LETTER TO THE EDITOR

This letter is to correct misconceptions about the recently revised Office of Management and Budget (OMB) Circular A-16, titled "Coordination of Surveying, Mapping, and Related Spatial Data," discussed in the article "OMB Considers Data Committee, A-16 Revisions" in the Summer 1990 issue of *Cartographic Perspectives*. Specifically, we would like to correct the following misconceptions: 1) that the Federal Interagency Coordinating Committee on Digital Cartography's (FICCDC's) proposal to establish the Federal Geographic Data Committee (FGDC) was separate from its proposal to revise OMB Circular A-16; 2) that the proposal advocated that resource, environmental, cultural and demographic, and ground transportation data would become part of the responsibility of the Geological Survey's National Mapping Division; and 3) that the proposal named the National Mapping Division as the chair of the FGDC.

The revised Circular A-16 expands the breadth of coordination to include other categories of spatial data and assigns government-wide leadership roles to Federal departments for coordinating these data. These categories and lead departments include: digital soils and vegetation data (Department of Agriculture); geodetic and cultural and demographic data (Department of Commerce); base topographic mapping, cadastral, geologic, and wetlands data (Department of Interior); portrayal of certain international boundaries (Department of State); and ground transportation data (Department of Transportation).

The revised Circular also establishes a new interagency coordinating committee named the Federal Geographic Data Committee which replaces the FICCDC. The objective of the FGDC is to promote the coordinated development, use, sharing, and dissemination of surveying, mapping, and related spatial data. The Circular identifies the following organizations as members of the FGDC: the Departments of Agriculture, Commerce, Defense, Energy, Housing and Urban Development, Interior, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the National Aeronautics and Space Administration; and the National Archives and Records Administration. The Circular also identifies the Department of the Interior as the chair of the committee.

The proposal for a revised Circular A-16 was developed by the FICCDC in response to a request from OMB. The proposal was reviewed and commented upon at a government-wide Forum on Spatial Data Coordination in December 1989.

Written comments from Federal, State, and local government agencies and professional societies were received in early 1990. The Secretary of the Interior formally sent the proposal to OMB in May. During the summer OMB requested that the departments and independent agencies, which are members of the FICCDC, formally review and comment on the proposal. OMB Director Richard Darman signed the revised Circular on October 19, 1990.

If you have any questions about this information, please call me at (703) 648-4533.

Sincerely yours,
Michael A. Domartz,
Executive Secretary,
Federal Interagency Coordinating Committee on Digital Cartography

cartographic techniques

ANATOMY OF THE INTRODUCTORY CARTOGRAPHY COURSE

Dr. James F. Fryman and Bonnie R. Sines, University of Northern Iowa

ABSTRACT

The principal focus of this paper is to determine whether a common consensus exists among cartography instructors regarding the content of the introductory cartography course. In addition, the research describes the background of instructors and the course context and content. The determination of differences and similarities among introductory cartography courses was facilitated using a questionnaire mailed to 378 instructors at 285 institutions of higher education in the United States and Canada in the Fall of 1989.

INTRODUCTION

Since the introductory cartography course is often students' only formal exposure to cartographic concepts, theory and map production, it is especially important to define essential topics, exercises and techniques. In addition, a strong cartographic foundation is needed for those students choosing to do advanced work in cartography. It is probably idealistic to assume that the population of cartography instructors would be in universal agreement about what should be contained in an introductory cartography course. However, it should not be unrealistic to believe that a reasonable consensus of what is important can be determined.

The intent of this study is to give an overview of the introductory cartography course today. The survey emphasizes the variations and similarities between introductory cartography courses in

structure, context and content. Specific topics examined in the survey are: textbook use, the degree of computer use in course exercises, the types of exercises assigned and the amount and types of equipment required to be purchased by the student. The study includes all four-year institutions of higher education in the United States and Canada offering an introductory course in cartographic methods.

