing some of the Societies resources into a mutual fund account was discussed and voted down. The Board called for Hall to move the funds at his discretion.

Local Arrangements

Greg Chu reported the registration for the computer workshops as follows: Macintosh Animation 4, IBM Animation 10 and Map Design with CoreIDRAW 21. He announced adjustments in the field trips available to the conference attendants. A van was rented for transportation needs at considerable savings over charter bus rates. The Board expressed appreciation for the work of Chu on local arrangements.

Cartographic Perspectives

Editor Andrews reported that she has established deadlines for three issues of *CP* annually as January for the Winter issue, April for the Spring issue and August for the Fall issue. The Board moved to limit free back issues of *CP* to three for new members. She reported the total cost of 557 copies of *CP*13 as \$3079.86. Press runs of 600 copies will be continued for future issues. A limited number of back issues of *CP* are available at a cost of \$10.00 each. Abstracts of articles in French will be added with *CP*14. The Editor expressed the need to strengthen the content of the Cartography Lab and Map Library Bulletin Boards. This will be accomplished by assigning an appropriate member of the Editorial Board to each Bulletin Board section. To facilitate communication with the membership, *CP* will introduce a column by the President for Winter issues, a column by the Program Chair for Spring issues and a column by the Local Arrangements Chair for the Fall issue. A proposal was submitted by the Editor to have a future issue of *CP* incorporate one signature of color. The proposal will be decided upon in the forthcoming Board Meeting.

Elections

Fryman announced the results of the election for officers and board members. Henry Castner, Juan Valdez and Ron Bolton were elected to the Board. Charles Harrington was elected Vice President and Ed Hall was reelected as Treasurer.

NACIS Printing Needs

As a step toward our continuing goal of centralization, the Executive Officer will now be charged with meeting the printing demands of future Call for Papers, Preliminary Programs, and Programs.

Workshop Instructors

The Board approved a complementary banquet dinner for the instructors of the computer workshops.

Ottawa 1994

The President announced that he has contacted Betty Kidd who is willing to work on local arrangements of an Ottawa meeting. A preliminary

review of hotel room costs show a price range of between \$83.00 to \$97.00 U.S. Early October is the time frame, not to conflict with Canadian Thanksgiving. The Board will look toward the possibility of linking our meeting with that of another appropriate organization.

Committees

The Board was made aware of the need to expand committee memberships. Bolton, Hall, and Dodd will serve on an ad hoc committee charged with this task. Sign-up sheets will be circulated at the business meeting. Committee assignments and reappointments are annual at the pleasure of the President. While agreeing to serve as a member, Minton asked that a new Chair for the Inter-American Committee be found.

NACIS Representatives

Official representatives of NACIS for other professional groups include: Ed Hall (92-94) and Andrew Johnson (93-95) to the Cartographic Users Advisory Council, Diana Rivera to the Congress of Cartographic Information Specialists Associations and an open position to the American Library Association.

NACIS XIII

Bolton reported that Fred Anderson and Susan Nelson have agreed to serve on the Local Arrangements Committee. They will decide on a Chair.

NACIS XII

Other matters of NACIS XII having already been discussed, Patton added that the solicitation for papers via the mail produced only three submissions and suggested that face to face contact with potential presenters was the most fruitful means of covering sessions. Patton thanked the Board for their support on NACIS XII.

Other Business

McLean asked that we explore the possibility of again sharing a meeting with the International Map Dealers Association. The meeting was adjourned at 5:35 pm.

Craig Remington, Secretary

Minutes of the NACIS Business Meeting October 16, 1992 St. Paul, MN

The meeting began at 12:45 pm with Dodd thanking those present for their participation. Committee sign-up sheets were circulated. A call for session chairs and papers for NACIS XIII was announced. Dodd recognized the work of Greg Chu and Brent Allison along with their able students. New Board members were introduced along with thanks to those who had served. Dodd asked for nominations for future positions on the Board. A polling of those present showed support for a future meeting in Ottawa.

