El desarrollo de la aplicación de paquetes de software para la publicación de mapas por la Temple University fue instigado en 1986 por la necesidad de buscar una alternativa para la produccíon de mapas por la micro-computadora Apple Macintosh. Nuestra experiencia indica que estos aperos pueden reducir significamente los costos asociados con el diseño y produccíon de atlases tematicos sin sacrificar la calidad de los gráficos. Este articulo presenta concisamente las actividades cartográficas de la Temple University con el proposito de stimular discursos pláticos sobre formas alternativas para el diseño y produccíon de mapas.

Extracto

cartographic techniques

COLOR PRINTER TECHNOLOGIES

The July, 1989 issue of *Computer Graphics Review* features an article dealing with the current status and future prospects of color printer technologies (Kinnucan, Paul (1989), The technology cornucopia in color printers, *Computer Graphics Review* 4:7, pp. 26–34).

Sales of color printers are reported to have totalled $365 million in 1988, surpassing other output devices such as pen plotters and film recorders. Despite their relatively low resolution (180–400 dpi), market analyst CAP International projects that annual sales of color printers may exceed $1 billion in three years.

Kinnucan classifies color printers by five general types. **Dot matrix** color printers "employ small wires (or hammers) in the print head to transfer ink from a multicolored ribbon onto the paper." Dot matrix printers are popular because of their relatively low cost. **Ink jet** color printers "propel ink droplets, either continuously or on demand, toward the surface of the paper . . .", producing highly saturated colors and sharp, continuous-tone images. **Thermal wax transfer** printers "create images by melting pinpoint spots of colored wax onto paper. Because this dot formation technique entails no head movement, thermal transfer printers can create high-resolution images (200- to 300 dpi) with highly saturated colors at twice the speed of ink jet printers . . .". **Dye diffusion** printers "heat a dye-impregnated ribbon, causing dye spots to vaporize and diffuse onto paper . . . [creating] images that rival photographs in clarity and sharpness." Dye diffusion printers are as yet not in widespread use, due to high cost and small image size (maximum 4" x 6"). **Electrostatic** printers "put electric charges on paper where a spot is needed, and then apply colored toners to create an image." The high price of electrostatic color printers is offset by their capability to produce high-resolution (up to 400 dpi), large-format (up to E size) images at high speed.

Kinnucan is optimistic that color printers will improve with regard to both performance and price. Kodak and Hitachi, for example, are currently working on page size dye diffusion devices. An emerging technology dubbed the "Cycolor" process (developed by Mead Imaging, Miamisburg, OH) "creates latent images by exposing a donor sheet containing photosensitive ink capsules to light. The donor sheet is then pressed against a receiver sheet or transparency to create a final copy." Color laser printers, currently under development by Canon and Colorocs, are expected to appear in the coming year.

The article concludes with a "Color Printer Survey" matrix that compares 32 color printers from 18 vendors by output size, resolution, imaging time, interfaces, graphics device emulation, and price.

MacATLAS

MacAtlas, a product of MicroMaps Software Inc., Lambertville, NJ, is a collection of clip-art map boundary files for Macintosh drawing and paint programs. The maps can be opened in software such as MacDraw, MacPaint, Adobe Illustrator and Aldus FreeHand, and used to create choropleth maps, or as bases for other location or thematic mapping tasks.

Four MacAtlas products are currently available. The MacAtlas EPSF (Encapsulated PostScript Format) version ($199) includes 2 world maps, 11 regional maps, maps of the USA by state, and all 50 states by county. The MacAtlas Professional Version ($199) includes a similar set in PICT format. Also available are the MacAtlas Paint version 2.0 ($79) and the MacAtlas Presentation Pack ($199).

For more information, call MicroMaps at (800) 334-4291.