While specific comparisons cannot be made to any previous survey of cartography courses, there are several research articles which have addressed issues and topics raised in this questionnaire. The proceedings of a 1978 symposium on the introductory cartography course in twelve Canadian schools found that most introductory cartography courses focused primarily on the practical components of mapping. It also revealed an absence of computer-assisted mapping in this area (Coulson 1981). Andrew's (1985) survey of cartography textbook usage included all cartography related courses, from introductory to advanced classes. The textbook found to be used by over one-half of the introductory cartography instructors was Robinson, Sale, Morrison and Muehrcke's *Elements of Cartography* (Robinson *et al* 1984). Several articles by Dahlberg dealing with the state of professional training for cartographers and cartographic education in general stressed that the majority of cartographic training is taking place in a limited number of universities. Furthermore, he stated that the thematic map dominates course content in introductory cartography courses (Dahlberg 1977, 1983, 1984). Kimerling's chapter in *Geography in America* reviews the general state of cartography in the late 1980's (Gaile and Willmott 1989).

INTRODUCTORY CARTOGRAPHY COURSE SURVEY

Name _____ Institution _____

Title _____ Year Graduated _____ Graduate Instution _____

1. How long have you been teaching introductory cartography? _____ Years
2. How often is the introductory course offered per year? 1 2 3 4 5 6
3. How many credits does the course have? 1 2 3 4 5 6
4. Number of lecture hours per week. 1 2 3 4 5 6
5. Number of laboratory hours per week. 1 2 3 4 5 6
6. Total number of cartography courses offered in your department? _____
7. Under which system does your university function? Quarter ___ , Semester ___ , Other ___
8. Average size of class <10 ___ , 10-15 ___ , 16-20 ___ , 20-40 ___ , >40 ___
9. Do you have a laboratory assisstant? Yes _____ No _____
10. Are outside readings required? Yes _____ No _____
11. Is a math background required? Yes _____ No _____
12. Are there prerequisites to introductory cartography? Yes _____ No _____
    If yes, what are they?
13. Do you use a computer in your introductory courses? Yes _____ No _____
    If yes, - PC _____ , MINI _____ , MAINFRAME _____
14. What software programs do you use? (i.e. SYMAP, SAS Graph, etc.)
    A. _____ B. _____ C. _____ D. _____
15. What percent of exercises are constructed:
    A: by hand? _____ %
    B: by computer? _____ %
16. What percent of lecture is devoted to:
    A: theory? _____ %
    B: applied? _____ %
17. Is a textbook required? Yes _____ No _____
    If yes, which one(s)? Please check.

___ J. Campbell, *Introductory Cartography*
___ D. Cuff and M. Mattson, *Thematic Maps*
___ B. Dent, *Principles of Thematic Map Design*
___ ICA, *Basic Cartography Vol. I*
___ ICA, *Basic Cartography Vol. II*
___ J. Keates, *Cartography Design and Production*
___ G. Lawrence, *Cartographic Methods*
___ P. Monkhouse and Wilkinson, *Maps and Design*
___ M. Monmonier, *Technological Transitions in Cartography*
___ P. Muehrcke, *Map Use*
___ T. Rabinhorst, *Applied Cartography*
___ A. Robinson, et al., *Elements of Cartography*
___ C. Westfall, *Basic Graphics and Cartography*
___ Others (please cite)
_____
_____

18. Which of the following map exercises are required?

___ Graduated/proportional circle
___ Maps to accompany an article
___ Stepped statistical surface
___ Smooth statistical surface
___ Maps from aerial photos
___ Large scale survey
___ Redesigned published map
___ Isometric
___ Isoplethic
___ Cartogram
___ Choropleth
___ Dasymetric
___ Land use
___ Map projections
___ Situation
___ Dot
___ Flow
___ OTHERS:
_____
_____
_____