Sona Andrews asked that members continue to send comments and suggestions concerning *CP* to her attention.

Chris Baruth asked members for the addresses of potential participants to be included on the Call for Papers mailing list.

Sona and the members present joined in thanking Jack Dodd for his work as President. An Open Board Meeting was announced on this day at 4:00 pm. Adjourned, 1:05 pm.

Craig Remington, Secretary

Minutes of the NACIS Board Meeting October 16, 1992 St. Paul, MN

The following members of The Board were present: J. Patton, C. Harrington, H. McLean, J. Anderson, C. Remington, J. Sutherland, J. Minton, E. Hall, H. Castner, J. Dodd, R. Bolton, Executive Officer, C. Baruth, *CP* Editor S. Andrews, Editorial Board Chair M. Peterson.

President Jeff Patton called the meeting to order at 4:03 pm.

Editorial Board

After thanking Jack Dodd for his service to the Society, business turned to changes in Editorial Board proce-

dures as outlined by Mike Peterson. Changes include: a limit of three reviewers from the Board per article based upon the topic of the article, authors names will be removed from the reviewing process and, an increase in the size of the Editorial Board to 7 or 8 with term limits of 3 years thereby allowing for 2 new members annually. Further, the composition of the Board will be drawn from members in the fields of education, cartographic labs, map libraries and government service. Donna Schenstrom will take the lead on cartographic lab submissions and Marsha Selmer will do the like for map library submissions. Andrews asked that four copies be provided for each paper submitted for review. She also suggested the possibility of future guest editors for *CP* as might be appropriate for special topic issues. Peterson received the sign-up sheet of those interested in serving on the Editorial Board and will act in response to their interest.

Cartographic Perspectives

Attention turned to the matter of future issues of *CP* containing color. An eight page signature in color will add \$1100 to printing costs. A motion was placed upon the floor to approve one future issue to include one signature of color, the particular issue to be at the discretion of the Editor. The motion was seconded and passed. C. Baruth noted that additional copies above the normal press run would serve as a promotional device for the journal. He also asked that the membership growth committee have past issue overruns to serve in recruiting new members.

Dues

The matter of increasing dues was tabled.

New Business

Some suggestions were offered for the meeting in Washington including a list of conference pre-registrants and the

possibility of a new directory of NACIS members for those who register for the conference. Responding to the wishes of those present at the Business Meeting, Dodd will initiate preliminary negotiations with Ottawa hotels. Patton offered the suggestion that at future meetings, PC's be made available to allow members the opportunity to exchange data base files. An effort will be made to expand the offering of exhibits from Federal agencies owing to our Washington meeting site. Harrington will solidify a theme for the meeting and have a call for papers ready by February 15. Dodd will search for additional address of federal employees to supplement the call for papers mailing list. Business was concluded with Baruth asking for the creation of an ad hoc standing committee on digital applications of cartographic information. Adjourned 5:43 pm.

Craig Remington, Secretary

PRELIMINARY CALL FOR PAPERS

NACIS XIII

The theme for the conference is
CARTOGRAPHY IN OUR CHANGING WORLD

October 20-23, 1993
Washington, D.C.

It is not too early to be thinking about presenting a paper for the conference

Please contact
Charles E. Harrington
National Ocean Service - N/CG2x5
6001 Executive Blvd.
Rockville, MD 20852-3806
(301) 443-8360
fax (301) 443-8701

(note: the address and phone number will change after June of this year as NOS completes its consolidation move to the Sivler Spring Metro Center Complex)

EXCHANGE PUBLICATIONS

Cartographic Perspectives gratefully acknowledges the publications listed below, with which we enjoy exchange agreements. We continue to seek agreements with other publications.

ACSM Bulletin. Offering feature articles, regular commentaries, letters, and news on legislation, people, products and publications, the American Congress on Surveying and Mapping's *Bulletin* is published six times a year. Contact: Membership Director, 5410 Grosvenor Lane, Bethesda, MD 20814; (301) 493-0200.

