# THE INFLUENCES OF THE TECHNICAL CONSTRAINTS AND PERSONNEL LIMITATIONS ON THE QUALITY OF MAPS IN AMERICAN NEWSPAPERS

by

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A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

(Cartography)

at the

UNIVERSITY OF WISCONSIN-MADISON

1982

## ACKNOWLEDGMENTS

I extend my sincere appreciation to all of the newspaper personnel who freely gave of their time and insight. The advice and guidance of David Woodward, my major advisor, is gratefully acknowledged, as is that of the other members of my thesis committee. The encouragement, suggestions, and comments of the current graduate students in the Department of Geography at the University of Wisconsin, Madison, were invaluable. Special thanks go to Paul and Josh for their patience and assistance and to Joan and John for their constant support.

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# I. INTRODUCTION

## Statement of Problem and Literature Review

Even a cursory review of maps in U.S. newspapers indicates that they contain inaccuracies, present insufficient information, and employ poor cartographic design. This research is designed to identify the principal cartographic problems evidenced in newspaper maps and to trace and analyze the probable causes of these problems.

Reasons for the low quality of maps in newspapers may be many and diverse; strenuous technical limitations must certainly be overcome to produce them, and rigorous newspaper schedules drastically restrict their preparation time. The format of newspapers, mainly text supplemented with photographs, graphics, and advertising, places space at a premium and restricts the size of newspaper maps; the speed of printing presses and the use of low-quality paper provide further constraints.

In addition to these technical limitations, the personnel preparing maps for newspapers may also be a factor in their low quality. Because maps are only one small part of newspaper production, many people preparing them also perform a variety of other tasks. Their background and training may be totally unrelated to cartography and they may have little or no knowledge of cartographic methods. There is also a tendency for newspaper personnel to view maps as simply one of many line graphics, such as charts or graphs, and not as unique graphic tools.

The dynamic relationship of these two factors, technical constraints and limitations of personnel, in conjunction with their relative influences on newspaper map preparation, determine the quality of the final cartographic product. It would seem that the technical constraints, rigorous as they are, could be overcome by a knowledgeable and skilled staff and that a lack of cartographically knowledgeable and skilled personnel is the main cause for poor newspaper maps. To evaluate this hypothesis, this research will critically examine the mapmaking procedures and products of U.S. newspapers. Through surveys and interviews, the technical processes and personnel making newspaper maps will be investigated. A detailed study and critique of newspaper maps will identify common cartographic problems. Knowledge of the procedures and personnel involved in map preparation, along with the cartographic problems evidenced in newspaper maps, will provide the basis for assessing the relative influences of technical constraints and limitations of personnel on the poor quality of these maps.

U.S. newspapers, and the maps appearing in them, reach more than 60 million people every day. Although the public relies heavily on television and magazines for news information, the newspaper industry is working to reestablish the newspaper reading habit among Americans and is adopting new technology for more efficient newspaper production. The maps appearing in U.S. papers are intended to attract readers to stories and help them to better understand the geographic locations and relationships presented. In addition, they graphically

illustrate vital information that is difficult or impossible to present in words. Because they are seen by so many people, newspaper maps also have the potential to increase the geographic knowledge of society as a whole. This educational role is made more urgent by the extreme geographic ignorance of the American public, which has been discussed in educational and geographic publications,[1] newspaper articles,[2] and even popular advice columns in recent years.

In addition to reaching an extremely large audience, the number of newspaper maps is increasing. This is due mainly to the redesign of newspapers to reflect a heavy emphasis on graphics, including maps. As Tim Innes, of the San Francisco Examiner asserts,

> If the Seventies were the decade of photojournalism, the Eighties are surely the decade of graphics. It seems as if editors everywhere have accepted what some of us have been saying for years: that good graphics convey information more clearly and concisely than words, not to mention the fact that they can make a paper more attractive and readable.[3]

This graphic emphasis is strikingly apparent in several newspapers, including new ones trying to attract initial readers. One example is USA Today, a Gannett Corporation paper which began publication in September 1982. Eventually intended for nationwide distribution, it devotes much of its space to high-quality photographs and graphics, including a significant number of maps. The weather forecast

alone uses two maps; both are four colors, and one covers nearly half of a page.

It seems likely that the number of maps used in newspapers will continue to increase. But because newspaper maps often lack effective presentation and fail to include relevant and accurate information, their ability to attract readers, reveal geographic locations and relationships, and educate a geographically ignorant public is in doubt.

An example of the importance and scarcity of high-quality cartographic products in American newspapers is provided by the coverage of the war over the Falkland Islands between Great Britain and Argentina. Not only did most Americans not know where the Falkland Islands were geographically located, but it is doubtful that many even knew they existed. The public was surprised to discover that it could not obtain instantaneous coverage in the crisis because reporters and photographers did not have the necessary access. News reports issued from Britain and Argentina were in continual conflict and photographs of war-related activities were unavailable. Newspapers, and the maps they contained, became a primary information source for a significant portion of the American population. Because geography played a major role in the development of the conflict and the decisions made toward its resolution, newspapers were given a crucial responsibility and opportunity to inform and educate the public with maps. Although a few newspapers responded quickly

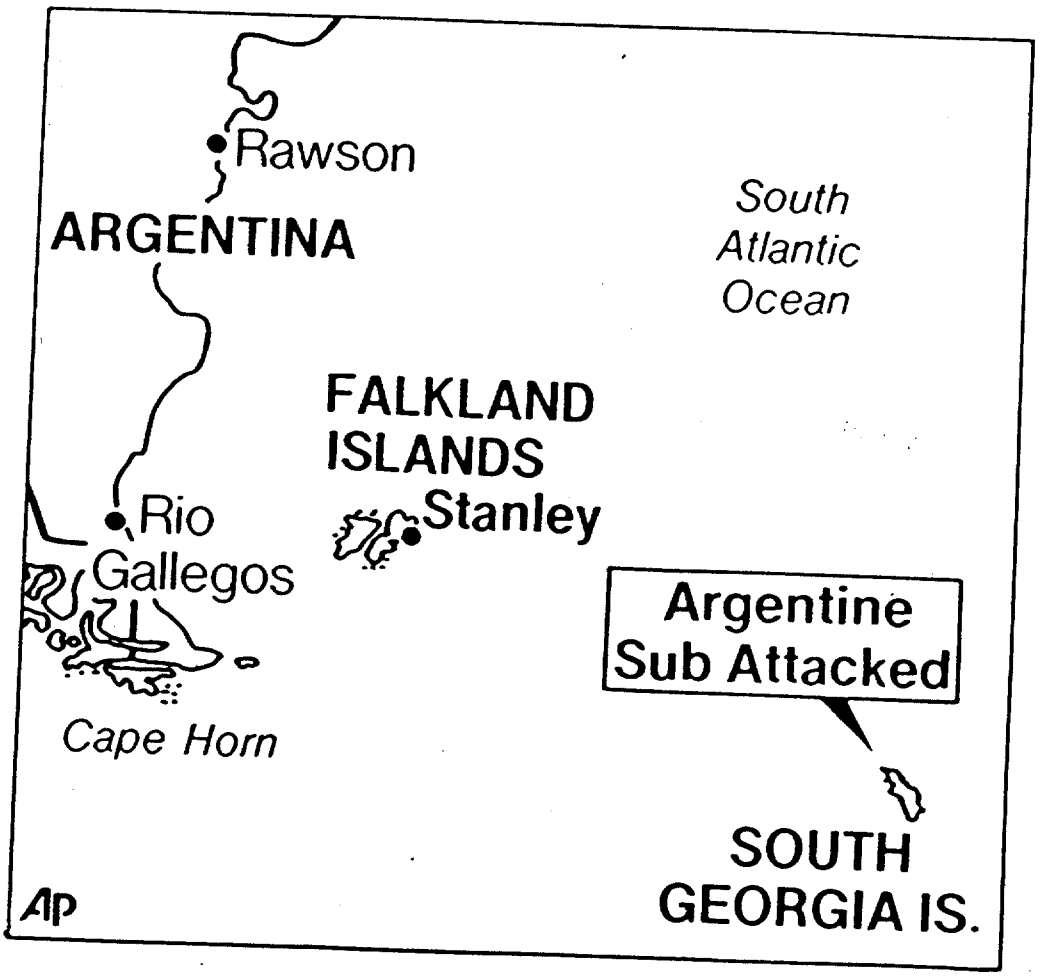
with quite sophisticated maps, this was not common. In general, the maps of the Falkland crisis featured simplistic design, provided minimal information, contained inaccuracies, and did not reflect the appropriate use of cartographic techniques. The following are a few examples of the maps printed during the crisis and some of the criticism that could be leveled at them.