19. What equipment is required to be purchased by the student? Please check.

___ Drafting pens
___ Protractor
___ T-square
___ Scale (architects, 16ths)
___ Compass set
___ Ships curves
___ Map distance measure
___ Gum eraser
___ Triangle (45°)
___ Curve Irregular
___ Masking tape
___ Drafting pencils, 6H, 7, 4H
___ Beam compass
___ Hand calculator
___ Screen patterns
___ Pencil and ink eraser
___ Triangle (30-60°)
___ Scale (engineers, 10ths)
___ Exacto knife set
___ Drafting paper
___ Plainmeter
___ Flexible curve
___ Rub on letters

Figure 1: Questionnaire sent to 378 cartography instructors at 285 institutions in the U.S. and Canada in the fall of 1989.

THE SURVEY

The questionnaire (Figure 1) was designed to acquire specific information about the introductory cartography course. This information included the structure and context of the course, the content of the course, and back-ground information on the course instructor. The questionnaire was limited to the introductory cartography course and designed to be completed within ten minutes.

Two primary sources, the Association of American Geographers' *Guide to Departments of Geography in the United States and Canada 1989-1990* and *Schwendeman's 1989 Directory of College Geography of the United States* were used to obtain the names and addresses of institutions and individuals that provide cartography instruction in the United States and Canada (Monsebroten 1989). Two other excellent sources of information, *Mapping Sciences Education Data Base (MSEDB)* (Dahlberg 1980) and the Association of American Geographers' *Cartographic Specialty Group 1985 Membership Directory* (Carstenson 1985) were determined to be dated.

Questionnaires were mailed on August 27, 1989 to 378 individuals at 285 institutions of higher education. The United States accounted for 257 of the institutions, with the remaining 28 located in Canada. Approximately 51 percent of all questionnaires sent, or 193 questionnaires, were completed and returned by October 2, 1989. An additional fourteen instructors responded that they no longer taught cartography or that the course was no longer offered at their institution. The distribution of responding instructors in the United States and Canada is depicted in Figure 2.

Figure 2: Distribution of responding institutions.

THE RESULTS: INDIVIDUAL BACKGROUND

Several questions regarding the instructors of introductory cartography courses were included in the survey. Although these questions are not the primary focus of the analysis, they do give a good portrayal of the personnel teaching cartography.

Years Teaching Cartography

The average amount of teaching experience reported by respondents is thirteen years. Figure 3 depicts responses grouped and graphed into five-year categories. In addition, a category for persons teaching longer than 26 years is included. The survey reveals a dominance of neither veteran or novice teachers. However, approximately one-half of the instructors have been teaching less than ten years.

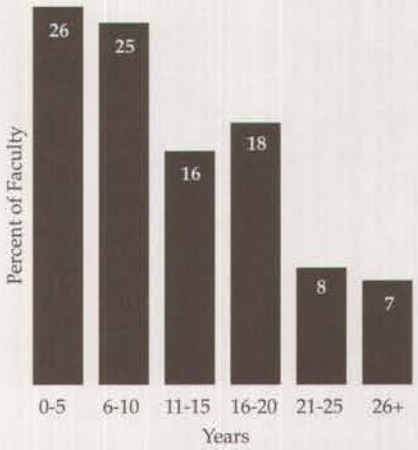

Figure 3: Reported years of cartography teaching experience.

Rank of the Instructor

While the number of instructors is relatively even across levels, the rank of professor is the most often cited (Figure 4). However, the median rank of responding instructors was associate professor.

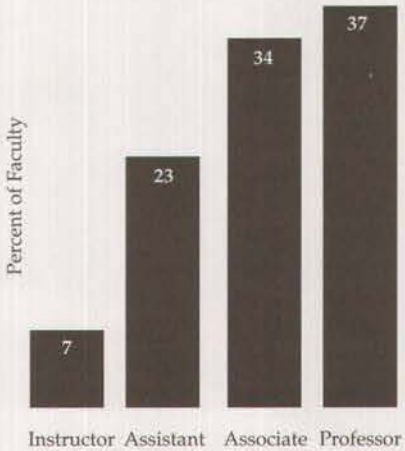

Figure 4: Academic rank of instructors of introductory cartography.