A WORLD SOILS AND TERRAIN DIGITAL DATABASE

Marion F. Baumgardner
International Society of Soil Science

In 1985 a provisional working group was established by the International Society of Soil Science (ISSS) to consider the feasibility and desirability of developing a world soils and terrain digital database at a map scale of 1:1M. The project, known as SOTER, won a contract from the

United Nations Environment Programme (UNEP) in 1987. It had two obligations: to produce a general soil degradation map of the world at a scale of 1:15M, and to develop a soils and terrain digital database at a scale of 1:1M for an area of approximately 250,000 sq. km which includes portions of Argentina, Brazil, and Uruguay.

OBJECTIVES

The long range objective of the SOTER Project is to produce a world soils and terrain digital database containing digitized map unit boundaries and their attribute (descriptive) database. The database has the following characteristics:

§ general average map scale, or accuracy, of 1:1M;
§ compatible with global databases of other environmental resources and features;
§ amenable to updating and purging of obsolete and/or irrelevant data;
§ accessible to a broad array of international, regional, and national decision-makers and policy-makers;
§ transferable to and useable by developing countries for national database development at larger scales (greater detail).

This is an exceedingly ambitious project, one which will require sustained, innovative effort over a period of many years.

Specific short range objectives are required in the initial phases of the Project to provide a logical and orderly sequence of activities to produce an operational world soils and terrain digital database. Emphasis will be on research, development and testing of methodologies in the field and in the laboratory and demonstration of the uses of the database. Specific short term objectives are as follows:

§ development of an implementation plan;
§ adoption of a universal legend for the SOTER Database;
§ development of guidelines for correlation of soils and terrain mapping units;
§ definition of soils and terrain parameters and specifications to be included in the Database;
§ development of a detailed set of specifications and logic which define the minimum set of capabilities/functions required for the Database;
§ selection of three specific areas of 250,000 sq. km each in developing countries for initial database construction;
§ acquisition and correlation of all relevant maps and data about the selected areas essential for the Database;
§ input of data, including digitized maps, into the Database;
§ test and demonstration of the reliability, accuracy and utility of the Database;
§ conduct of an assessment of current geographic information systems and development of recommendations on the optional system for the SOTER Project; and
§ documentation of results, conclusions and recommendations from the initial phase of the SOTER Project.

A UNIVERSAL LEGEND FOR THE SOTER DATABASE

A draft version entitled "SOTER Procedures Manual for Small Scale Map and Database Compilation" was produced by an International Committee of Soil Scientists in 1988. This Manual describes procedures for compiling and coding the following kinds of data for entry into the SOTER Database:

§ Polygon file (15 attributes)
§ Terrain component file (28 attributes)
§ Soil layer file (73 attributes)
§ Soil degradation file

The Manual also presents coding forms on which to enter all the attribute file data which have been translated into the universal legend from whatever soil classification system that is being used.

SELECTION OF BASE MAP FOR SOTER DATABASE

In 1984 a joint Working Group of the International Geographical Union (IGU) and the International Cartographic Association (ICA) was established to explore the feasibility of developing a standard global data set. This project, entitled World Digital Database for Environmental Science (WDDES), concluded that the Operational Navigation Chart (ONC) series produced by the US Defense Mapping Agency provides consistent global map coverage of high cartographic quality at a scale of 1:1M. The IGU/ICA Working Group recommended the use of digitized ONCs as the best available 1:1M base map for input into world databases for registration and overlay of other natural resource data, including soils and terrain.

Representatives of the SOTER Project, having participated in many of the deliberations of the IGU/ICA Working Group, accepted the recommendations of that Working Group and have made the decision to use digitized ONCs as the base map for SOTER.

PROGRESS REPORT

LASOTER (Latin American SOTER Pilot Area). Scheduled for completion on 31 December 1989, database development for the Latin American Pilot Area is on schedule. In March 1988 a regional workshop was held in Montevideo to develop an implementation plan and to train soil scientists from Argentina, Brazil and Uruguay to use the universal SOTER legend and procedures manual for correlating soil maps of different classification systems to a uniform system of description and attribute entry into the database.