One prevalent source of maps for newspapers is the Associated Press (AP) wire service, received by over 1,000 newspapers nationwide. AP's standard coverage of the Falkland crisis, Examples 1 and 2, portrayed minimal information and relied on one base map with minor revisions whenever possible. Although professional graphic services such as Newspaper Enterprise Association (NEA) produced more complicated looking maps, Example 3, in most cases the apparent complexity was merely the result of including more name information without hierarchy of purpose or importance. This, in combination with coarse, distracting line patterns, produced a map lacking organization and focus.

As simple as many of the Falkland maps were, they contained inaccuracies. Both examples from AP note in the accompanying text that South Georgia is located 800 miles east of the Falklands, while News Graphics, a Field Newspaper Syndicate, indicates that the distance is 1,300 miles, Example 4. The distance is approximately 725 nautical, 833 statute miles, which is just over 1,300 kilometers. The map from News Graphics also depicts the Falklands as 600 miles from Rios Gallegos, Argentina, while the distance is actually closer

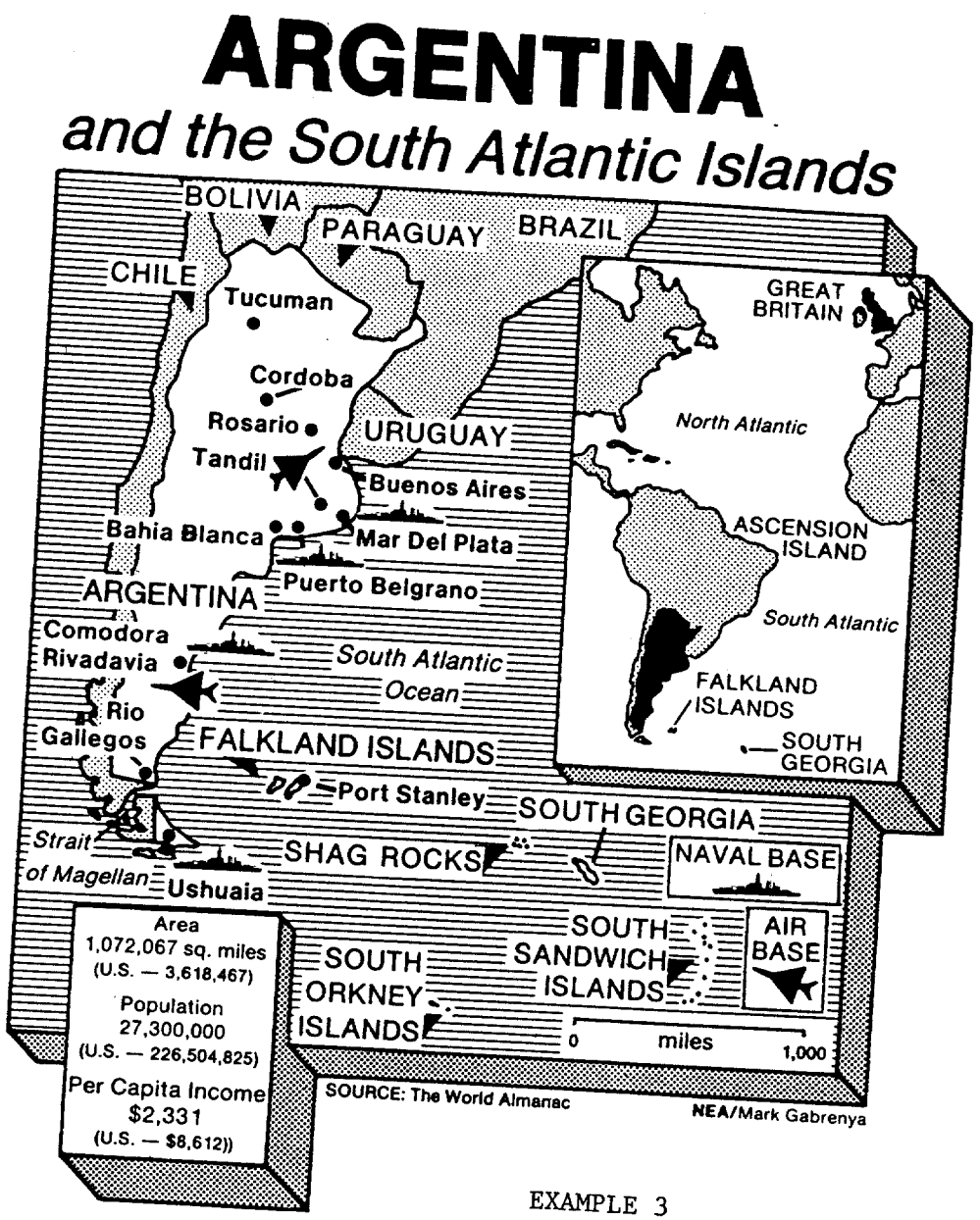

(NY13-April 22)BRITISH DESTROYERS SCHEDULED TO ARRIVE--Map locates South Georgia, 800 miles east of the Falklands, where British destroyers were scheduled to arrive Thursday, the British press reported. Only about 140 Argentine soldiers were reported on South Gerogia, in contrast to an estimated 9,000 or more in the Falklands. (AP Laserphoto) (slg51010ar)1982 Slug:FALKLANDS

EXAMPLE 1

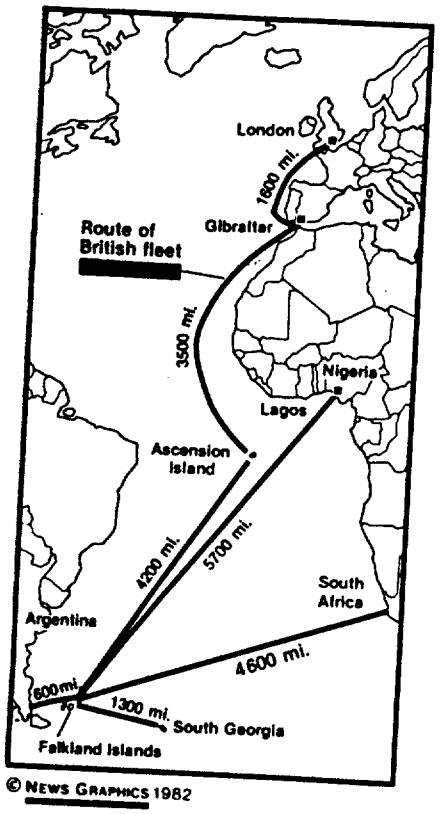



(NY8-April 25)--BRITISH ATTACK--This map locates the South Georgia Islands, 800 miles east of the Falkland Islands, the center of a dispute between England and Argentina. British helicopters attacked an Argentine submarine off the coast of South Georgia, the British Defense Ministry said Sunday. No details were given.(AP Laserphoto)(lh11115ar)1982 SLUG: BC-FALKLANDS-BRITAIN

EXAMPLE 2


ARGENTINA
and the South Atlantic Islands
BOLIVIA
PARAGUAY
BRAZIL
CHILE
Tucuman
Cordoba
Rosario
URUGUAY
Tandil
Buenos Aires
Bahia Blanca
Mar Del Plata
Puerto Belgrano
ARGENTINA
Comodora
Rivadavia
South Atlantic
Ocean
Rio
Gallegos
FALKLAND ISLANDS
Port Stanley
SOUTH GEORGIA
Strait
of Magellan
SHAG ROCKS
NAVAL BASE
Ushuaia
SOUTH
SANDWICH
ISLANDS
AIR
BASE
SOUTH
ORKNEY
ISLANDS
0
miles
1,000
Area
1,072,067 sq. miles
(U.S. — 3,618,467)
Population
27,300,000
(U.S. — 226,504,825)
Per Capita Income
$2,331
(U.S. — $8,612))
SOURCE: The World Almanac
NEA/Mark Gabrenya
GREAT
BRITAIN
North Atlantic
ASCENSION
ISLAND
South Atlantic
FALKLAND
ISLANDS
SOUTH
GEORGIA