Production of Cartography Instructors

All respondents indicated the name of the institution where they completed their graduate training. All graduate schools cited two or more times are ranked in Figure 5. Of the 73 institutions mentioned, twelve schools (with 5 or more citations) accounted for approximately 45 percent of all instructors. The three most frequently cited schools accounted for almost one-fourth (23 percent) of the graduate training institutions. It should be noted that these three schools — University of Kansas, University of Wisconsin and the University of Washington — were also cited by Dahlberg (1978) as the three principal centers of cartography instruction. Graduate cartography training continues to be concentrated in a small number of institutions.

COURSE CONTEXT AND STRUCTURE

Course structure and context refers to the design, administration and sequence of the introductory cartography course, relative to the general cartography program at each university.

Frequency of Course Offerings

We asked instructors to quantify the frequency with which the introductory course is offered. Approximately 67 percent of the respondents indicated that an introductory cartography course is offered only once each academic year, while twenty-six percent noted that they offer it twice per year (Figure 6). Interestingly, the frequency with which the introductory cartography course is offered does not appear to be correlated with the number of faculty in the department (r^2 =.320).

GRADUATE INSTITUTION	NUMBER OF INSTRUCTORS PRODUCED
University of Kansas	18
University of Wisconsin—Madison	13
University of Washington	13
Clark University	8
Pennsylvania State University	6
Louisiana State University	5
University of Illinois	5
University of Georgia	5
University of Iowa	5
Syracuse University	5
University of North Carolina	5
University of Michigan	5
University of Colorado	4
Indiana University	4
University of Pittsburgh	4
University of California—Berkeley	4
Michigan State University	4
Portland State University	3
Oregon State University	3
University of Western Ontario	3
University of Minnesota	3
Boston University	2
University of Utah	2
University of Oregon	2
University of California—Los Angeles	2
University of Maryland	2
Kent State University	2
Florida State University	2
University of Tennessee	2
State University of New York—Buffalo	2
Ohio University	2
Southern Illinois University	2
University of Denver	2
Indiana State University	2
University of Florida	2
Ohio State University	2
University of Oklahoma	2
University of Kentucky	2
Others (one each)	35

Figure 5: Production of cartography instructors by graduate cartography programs.

Number of Cartography Courses Offered

A second survey question asked how many cartography-related courses are offered by each department. The most frequent response was two courses (23 percent) offered by the department, but this was only slightly greater than offerings of three courses (20 percent), one course (15 percent) and, four courses (10 percent). The number of courses offered ranged from one to twenty. Institutions that reported ten or more cartography course offerings are listed in Figure 7.

Number of Credit Hours

Fifty-three percent of responses to the question "How many credits are offered for the introductory course?" was three. Four and five-credit courses were offered primarily by institutions using the quarter system.

Size of the Introductory Cartography Course

The median reported average class size was 16-20 students, and the middle 50 percent of responses ranged from 10-15 to 16-20 students (Figure 8).

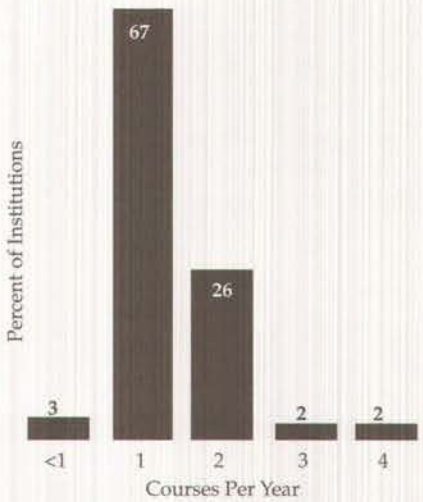

Figure 6: Frequency of introductory cartography course offerings.