Bulletin of the Society of Cartographers. Published twice a year, the *Bulletin* features articles on techniques and ideas applicable to the Cartographic Drawing Office. Contact: John Dysart, Subscriptions Manager, Room 514, Middlesex Polytechnic, Queensway, Middlesex, EN3 4SF, England.

Cartouche. A quarterly publication offering news and announcements to members of the CCA. Contact: Canadian Cartographic Association, c/o Jim Britton, Sir Sandford Fleming College, School of Natural Resources, P.O. Box 8000, Lindsay, Ontario K9V 5E6 Canada; (705) 324-9144; e-mail: britton@trentu.ca; fax: (705) 324-9716.

Cartographica. A quarterly journal endorsed by the Canadian Cartographic Association/Association Canadienne de Cartographie that features articles, reviews and monographs. B V Gutsell, founder and editor. ISSN 0317-7173. Contact: University of Toronto Press Journals Department, 5201 Dufferin Street, Downsview, Ontario, M3H 5T8 Canada; (416) 667-7781.

Cartographic Journal. Biannual Journal of the British Cartographic Society. Includes research articles, 'shorter' articles, official records of the Society, book reviews, and list of recent cartographic literature. Contact: Hon. Secretary, Charles Beattie, 13 Sheldrake Gardens, Hordle, Lymington, Hants, SO4 10FJ, England.

Cartography. Biannual Journal of the Australian Institute of Cartographers. Each issue contains two parts, the Journal proper and the Bulletin. The Journal contains original research papers, papers describing applied cartographic projects, reviews of current cartographic literature and abstracts from related publications. ISSN 0069-0805. Contact: John Payne, Circulation Manager, GPO Box 1292, Canberra, A.C.T. 2601, Australia.

Cartography Speciality Group Newsletter. Triannual publication of the Cartography Speciality Group of the Association of American Geographers. Features news, announcements and comics. Contact: Ann Goulette, Editor, Intergraph Corporation, 2051 Mercator Drive, Reston, VA 22091-3414; (703) 264-7141; e-mail: ann@pluto.ne1300.ingr.com.

Cartomania. This quarterly newsletter of the Association of Map Memorabilia Collectors offers a unique mix of feature articles, news, puzzles, and announcements of interest to cartophiles. ISSN 0894-2595. Contact: Siegfried Feller, publisher/editor, 8 Amherst Road, Pelham, MA 01002; (413) 253-3115.

Geotimes. Monthly publication of the American Geological Institute. Offers news, feature articles, and regular departments including notices of new software, maps and books of interest to the geologic

community. Articles frequently address mapping issues. ISSN 0016-8556. Contact: Geotimes, 4220 King Street, Alexandria, VA 22302-1507.

GIS World. Published six times annually, this news magazine of Geographic Information Systems technology offers news, features, and coverage of events pertinent to GIS. Contact: Julie Stutheit, Managing Editor, GIS World, Inc., P.O. Box 8090, Fort Collins, CO 80526; (303) 223-4848; fax: (303) 223-5700.

Information Design Journal. Triannual publication of the Information Design Unit. Features research articles reporting on a wide range of problems concerning the design and use of visual information. Contact: Information design journal, P.O. Box 185, Milton Keynes MK7 6BL, England.

Perspective. This newsletter of the National Council for Geographic Education (NCGE) is published five times a year in October, December, February, April and June. News items related to NCGE activities and geographic education are featured. Contact: NCGE, Leonard 16A, Indiana University of Pennsylvania, Indiana, PA 15705; bitnet: CLMCCARD@IUP.

FEATURED PAPERS

Each issue of *Cartographic Perspectives* includes featured papers, which are refereed articles reporting original work of interest to NACIS' diverse membership. Papers ranging from theoretical to applied topics are welcome. Prospective authors are encouraged to submit manuscripts to the Editor or to the Chairperson of the NACIS Editorial Board. Papers may also be solicited by the Editor from presenters at the annual meeting and from other sources. Ideas for special issues on a single topic are also encouraged. Papers should be prepared exclusively for publication in *CP*, with no major portion previously published elsewhere. All contributions will be reviewed by the Editorial Board, whose members will advise the Editor as to whether a manuscript is appropriate for publication. Final publication decisions rest with the Editor, who reserves the right to make editorial changes to ensure clarity and consistency of style.