EXAMPLE 3


London
1600 mi.
Gibraltar
Route of British fleet
3500 mi.
Nigeria
Lagos
Ascension Island
4200 mi.
5700 mi.
South Africa
Argentina
4600 mi.
800 mi.
1300 mi.
South Georgia
Falkland Islands
© NEWS GRAPHICS 1982

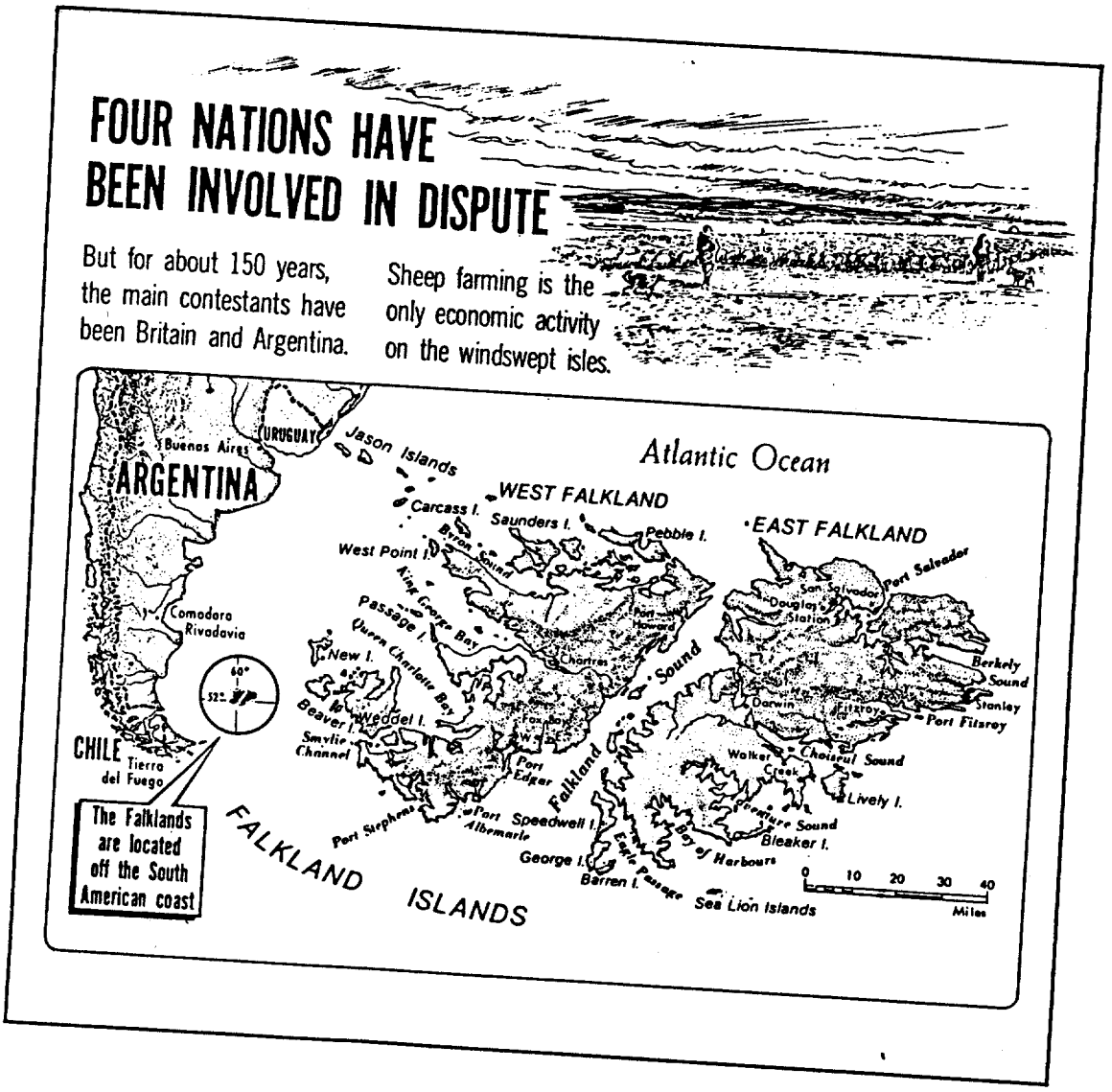
EXAMPLE 4

to 420 nautical, 480 statute miles or approximately 770 kilometers. It seems likely that kilometers were mistakenly labeled as miles and/or some of the erroneous distances were the result of map measurements made without regard for projection distortion.

Example 5, prepared by Associated Press Newsfeatures, did not suffer from simplistic design, nor was it strictly inaccurate, but it did reflect the inappropriate use of a cartographic technique and may have caused severe misconceptions for map readers. Although the use of more than one scale on maps in the form of insets is common and often advantageous, the relationship between the map parts must be explicit. In Example 5, the separation of the two maps is difficult (Are the Jason Islands off the coast or Uruguay or West Falkland?) and their geographic relationship to one another is not obvious.

These Falkland examples illustrate only a few of the problems observed in newspaper maps printed during the crisis. It is likely that these and other trends are evidenced in much of the cartography seen in newspapers today including maps made by newspapers themselves, wire services, and graphic services. The prevalence of newspaper maps, their increasing importance, and their overall low quality indicate the necessity to investigate newspaper maps from a cartographic perspective.

Newspaper maps have not been considered in the recent cartographic literature and this may be because few cartographers are


FOUR NATIONS HAVE BEEN INVOLVED IN DISPUTE
But for about 150 years, the main contestants have been Britain and Argentina.
Sheep farming is the only economic activity on the windswept isles.
Atlantic Ocean
ARGENTINA
URUGUAY
Buenos Aires
Jason Islands
WEST FALKLAND
EAST FALKLAND
Carcass I.
Saunders I.
Pebble I.
West Point I.
Byron Sound
King George Bay
Passage I.
Queen Charlotte Bay
New I.
Weddell I.
Beaver I.
Smylie Channel
Port Stephens
Port Albemarle
Port Edgar
Speedwell I.
George I.
Barren I.
Eagle Passage
Falkland Sound
Bay of Harbours
Port Salvador
San Salvador
Douglas Station
Darwin
Fitzroy
Port Fitzroy
Berkely Sound
Stanley
Walker Creek
Choiseul Sound
Lively I.
Pleasure Sound
Bleaker I.
Sea Lion Islands
Comodoro Rivadavia
CHILE
Tierra del Fuego
60°
52°
The Falklands are located off the South American coast
FALKLAND ISLANDS
0 10 20 30 40
Miles

EXAMPLE 5

involved in newspaper map production. The one article that specifically examines newspaper maps, along with maps in newsweeklies and news magazines, is "Journalistic Cartography" by Walter Ristow, published a quarter of a century ago. Ristow was initially attracted to journalistic cartography because it provided one of the few opportunities for cartographers to express "personal initiative, self-expression, and original craftsmanship in mapmaking."[4]. Some of the best cartographic examples from the New York Times, Associated Press, Fortune, Life, Time, and Newsweek, along with the individual cartographers responsible for them, were discussed. He gave journalistic cartographers credit for bringing maps to the man on the street in an educational, effective, and attractive way, and for expanding the average reader's conception of the world beyond that of the Mercator projection. The events of the 1940s and 1950s, including World War II, the Korean War, and the Middle East situation, as well as increased air travel, encouraged the mass media to present global geography and also to take advantage of formerly seldom used projections. Certainly current world events and the American public's lack of geographic knowledge, demand that newspapers meet these same needs today by presenting global geography to the general public in an educational, effective, and attractive way. Ristow acknowledges excellence in AP maps exemplified by the Pulitzer Prize received by J.S. Detje for his wartime AP maps. In contrast, Tim Innes, writing in a 1982 review of wire service graphics, describes them as "poorly

conceived, inadequately researched, and sloppily executed"[5] and proceeds to illustrate with several cartographic examples. Cartographic research has failed to respond to this changing status of newspaper maps.

Although it is evident that newspapers consider maps important, little is written about them in journalistic or design literature. Journalistic newspaper research tends to focus on the characteristics of newspaper readers and how they read a newspaper.[6] Newspaper design literature often only touches on maps in discussions on the role of graphics in the newspaper.[7] Frequently design books identify the highly regarded graphic newspapers and display cartographic products prepared by these papers.[8] However, research techniques, content selection, and design decisions involved in these well constructed and effective maps are seldom mentioned and the examples are only briefly discussed. The topic that is specifically addressed in almost all design literature is typography. But the limits of type size and the effect of style and form are only related to newspaper text and rarely discussed as they apply to graphics and maps. One source did provide useful typographic suggestions about using reverses, letterspacing, avoiding fine serif types, and utilizing full-bodied type styles with lower case lettering.[9] However, this information was in the section on decorative headlines, and maps were not mentioned.