INSTITUTION	NUMBER OF COURSES
University of Kansas	20
University of Maryland	12
University of Hawaii	12
George Mason University	12
University of Wisconsin—Madison	11
Memorial University of Newfoundland	10
Clark University	10

Figure 7: Institutions reporting 10 or more cartography course offerings in 1989.

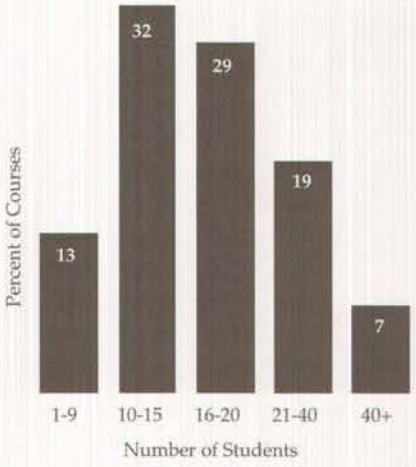

Figure 8: Class sizes for introductory cartography courses.

Hours Assigned to Lecture and Laboratory

Respondents indicated that an average of two hours each is devoted to lecture and laboratory. Forty-four percent of the average introductory course is spent on lecture and fifty-six percent of the time is spent on laboratory work.

Prerequisites for Introductory Courses

Slightly less than one-half (44.5 percent) of the surveys indicate that some prerequisites are required for entry into the introductory cartography course. In general, course prerequisites can be grouped into required geography courses, courses in statistics and computers, map appreciation or map use courses, and restrictions on the year in school and the type of major. The specific prerequisites are given in Figure 9.

	NUMBER OF RESPONSES
REQUIRED MAJOR OR CLASS STANDING	
Geography major	2
Junior status	2
Sophomore status	2
Graduating senior with geography major	1
REQUIRED GEOGRAPHY COURSES	
One previous geography course	8
Two previous geography course	7
Introductory physical geography course	5
Introductory geography course	5
Introductory human geography	2
Geography techniques	2
Physical and cultural geography	2
Three previous geography courses	2
Two introductory physical geography courses	1
Man and environment	1
Environmental and cultural geography	1
Six hours of geography or environmental science	1
Any first year geography course	1
Geography: a systems introduction	1
World regional	1
REQUIRED "MAPS" COURSES	
Map interpretation	6
Map reading	6
Map use	6
Introduction to maps and air photo	6
Maps	2
Remote sensing	1
Maps and images	1
Maps and map reading	1
REQUIRED STATISTICS, MATHEMATICS OR COMPUTER COURSES	
Basic statistics	5
Any computer course	2
Basic collegiate algebra	2
Entry level math course	1
Trigonometry and algebra	1
Trigonometry	1
Quantitative analysis	1
Analytic geometry	1

Figure 9: Prerequisites for introductory cartography courses reported by survey respondents.

COURSE CONTENT

Textbook Usage

Of the 193 respondents, 153 (84 percent) require a textbook. One-half of the respondents indicated that they used Robinson, Sale, Morrison and Muehrcke's *Elements of Cartography* textbook for the introductory cartography course (Figure 10). Similar findings were presented in Andrews' 1984 textbook survey (Andrews 1985). The second most frequently used textbook was Dent's *Principles of Cartography; Thematic Map Design* at 19 percent (Dent 1985). It should be noted that Dent's book ranked second despite the fact that it was out-of-print during the Spring and Fall semesters of 1989. The third most utilized textbook was Cuff and Mattson's *Thematic Map Design* holding a 12 percent share of the market (Cuff 1982).

Laboratory Exercises

The average number of exercises required in the introductory cartography laboratory is 7.5. However, if semester and quarter systems are separated, the average is 6.3 exercises required for courses on the quarter system and 7.6 for the semester system.