This workshop was followed by two separate correlation field trips

by participants of the three countries and an external soil correlator into the pilot areas of each country. By mid-December 1988 acquisition of all map and attribute data from each of the three countries for the Pilot Area was complete. All attribute data have been coded and entered into the SOTER attribute files. Entry of polygon or map data into the SOTER Database will be done in the latter half of 1989 after selection of a geographic information system (GIS) for SOTER. Once the polygon and attribute files are in place, testing and demonstration of utility of the database will be conducted.

NASOTER (North American SOTER Pilot Area). Work was begun on a US-Canadian Pilot Area following a workshop and implementation planning meeting in Ottawa in March 1989. This pilot area includes the state of Montana USA and the southern portion of the Canadian provinces of Alberta and Saskatchewan. A cooperative effort by the US Soil Conservation Service and the Land Resource Research Centre of Agriculture Canada, the SOTER Database for this Pilot Area is scheduled for completion by 31 December 1989.

WASOTER (West African SOTER Pilot Area). Negotiations are proceeding now to define an area which will involve six countries in West Africa in the development, testing and demonstration of the utility of a SOTER Database for that area.

Within the next two or three years it is anticipated that the SOTER Project may expand into other areas of the world. Particular interest has been expressed for cooperative implementation of the SOTER concept in an area of the Middle East, India, Southeast Asia, northern South America, Central-Eastern Europe, and Western Europe.

In general, the overriding objective of the SOTER Project is to improve the capability to deliver accurate, timely and useful information about soils and terrain resources to decision-makers and policy-makers. It is expected that a World Soils and Terrain Digital Database will provide this improved capability of information delivery. Some more specific expected results are as follows:

§ Orderly arrangement of resource information;
§ Improvement in standardization and compatibility of reporting soils and terrain data/information;
§ Improvement in accessibility of soils and terrain and related resource information;
§ Dynamic resource information system with updating and purging capabilities;
§ Information service for national resource planning in developing countries; and
§ System model for technology transfer.

As the world is being caught up in the "information revolution," there is an increasing need to find innovative and more effective methods for using and transferring this technology. The SOTER Database Project can provide an excellent vehicle for training a cadre of specialists, especially in developing countries, for using the Database, providing new data and developing new uses of the Database. The operational World Database can also serve as a model for the design and construction of incountry databases with sufficient detail and scale (accuracy) for local and provincial use.
(reprinted from ICSU Newsletter, 6/89)

EXPERT MAP PROJECTION SELECTION SYSTEM

Doyle Smith and John Snyder
United States Geological Survey

Cartographers at the U.S. Geological Survey are developing a system for the computerized selection of map projections for special-purpose map and chart design applications. This system, named the Expert Map Projection Selection System (EMPSS), is a computer software package that uses object-oriented structures and artificial-intelligence programing methods. The EMPSS has been developed for use in the design of thematic maps and other customized map products of the type generally constructed within a geographic information system environment.

The EMPSS package includes a base of information that contains human-expert technical descriptions and evaluations of the physical attributes of more than 50 of the most commonly used map projections.

The EMPSS operates by asking the user a series of general questions about specific needs or applications. The answers to this series of 10 to 24 questions enable the system to construct an idealized set of specifications for the proposed application. Once this ideal model has been constructed, the system evaluates each of the map projections in the knowledge base against the ideal model, using the stored evaluative information provided by the human expert. The name of the map projection that compares most favorably to the specifications of the idealized model is provided to the user as the optional projection for the proposed application or usage.
(extracted from U.S. Geological Survey Yearbook FY 1988)