In short, therefore, the cartographic, journalistic, and design literature have all failed to consider the current use of newspaper maps. The necessity of such study is emphasized by the prevalence of newspaper maps, their increasing use, and their poor quality. This study addresses the issue by systematically investigating the use of maps in newspapers, identifying their common problems, and evaluating the influences of technical constraints and limitations of personnel.

## Methodology

A three-part approach to evaluating the specific problems with newspaper maps and their causes was designed for this study. First, two questionnaires were compiled to solicit general information about map use and preparation and to identify specific constraints in newspaper production. One questionnaire was sent to newspapers and the other was sent to services that provide maps to newspapers. The results provided an overview of maps in a newspaper context and detailed some of the concerns and problems faced by personnel involved in preparing newspaper maps. Second, a systematic survey of over 200, 1982 newspaper maps from 36 U.S. newspapers was conducted. Each newspaper map was catalogued and analyzed to identify trends in usage and reveal specific problems in cartographic technique. Third, several interviews were conducted with people involved in making maps for newspapers. During these interviews, questions were clarified,

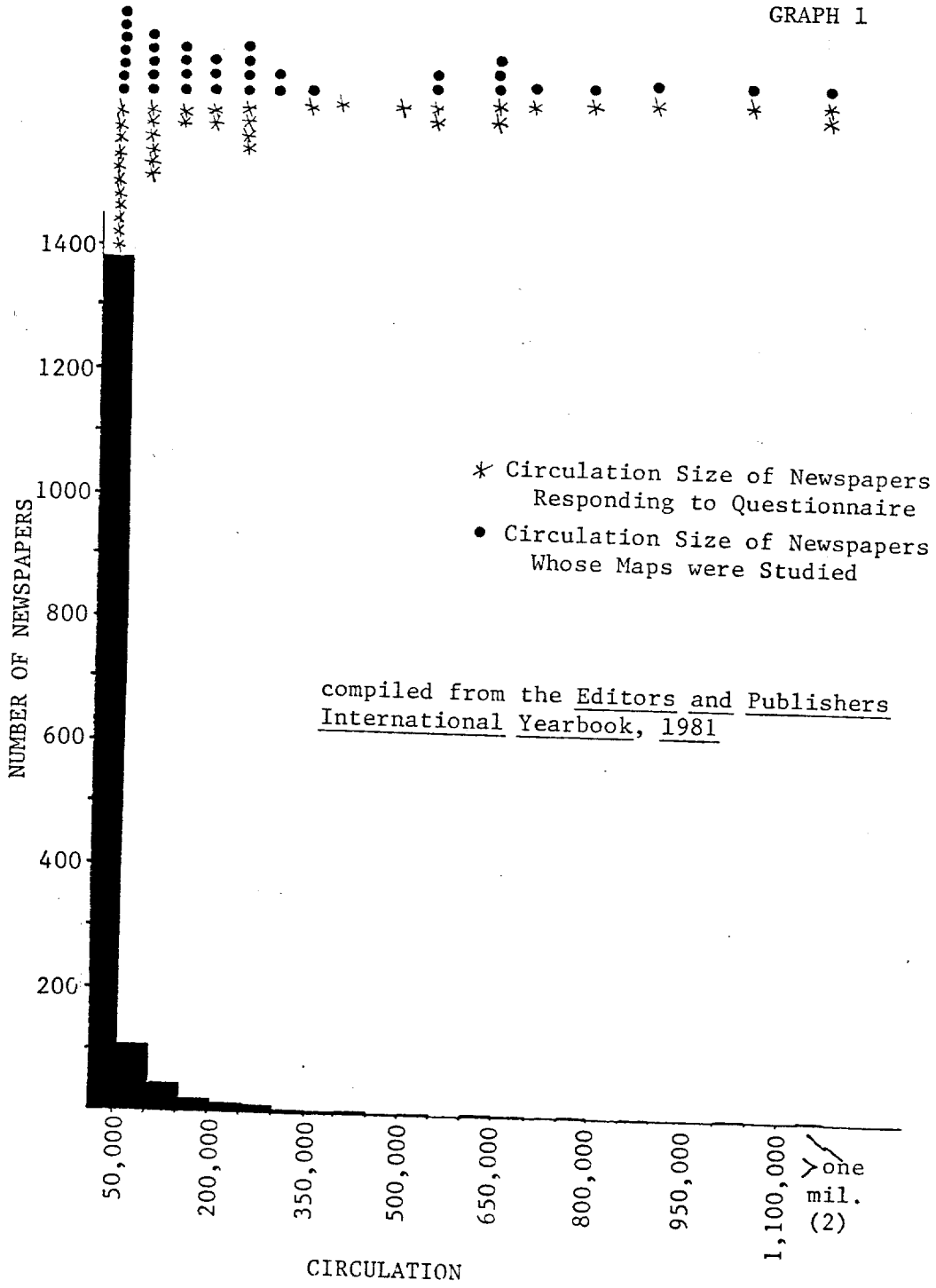
opinions were aired, and examples of additional newspaper maps of special interest were collected and examined.

Questionnaires

The questionnaires served to contact the employees who work under the constraints of newspaper production and make the journalistic, graphic, and cartographic decisions that affect the use and appearance of maps in newspapers. Both the questionnaire to individual newspapers and the one to services providing maps to newspapers were sent with a cover letter introducing the research and a self-addressed, stamped envelope to facilitate responses. The questionnaires were printed on the reverse side of the cover letter.

The individual newspapers surveyed were selected to represent a wide geographic distribution and a great range of circulation sizes. Graph 1 shows the circulation of all U.S. newspapers and each asterisk represents the circulation size of one of the newspapers responding to the survey. The full range of newspaper sizes responded, however it should be noted that approximately 95% of U.S. newspapers have a circulation of under 100,000 and only about one half of the respondents were in this circulation category. Therefore, the smallest newspapers responding indicate more accurately what most American newspaper readers see. Thirty-eight responses were received (Appendix A) from the fifty-three newspapers surveyed yielding a return rate of 71%. The questionnaire solicited information on the individual newspaper's policies and/or guidelines on map use and preparation,

GRAPH 1


1400
1200
1000
800
600
400
200
NUMBER OF NEWSPAPERS
* Circulation Size of Newspapers Responding to Questionnaire
• Circulation Size of Newspapers Whose Maps were Studied
compiled from the Editors and Publishers International Yearbook, 1981
50,000
200,000
350,000
500,000
650,000
800,000
950,000
1,100,000
>one mil. (2)
CIRCULATION

the personnel involved in the decision to use maps, the frequency of map use, the time constraints in map preparation, the size of the paper's graphic staff, the sources commonly consulted in map preparation, and the use by the newspaper of other services that prepare maps. Sample 1 is a reprint of the questionnaire sent to individual newspapers.

Names and addresses of the main suppliers of maps to newspapers were obtained from the Directory of Syndicated Services. Nine services responded to the questionnaire including: the two wire services, two newspapers who supply their maps to other papers, and five other sources. All are listed in Appendix B. This questionnaire requested information from the services concerning the number of U.S. newspapers they supply with maps, the frequency with which they provide maps to customers, the size and form of the maps they provide, the number of persons on the graphic staff and the number of those preparing maps, the services' specific guidelines and/or policies for map preparation, and information on whether the services are acknowledged in the newspapers. Sample 2 shows the questionnaire sent to services.

Systematic Study of Newspaper Maps

In addition to the use of questionnaires, a detailed study of 207 newspaper maps was conducted. The maps studied represented approximately one publishing week of 36 different U.S. newspapers which were selected to represent a diversity of geographic locations

and a wide range of circulation sizes. On Graph 1, previously referred to, each dot represents one of the newspapers whose maps were reviewed. Again, it should be kept in mind that although a wide range of newspaper circulations was selected, the maps from the smallest newspapers represent what the majority of Americans read and see. Also taken into consideration in selecting the newspapers to be studied was the availability of the original papers to avoid examination of reprints or Xerox copies. A list of the newspapers whose maps were included is found in Appendix C. There is some overlap between the respondents to the questionnaire and the newspapers selected for the systematic study. This facilitated a convenient check to compare what was reported in the questionnaire and what was observed in the newspaper.