The most common exercise is the choropleth map with 88.2 percent of the respondents indicating it is used in their course. Other exercise topics cited by over fifty percent of the respondents are scaled circle maps (79 percent) dot maps (62 percent), isarithmic maps (61 percent), and map projections (56 percent). As Figure 11 indicates, the thematic map is the most popular exercise assigned in introductory cartography courses. However, the one exception is the map projection, which has had a long history as a required exercise in introductory cartography courses, even though the treatment of map projections today are often relegated to textbook appendices.

Equipment

The question "What equipment is required to be purchased by the student?" was included in the study to determine if the cost of purchasing equipment in addition to the textbook, has a prohibitory effect on student enrollment.

The item of equipment most frequently required for purchase

AUTHORS	PERCENT OF COURSES
Robinson, et al	50
Dent	19
Cuff/Mattson	12
Muehrcke	5
Campbell	4
Rabenhorst	2
Greenhood	2
Others	6

Figure 10: Required textbooks for introductory cartography courses.

MAP EXERCISES	PERCENT OF COURSES
Choropleth	88
Scaled circle	79
Dot map	62
Isarithmic	61
Map projections	56
Map for article	32
Cartogram	28
Redesigned map	28
Land use	26
Smooth statistical surface	25
Stepped statistical surface	24
Flow map	20
Situation map	19
Map from aerial photo	16

Figure 11: Laboratory exercises.

by the student is the drafting pen set (required for more than 60 percent of introductory courses). Drafting pens, because of their delicate nature, are often prone to problems (leaks, breakage, etc.) and they are expensive to replace. Expendable items such as erasers, tape, pencils and paper are also often required to be furnished by the student. Angles, T-squares, and scales are more likely to be provided by the departments.

THE COMPUTER IN THE INTRODUCTORY CARTOGRAPHY COURSE

Computer Use

Perhaps the most significant change in the field of cartography is the continuing adaptation of computer technology to cartography. Prior to the survey we expected that introductory cartography courses would include the computer, either in lecture through demonstrations, or through actual use in completing laboratory exercises. A survey question asked if computers are being used for laboratory mapping exercises. Slightly over one-half (53 percent) of the institutions indicated that they do use computers in the introductory course. A second question asked of those who use computers "What percent of exercises are actually constructed using a computer?" The average response was 16.2 percent, which is far less than we had expected.

Computer Types

Survey question 13 categorizes computers by 3 types: (a) personal computer, (b) mini computer, and (c) mainframe computer. Respondents were free to check one, two or three of the options, as appropriate. The personal computer is the most frequently used computer in the introductory cartography course, being cited by 68 percent of the instructors. The mini computer was cited by only 4.2 percent of computer users and the mainframe 6.3 percent. The remaining percentage of uses employed some combination of the three.

One assumption we made is that instructors who have been teaching cartography for a long period of time would be less apt to utilize the computer than individuals who just recently obtained a graduate degree. To test this assumption, we used a simple correlation analysis between 'years teaching cartography' and 'the percentage of exercises constructed using the computer. The results indicate that no strong correlation exists.

Computer software

Another aspect of the questionnaire asked instructors who use the computer in the introductory cartography course to list the types of computer software they use. A total of 214 software citations were made, including 15 in-house or generic programs and 78 commercial programs. Figure 12 lists the software programs mentioned at least twice.

COURSE SYLLABUS

Approximately one-third (54) of the responding cartography instructors enclosed a copy of their course syllabus. An analysis of these syllabi allowed us to determine the percentage of the final course grade based on either testing (exams, quizzes, etc.) or project (drafting or computer mapping). Of the sixty-three syllabi received, thirty contained the grading scheme for the course. The percentage of the final course grade determined by exam and quiz scores was 37 percent, with a range from none (no exams given) to 80 percent of the grade based on testing. Generally, it appears that the final grade in the introductory cartography course is primarily determined by the ability of the student to complete the map and graph exercises satisfactorily.