REVIEWS

Book reviews, map reviews, and mapping software reviews are welcome. The Editor will solicit reviews for artifacts received from publishers. Prospective reviewers are also invited to contact the Editor directly.

TECHNICAL GUIDELINES FOR SUBMISSION

Literature cited should conform to the Chicago Manual of Style, 13th ed., University of Chicago Press, Chapter 16, style "B." Examples of the correct citation form appear in the feature articles of this issue. Authors of Featured Papers should submit four printed copies of their manuscript for review directly to Dr. Michael Peterson, Chair of the *CP* Editorial Board, Department of Geography, University of

Nebraska - Omaha, Omaha, Nebraska 68182. Manuscripts are reviewed by a minimum of two referees. The recommendations of the reviewers and the Chair of the *CP* Editorial Board are sent to the Editor of *CP*. The Editor will contact all authors to notify them if their paper has been accepted for publication and if revisions are necessary prior to publication. The following technical guidelines should be followed for all accepted manuscripts (these guidelines also apply to book, map, and software reviews).

Material should be submitted in digital form on 3.5" diskettes. Please send a paper copy along with the disk, in case it is damaged in transit. Text documents processed with Macintosh software such as *WriteNow*, *WordPerfect*, *MS Word*, and *MacWrite* are preferred, as well as documents generated on IBM PCs and compatibles using *WordPerfect* or *MS Word*. ASCII text files are also acceptable.

PostScript graphics generated with *Adobe Illustrator* or *Aldus FreeHand* for the Macintosh or *Corel Draw* for DOS computers are preferred, but generic PICT or TIFF format graphics files are usually compatible as well. Manually produced graphics should be no larger than 11 by 17 inches, designed for scanning at 600 dpi resolution (avoid fine-grained tint screens). Continuous-tone photographs will also be scanned.

Materials should be sent to: Dr. Sona Karentz Andrews, Editor- *Cartographic Perspectives*, Department of Geography, 3413 N. Downer Avenue, University of Wisconsin-Milwaukee, Milwaukee, WI 53211; (414) 229-4872, fax (414) 229-3981; e-mail: sona@csd4.csd.uwm.edu.

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NACIS membership form

**North American Cartographic Information Society
Sociedad de Información Cartográfica Norte Americana**

Name/Nombre: _____

Address/Dirección: _____

Organization/Afiliación profesional: _____

Your position/Posición: _____

Telephone Number: _____

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Valor de nómina de socios para el año:

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**Membership fees include subscription to *Cartographic Perspectives*.*

The North American Cartographic Information Society (NACIS) was founded in 1980 in response to the need for a multidisciplinary organization to facilitate communication in the map information community. Principal objectives of NACIS are:

§ to promote communication, coordination, and cooperation among the producers, disseminators, curators, and users of cartographic information;

§ to support and coordinate activities with other professional organizations and institutions involved with cartographic information;

§ to improve the use of cartographic materials through education and to promote graphicacy;

§ to promote and coordinate the acquisition, preservation, and automated retrieval of all types of cartographic material;

§ to influence government policy on cartographic information.

NACIS is a professional society open to specialists from private, academic, and government organizations throughout North America. The society provides an opportunity for Map Makers, Map Keepers, Map Users, Map Educators, and Map Distributors to exchange ideas, coordinate activities, and improve map materials and map use. *Cartographic Perspectives*, the organization's Bulletin, provides a mechanism to facilitate timely dissemination of cartographic information to this diverse constituency. It includes solicited feature articles, synopses of articles appearing in obscure or non-cartographic publications, software reviews, news features, reports (conferences, map exhibits, new map series, government policy, new degree programs, etc.), and listings of published maps and atlases, new computer software, and software reviews.

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