Every map that appeared in the paper during the week it was obtained was included in the study with the exception of three types:

1. Advertising Maps. Because these maps appear in advertisements, they are not necessarily selected for use or prepared by the newspaper staff.
2. Daily Weather Maps. These are often a standard base map with standard symbols applied according to National Weather Service Bulletins and are not made in response to news.
3. Illustrative Graphics. These are graphics that, under very broad definition, could be considered maps. They utilize a geographic form but they do not serve a

cartographic purpose such as showing location or distribution.

Two hundred and thirty one individual daily newspapers were reviewed. In those 231 days of news, 207 maps were printed. An index card was prepared to catalogue and critique each map. The cataloguing process was designed to provide an overview of the map and the context in which it appeared in the paper. It consisted of recording the following information; name of the newspaper, the day and date, the section (if applicable), the page number, the title or subject of the map, the type of map, the map size, who made the map (if noted), the type of story accompanying the map, and the purpose of the map as best determined from the story and the map itself. A general description of the map including the patterns, colors, and symbols used, the use of captions, legends, scales, or source acknowledgment, and any other identifying traits of the map were also recorded.

Also contained on the index card for each map was a critique. The critique was divided into four parts designed to cover the steps in the cartographic process and to identify problem areas with each map. The map analysis was defined and divided in the following manner:

Map Structure (size, scale, and transformation).

The physical dimensions of the map were examined and compared to the area of the earth's surface shown to ascertain subjectively if a larger or smaller scale would be beneficial to most readers.

Obvious deformation in distance, direction, size, or shape were evaluated to determine if an inappropriate transformation had been selected.

Map Content.

Maps were examined with respect to accuracy, completeness and lack of ambiguity in their content. They were also examined to determine the suitability of the amount and type of information presented with respect to the purpose of the map.

Map Design.

The clarity and legibility, balance, visual contrast, figure-ground, hierarchical organization, and typography of each map was analyzed to detect flaws in these map design elements.

Overall Evaluation.

The reproduction, execution, and general appearance of the final map were discussed along with particularly noteworthy techniques and an evaluation of the map's success.

Interviews with Newspaper Personnel

Interviews conducted with newspaper personnel were an invaluable source of information. Several large newspapers including the Washington Post, St. Petersburg Times, and San Francisco Examiner, were contacted to answer specific questions on map preparation for their paper. The Chicago Tribune, Christian Science Monitor, Associated Press, and United Press International (UPI), who all supply maps to

other newspapers, were interviewed about their production and distribution procedures. Also, the Capital Times, a local paper with a smaller circulation, provided information on their methods of approaching cartographic assignments.

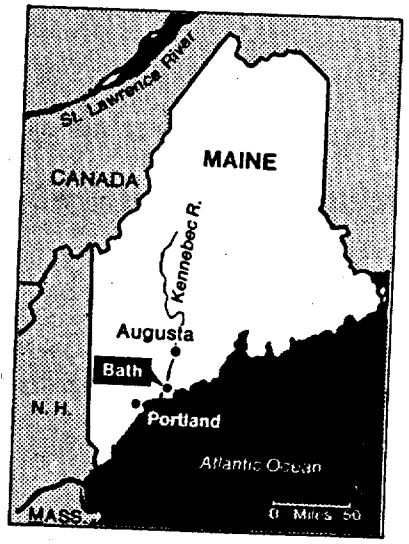
Every contact was graciously met and most of the people interviewed exhibited enthusiasm for making maps and concern for map improvement. In addition, many people took the trouble to search for examples of particular interest and to provide them unhesitatingly. The questioning of the wire services was especially time consuming and both AP and UPI expended considerable effort to discuss and show their cartographic techniques. These conversations with newspaper personnel proved integral in piecing together the information acquired from the questionnaires and newspaper map analysis.

## II. PATTERNS IN THE FUNCTION AND APPEARANCE OF NEWSPAPER MAPS

Although it is difficult to know absolutely the purpose of a given map from visual inspection alone, it is obvious from the context that the main purpose of the vast majority of newspaper maps is to provide simple locations. Rarely is data at ordinal, interval, or ratio levels portrayed cartographically and most maps are used to give the reader a simple sense of where an event occurred or to give geographical context to a city, country, or region. This locational function of most newspaper maps affects all other aspects of their use and appearance.

Most newspaper maps are black and white and many employ the use of dot, line or pictorial patterns or screens. Screen selection ranges from about 55 to 90 lines per inch and common percentages range from 10 to 40 and 80 to 90. It is not unusual to detect an individual style with some preparers of newspaper maps such as those in Examples 6, 7, and 8 from the New York Times of February 17, 20, and 21, 1982 respectively. The size of the map, typography and screen selections, and the basic design remain fairly consistent and are characteristic of New York Times' maps. A consistency in style is usually associated with newspapers who make many maps and of services that provide maps to newspapers such as AP, NEA, and the Chicago Tribune Graphic Service.

Although a small percentage of newspaper maps are in color, frequently only one color is used to highlight the map. Few newspapers use color extensively although the ones that do appear to be the most