A second question examined in the course syllabus was the frequency of topics mentioned in the lecture section for each cartography course. Of the 63 syllabi examined, 52 stated the major topic of each lecture session. Those topics mentioned at least 10 percent of the time are listed in Figure 13. Five topics were covered by at least 50 percent of the respondents. Data types and manipulation is the most com-

COMPUTER PROGRAM	NUMBER OF INSTALLATIONS
Atlas*Graphics	29
In-house programs	15
Symap	12
Mapmaker	12
SAS Graph	11
CAD (various vendors)	10
SuperPaint	9
Surfer	9
Idrisi	6
Symvu	5
Cricket Graph	3
Microsoft Word	3
SPSS	3
Map	3
MacDraw	3
PC Map	3
Arc /Info	3
The Map Collection	3
World	3
Atlas *Draw	2
PC Paintbrush	2
Roots	2
Aldus FreeHand	2
Adobe Illustrator	2
MacAtlas	2
Dissplа	2
Others (one each)	55

Figure 12: Software used in introductory cartography courses.

LECTURE TOPIC	NUMBER & PERCENTAGE OF RESPONSES	
Data tapes and manipulation	49	94.2
Symbolism	43	82.7
Map design	39	75.0
Map projections	39	75.0
Lettering	28	53.8
Scale	25	48.1
Grids	24	46.1
Generalization	24	46.1
Choropleth	21	40.3
History of cartography	21	40.3
Computer mapping	19	36.5
Color	16	30.7
Drafting	15	28.8
Graduated circle maps	14	26.9
Point maps	13	25.0
Aerial photos	12	23.1
Thematic mapping	12	23.1
Flow maps	11	21.1
Data analysis	11	21.1
Dot maps	11	21.1
Cartograms	10	19.2
Relief maps	10	19.2
Reproduction	10	19.2
Isarithmic maps	10	19.2
Landform analysis	7	13.4
Communication	7	13.4
Graphs	7	13.4
Sources of information	6	12.0
Base maps	6	12.0
Topographic maps	5	10.0

Figure 13: Most frequently cited lecture topic in 52 introductory cartography course syllabi.

monly cited topic (94 percent), followed by symbolism, design, map projections and lettering.

SUMMARY AND CONCLUSIONS

This discussion of course characteristics is based on a 1989 survey of instructors responsible for teaching introductory cartography courses in the United States and Canada. Out of a total of 378 questionnaires sent to academic cartographers, 193 completed forms (51 percent) were returned. In addition, 63 syllabi were examined and analyzed. Specific subjects covered in the survey were equipment availability and use, required textbooks, types and quantity of laboratory exercises, lecture topics, grading structure and background of course instructors.

General conclusions derived from the questionnaires are as follows: (1) most students of introductory cartography receive limited exposure to computer mapping exercises; (2) personal computers predominate over the minis and mainframes; (3) a wide variety of software programs are employed; (4) thematic maps, especially the choropleth, dot, isoline and scaled circle map, are overemphasized for mapping exercises, (5) a majority of departments supplying cartographic equipment to the students, with the exception of expendables and drafting pens, (6) a predominant use of the Robinson, Sale, Morrison and Muehrcke's *Elements of Cartography* textbook, (7) a large percentage of instructors graduating from cartography programs in the three traditional schools noted for training cartographers and (8) the final course grade is primarily determined by actual exercises and projects rather than by test scores. ◊

ACKNOWLEDGEMENT

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USGS RELEASES DLGs ON CD-ROM

In June 1990, the U.S. Geological Survey (USGS) began distributing the 1:2,000,000-scale Digital Line Graph (DLG) data on Compact Disc Read Only Memory (CD-ROM). The CD-ROM contains data for all 50 states, organized in 21 geographic regions. The CD-ROM also contains software to assist the user in selecting and displaying the data.

The data were collected from updated 1:2,000,000-scale sectional maps from the National Atlas of the United States of America, and are current to late 1979. Up to eight categories of data are available for each geographic region. These categories and examples of included features are described in

Figure 1 . The CD-ROM contains data in all three formats the USGS distributes at this scale: the DLG-Standard format, the DLG-Optional format, and the Graphic Data format.