SPACE SHUTTLE DEPLOYS RECONNAISSANCE SATELLITE

The space shuttle Columbia's latest mission, a secretive Pentagon exercise undertaken August 8 to 12, reportedly focused on the deployment of a $1 billion advanced photo reconnaissance satellite known as the KH-12. The satellite, a spy craft with more powerful sensors and greater maneuverability than previous

models, is expected to photograph a large portion of the world, but spend the majority of its time flying over the Soviet Union. Its less predictable orbits are being hailed by industry analysts as the beginning of an era in which it will be "far more difficult for the Soviets to evade [American] surveillance." Experts agree that the machine will greatly enhance the ability of the United States to verify treaties and arms control agreements, but have offered little clue as to just how powerful its sensors are. In this age of rumor mills, information leaks, and spy scandals, it is amazing that no one (without a high-level security clearance) seems to know what the image resolution capabilities of modern remote sensing surveillance equipment really is.
(adapted from the New York Times, 8/9/89)

cart lab bulletin board

This forum is offered to encourage communication among practitioners at a time of rapid technological transition. Questions, comments, and announcements are invited.

CARTOGRAPHY AT THE UNIVERSITY OF TORONTO

G.J. Matthews, Chief Cartographer
University of Toronto

The cartography office at the University of Toronto is an integral part of the Department of Geography. The present office occupies a 2080 square foot open plan room, with natural light, in the basement level of Sidney Smith Hall in the Arts and Science Faculty.

The office was established in 1963 when I was hired to design and produce the *Economic Atlas of Ontario*. For that project the staff gradually increased to 6 cartographers. Cartographic supply and demand caused some fluctuations in staff levels over the years: from a low of 3 personnel in the early 70's to the present high level of 8 female and 5 male full-time professionals.

In the early years the cartographic mandate was to provide a drafting service to the geography academic staff for slides, overhead transparencies, and for publication materials. If time was available the cartographers were also expected to extend this free service to graduate students in need of maps and graphs for their theses. During these years, though, the *Economic Atlas* project had priority over all other work.

The office established, with the *Economic Atlas* publication, a style and quality of cartographic production second to none. When the applause abated the expected flow of major projects to our office failed to materialize, so once again we became a service lab for geography staff. Unfortunately the academic staff were now in the first hypnotic trances of the computer age and the demand for maps almost entirely disappeared.

The mid 70's introduced a new phenomena that effected our operation—the shrinking University budget! Partly, at first, to supplement the departmental budget, and later as a contribution to salaries, the "free" drafting service disappeared and "cost recovery" was now introduced. This had a profound effect on our operation and changed the direction of the office entirely. Academic staff now had to pay through pre-arranged grants for their previously free cartographic service, and our time and materials were charged to all jobs.

We now extended our cartographic service to all University departments, and later promoted our talents to provincial government departments and to interested publishing houses. Contract cartography for specific map work was now more frequent.

In 1978 a group of geographers, historians, and cartographers made a formal proposal to the federal government, through the Social Sciences and Humanities Research Council, to produce a three-volume *Historical Atlas of Canada*. The cartography office was an integral part of that proposal. When the project was approved in 1979 (with a $5 million budget) the gradual hiring of new staff began. Today the office is staffed by 13 cartographers with a combined total of 170 years experience.

Because of our professional reputation and high quality of production our atlases have been awarded 4 gold medals; all staff are full-time highly qualified cartographers. Only occasionally has the office hired students for summer help. The cartography operating budget for salaries, supplies and filmwork is well in excess of a half million dollars a year.

Volume I of the *Historical Atlas of Canada* was published in 1987. The French and English editions sold over 24,000 copies at $95 each and received very positive reviews and awards. Production is nearing completion on the second volume in the series which will be published in September, 1990.

About the time we were gearing up for the *Historical Atlas* the number of commercial mapping contracts increased dramatically. During the past ten years there have been few periods without 2 different atlases being produced concurrently. The office has now 12 full colour atlases to it's credit and is currently working on numbers 13 and 14.

Although the office is an integrated unit and the cartographers are intermingled the cartographic responsibilities are divided. *Historical Atlas* staff work solely on that project, while geography staff work on all other contracts. On occasions when deadlines are critical manpower is rearranged temporarily to maintain production schedules.