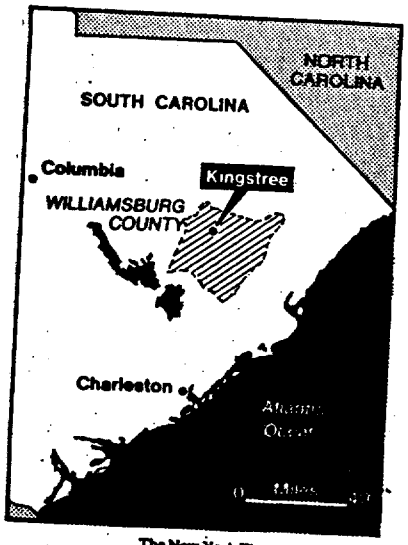



The New York Times / Feb. 17, 1982

**Maine is struggling economically, but Bath and Portland are not.**

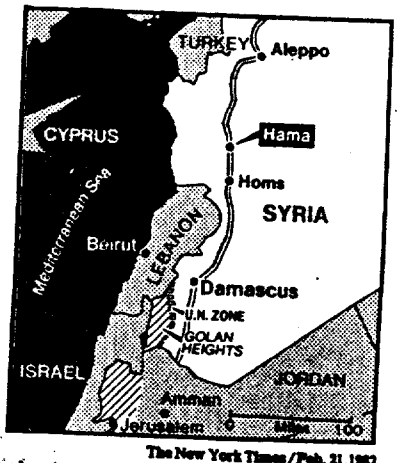
EXAMPLE 6

EXAMPLE 7




The New York Times / Feb. 20, 1982

**At the railway station at Kingstree, many black farmworkers began journeys to Northern cities.**




The New York Times / Feb. 21, 1982

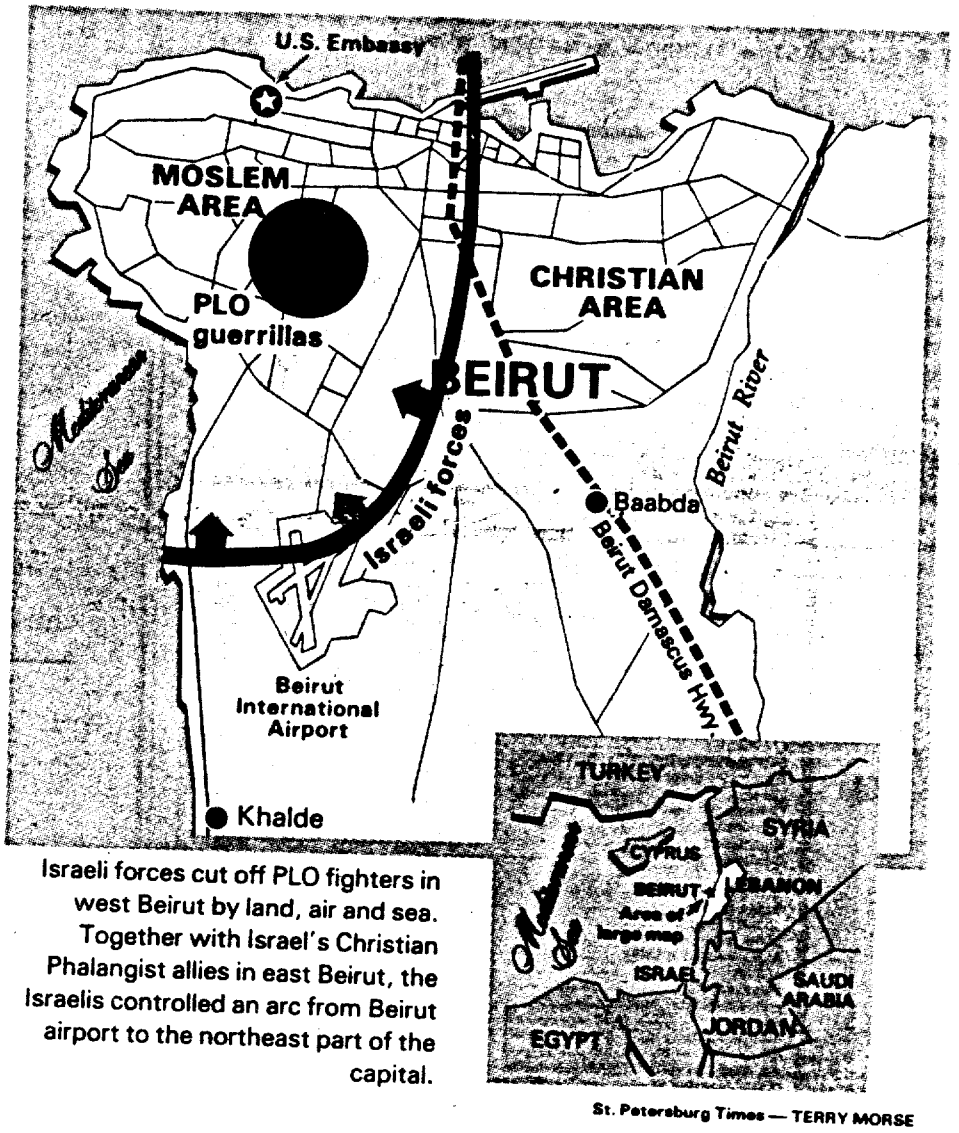
**Fighting in Hama reportedly began with army raid on an arms cache.**

EXAMPLE 8

frequent users of graphics and maps. The function of color on newspaper maps however, is usually restricted to enhancing appearance and does not add to the hierarchy of the graphic structure or aid in presentation of complex cartographic data. Examples 9 and 10, printed in the St. Petersburg Times on June 15 and 19, 1982 respectively, illustrate the effective use of color to enhance simple location maps.

Terrain and physical features are usually not depicted on newspaper maps, and map makers limit themselves to the labeling of essential reference features such as oceans, countries, cities, and streets. Symbolization for elements other than this type of base information is not common. Legends are seldom needed or used on newspaper maps and titles within the map border are not common. In most cases, identification of the map is accomplished by a caption adjacent to the map or the extension of the story headline over the text and the map. The effective use of an extended headline, a caption, or a map title is advantageous because it helps draw the reader to the map and concisely states its relevance.

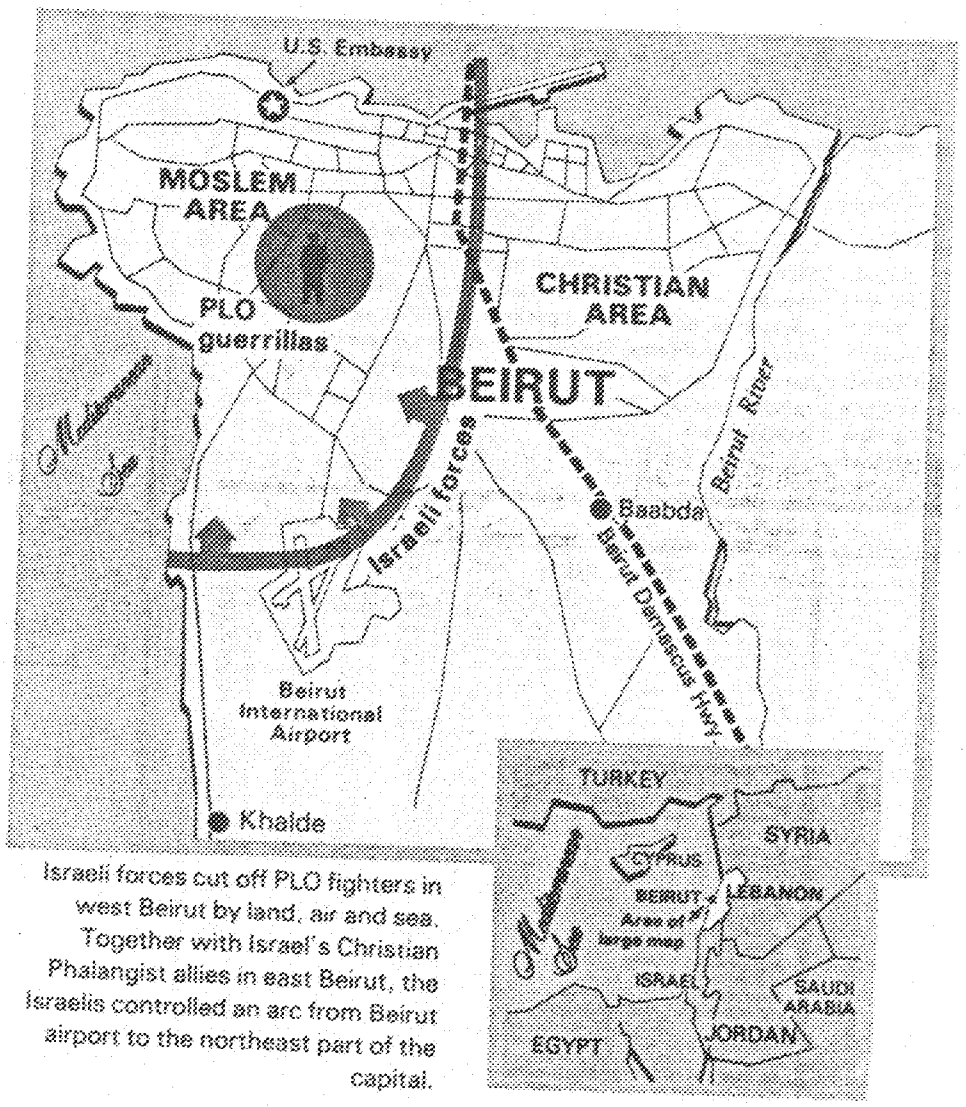
Although it is not a strict necessity with every map, virtually all would benefit from the use of a scale, however newspaper maps commonly do not use scales. A typical example is Example 11, prepared by UPI and appearing in the Evening Bulletin on April 5, 1982. The great distance between Great Britain and the Falkland Islands was highly publicized as the British Fleet prepared to sail. Although it was mentioned in the accompanying story, the distance should have been explicit on the map in the form of a scale.




Israeli forces cut off PLO fighters in west Beirut by land, air and sea. Together with Israel's Christian Phalangist allies in east Beirut, the Israelis controlled an arc from Beirut airport to the northeast part of the capital.

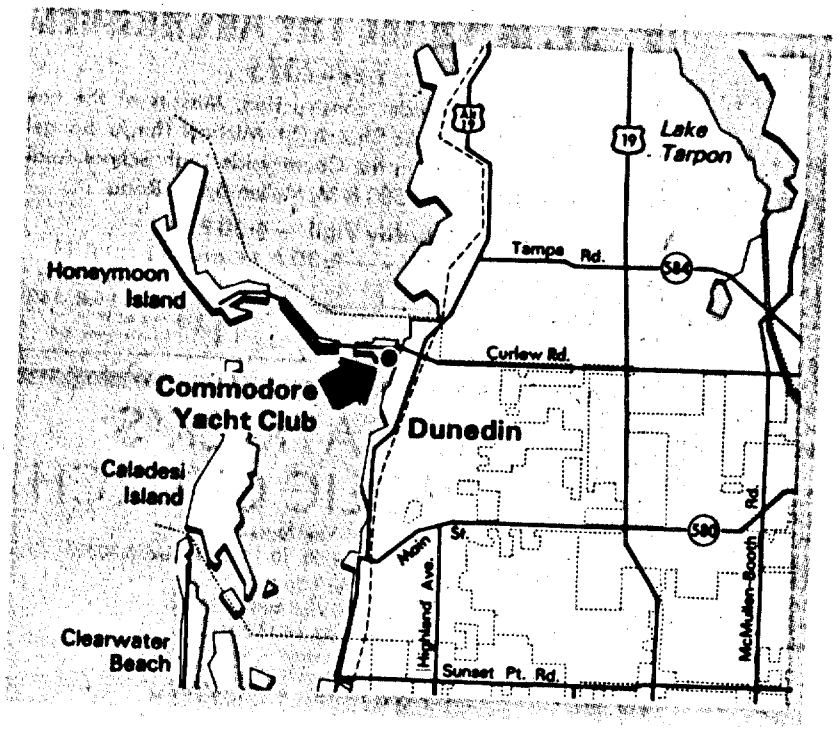
St. Petersburg Times — TERRY MORSE

EXAMPLE 9




Israeli forces cut off PLO fighters in west Beirut by land, air and sea. Together with Israel's Christian Phalangist allies in east Beirut, the Israelis controlled an arc from Beirut airport to the northeast part of the capital.