The software provides a menu-driven system to assist the user in transferring data from the CD-ROM to a hard disk. The user may select data by geographic region, data category, and data format. The software is designed to run on any class of DOS-based (version 3.1 or later) microcomputer (8088,8086, or 80386) with 512 Kb of free memory and a hard disk. At the minimum, and EGA monitor and display card are required to select the data. The user must have a CD-ROM reader using Microsoft Extensions version 2.0 or later.

The CD-ROM also includes software to display the data. The software displays a preprocessed version of the DLG data. A user may display one of the preselected combinations of data or may customize the display. The software allows the user to display the processed DLG data using up to 16 different colors. It is recommended that this software be run on a system with a VGA monitor.

The software may also be used to process the DLG data on the CD-ROM to produce customized maps. The software allows the user to display the selected data using different colors and line thicknesses in five common map projections.

The CD-ROM is sold at an interim price of $28. The Government Printing Office is placing the CD-ROM in 800 Federal Depository Map Libraries throughout the United States for previewing by the public.

The data will continue to be available on nine-track computer-compatible magnetic tape. For distribution on magnetic tape, different combinations of data may be ordered by region, category, and data format. For example, the cost for the entire data set in one of the distribution formats on magnetic tape is $531. If a user would like to purchase all the data that are on the CD-ROM on magnetic tape, the cost is $1,413.

CATEGORY	EXAMPLES OF INCLUDED FEATURES
Political boundaries	States and counties
Administrative boundaries	Federally administered forests, parks, and wildlife refuges
Streams	Perennial and intermittent streams and canals
Water bodies	Perennial, intermittent, and dry lakes; swamps; and glaciers
Hypsography	Continental Divide
Roads and trails	Interstate U.S., and primary State highways
Railroads	Mainline and branchline railroads
Cultural features	Airports and the Alaska pipeline

Figure 1: Categories of 1:2,000,000 DLG data and examples of included features

To obtain additional information or to order the CD-ROM contact: Earth Science Information Center, U.S.G.S., 507 National Center, Reston, VA 22092; (703) 648-6045; FTS 959-6045; or (800) USA-MAPS (800-872-6277).
Daniel K. Cavanaugh, FDC Newsletter 12, Fall 1990

FIND YOUR WAY

A 24-hour-a day toll-free service is available to subscribers who need directions. Telemap Navigation Services has a computerized system to provide step-by-step directions to any destination in 12,000 cities in the United States, Canada, and Mexico. Usually directional information can be obtained within four minutes. The subscription price is $24 per year for unlimited calls. Contact: Telemap Services, 1327 N. Main Street, Walnut Creek, CA 94596; (800) 843-1000; (415) 256-1867.

LANDSAT NEWS

The Earth Observation Satellite Co. (EOSAT) and the National Oceanic and Atmospheric Administration (NOAA) have negotiated an agreement to make some remote sensing data acquired by the Landsat Multispectral Scanner (MSS) available to support the international global change research effort and other environmental applications.

In a joint statement, EOSAT President C.P. Williams and NOAA Assistant Administrator for Environmental Satellite, Data and Information Services, Thomas Pyke, Jr. announced that effective immediately, EOSAT will limit its exclusive MSS data distribution rights to two years after the date of acquisition. The agreement will make more than 600,000 MSS scenes dating from 1972 until 1988 also available for distribution through U.S. Geological Survey.

The availability of MSS data will aid researchers in developing new technologies in the application of remote sensing data for global change monitoring. These advanced-technology applications will increase the value and utility of data sets to be introduced by the next generation Landsats and other future remote sensing platforms.

The Landsat 6 satellite will carry the Enhanced Thematic Mapper, a state-of-the-art sensor that will set new standards in commercial remote sensing. Currently, commercial data users must choose between remote sensing data sets offering either multispectral or spatial capabilities. After the launch of Landsat 6, however,