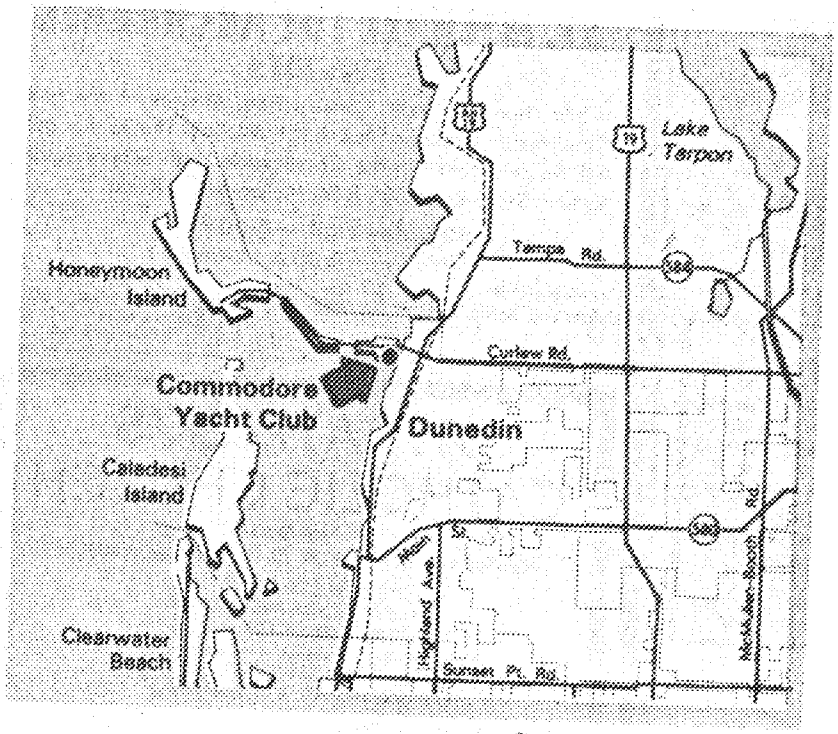
EXAMPLE 9




Clearwater Times — TERRY MORS

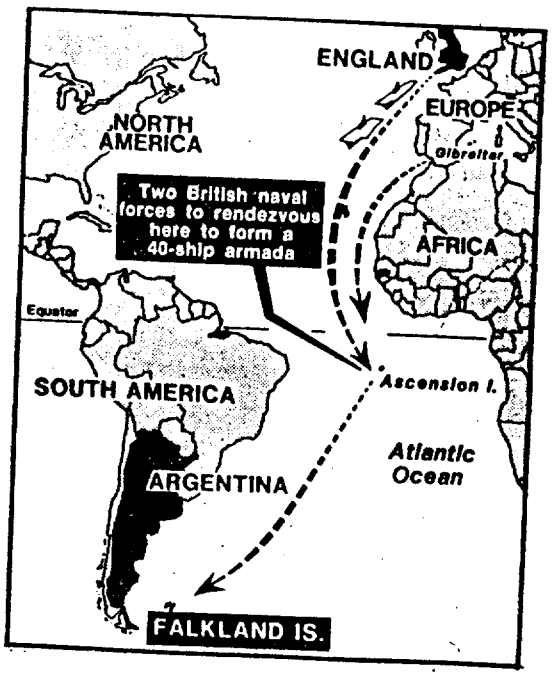
Map locates Commodores Harbor in Dunedin.

EXAMPLE 10




Map locates Commodores Harbor in Dunedin.

EXAMPLE 10




—UPI Map

EXAMPLE 11

When a major news event occurs, such as the invasion of the Falkland Islands by Argentina, many newspapers feature a map on the front page, above the fold to attract readers at the news stands. A map's location within the paper is always carefully calculated, but it can occur in virtually any section. The average American newspaper reader sees considerably less than one map per day, although readers of the more graphic newspapers are exposed to maps more frequently. Graph 2 gives an indication of this relationship and, in general, smaller newspapers publish fewer maps. Of the smaller newspapers studied, three stand out as having slightly higher average number of maps and are indicated with dashed lines on Graph 2. One is the Christian Science Monitor, a paper that frequently uses maps and also syndicates them through the Los Angeles Times Syndicate. Another is the Providence Evening Bulletin which was studied with the Providence Sunday Journal, the latter of which, at least, is recognized as a strong graphic paper. Of the larger newspapers studied, three stand out as having slightly lower average number of maps, also indicated by dashed lines. One of these is a business-oriented newspaper, the Wall Street Journal, and the other two, the Chicago Sun-Times and the San Francisco Chronicle, are located in large cities that have another, competing newspaper. In both cases, the competing newspapers, the Chicago Tribune and the San Francisco Examiner, are known to heavily emphasize graphics.

In the systematic study of maps, the number of maps printed by one newspaper in seven consecutive days ranged from zero to nineteen.

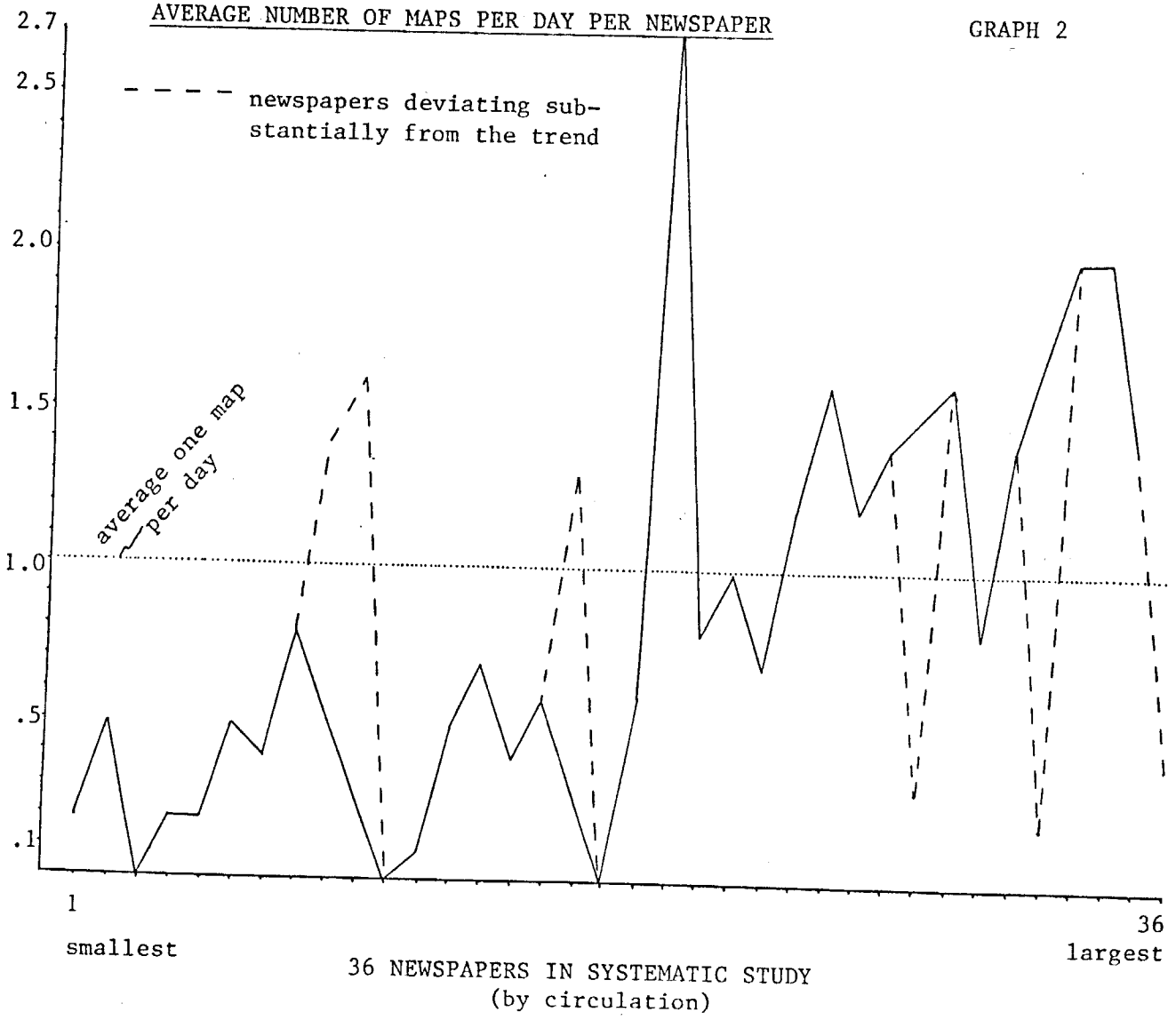

AVERAGE NUMBER OF MAPS PER DAY PER NEWSPAPER
GRAPH 2
newspapers deviating substantially from the trend
2.7
2.5
2.0
1.5
1.0
.5
.1
average one map per day
1
smallest
36
largest
36 NEWSPAPERS IN SYSTEMATIC STUDY
(by circulation)

Table 1 shows the distribution of maps in the study by day of the week. The Sunday paper often reflects a greater commitment to feature writing and an orientation toward careful reading. In addition, many parts of the Sunday paper are planned further in advance than a daily paper. These factors contribute to a greater emphasis on graphics in Sunday editions, including twice the average number of maps. These may also be factors in the low occurrence of maps of Fridays and Saturdays.

TABLE 1

| | *number of newspapers | number of maps | number of maps per day |
|---|---|---|---|
| Monday | 36 | 33 | 0.9 |
| Tuesday | 37 | 33 | 0.9 |
| Wednesday | 39 | 36 | 0.9 |
| Thursday | 35 | 37 | 1.0 |
| Friday | 35 | 20 | 0.6 |
| Saturday | 29 | 14 | 0.5 |
| Sunday | 20 | 34 | 1.7 |
| | 231 | 207 | |

*The printing week of a paper can range from 5 to 7 days and in a very few cases, a particular date was unavailable or the sample included 8 or 9 days.

The detailed study of newspaper maps also gave information on the scale categories of the maps published in newspapers and to the types of stories that they accompany.

Six different types of maps were recognized in the study of newspaper maps based on their relative geographic scale:

Local - large-scale maps of cities, towns, or small geographic areas that were a portion of a state, province, or country.

Provincial or State - maps with emphasis on only one province or state, although neighboring geographic units may be identified by name only.

National - maps with emphasis on only one country, although neighboring geographic units may be identified by name only.

Regional - maps depicting more than one state, province or country with emphasis on a geographic region and relationships within that region.

Continental - maps showing an entire continent, or small scale maps depicting more than one continent but not the entire earth.

Global - maps showing the entire earth.

Table 2 shows the distribution of maps in the systematic study by type:

TABLE 2

| | number of maps | percent |
|---|---|---|
| Local | 73 | 35% |
| Regional | 62 | 30% |
| National | 42 | 20% |
| Provincial or State | 22 | 11% |
| Continental | 5 | 2% |
| Global | 3 | 2% |
| | 207 | 100% |

Regional and local maps appeared most frequently and together comprised 65% of all maps studied. Commonly mapped regions included Central America, parts of Africa, and the Middle East because of their obvious newsworthiness. The prevalence of local maps, which comprised over one-third of the maps reviewed, was especially interesting be-

cause the geographic areas portrayed varied greatly, relative to the particular paper in which the map appeared. In addition, the local maps exhibited wide diversity in cartographic style and design because many had to be prepared by the local newspaper itself and were seldom supplied by a graphic or wire service. The lack of maps of continental and global type is closely related to the small size allowed for newspaper maps and also the locational purpose for which many are designed. These figures do not reflect the number of maps used as insets, or locators, for other maps. When a map was presented with an inset, it was assigned to the category of the main body of the map. About 13% of the maps reviewed used some form of an inset.

Although some maps are designed to be "stand alone" graphics (self-contained maps, with or without text, to be used whenever and wherever space is available) most of the maps reviewed accompanied a story. Seven different types of stories were recognized:

Feature - stories located in feature sections such as travel or food with emphasis on human interest or local color and not timely news.

News/breaking - news stories that are front page, headline news, printed as soon as possible dealing with important news events that have just occurred or are still occurring.

News/national - news stories which would appear in any U.S. newspaper about the U.S. or a portion of it.

News/foreign - news stories which would appear in any U.S. newspaper about something occurring outside of the U.S.

News/local - news stories which would appear only in newspapers within close geographic proximity to the event or topic.

News/general - news stories not in one of the above mentioned categories, usually involving the U.S. and another geographic region.

Other or None - stories such as book reviews or editorials not located in a feature section or a map not accompanying a story.

The most common type of stories that maps accompanied were foreign news and local news as shown below in Table 3:

TABLE 3

| | number of maps | percent |
|---|---|---|
| News/foreign | 59 | 28% |
| News/local | 53 | 26% |
| News/national | 31 | 15% |
| News/breaking | 23 | 11% |
| Feature | 20 | 10% |
| Other or None | 14 | 7% |
| News/general | 7 | 3% |
| | 207 | 100% |

Foreign news stories, such as those covering the Falkland Islands, the Middle East, or Central America often appeared with regional maps which also occurred most frequently in the study. In the same manner, local news stories often accompanied local maps.

Although U.S. newspapers vary greatly in size, style, politics, and graphic emphasis, their maps have much in common. They are usually locational in function, limited in design, and simple in content.

They are often regional or local in type, and accompany foreign or local news stories. However, one obvious and important difference that exists between various newspaper maps is their cartographic quality. The consistent preparation of high-quality maps for newspapers is a challenging, but often unsuccessfully completed, task. Broadly speaking, the likely causes for this are tied to the technical constraints faced in newspaper production and the limitations of map making personnel.

## III. TECHNICAL AND PERSONNEL RESTRICTIONS

The preparation of maps for newspapers bears little resemblance to traditional cartographic work for private or government agencies. Although few cartographic products are free from financial problems, deadlines, printing limitations, and personnel limitations, in many respects newspaper maps reflect these constraints in the extreme. Both the technical constraints and personnel limitations vary depending on where the map is prepared. In order to discuss clearly the variability and impact of these restrictions it is first important to define four sources of newspaper maps: newspaper staffs, wire services, graphic services, and unknown services.

### Newspaper Staffs.

Most newspapers prepare some of the maps that appear in them. Some newspapers, such as the New York Times, Los Angeles Times, and Washington Post, prepare nearly 100% of the maps they publish, while other papers prepare fewer and rely on other sources more heavily. In addition, a few newspapers distribute their maps to other papers across the U.S. either as part of a news syndication, such as the Christian Science Monitor maps through the Los Angeles Times Syndicate, or as a newspaper based graphic service such as the Chicago Tribune Graphic Service serving over 250 papers. The technical constraints on newspaper staffs do not vary widely from paper to paper with the exception of printing techniques which vary somewhat. The limitations of personnel, however, vary considerably throughout this source of newspaper maps.

Wire Services.

The Associated Press (AP) and United Press International (UPI) distribute maps via satellite and telephone lines to many of the newspapers in the U.S. As of May 1982, these two services provided maps to approximately 1,500 newspapers nationwide. Although technical constraints and personnel limitations greatly affect the quality of wire service maps, the specifics of these constraints vary substantially from those on a newspaper staff.

Graphic Services.

Services such as Newspaper Enterprise Association (NEA), Visual Education Consultants (VEC), and News Graphics (Field Newspaper Syndicate) provide maps, often in conjunction with other graphics, to newspapers for reprinting. The specifics of the constraints facing these services vary from both newspaper staffs and wire services and can also vary considerably from service to service.

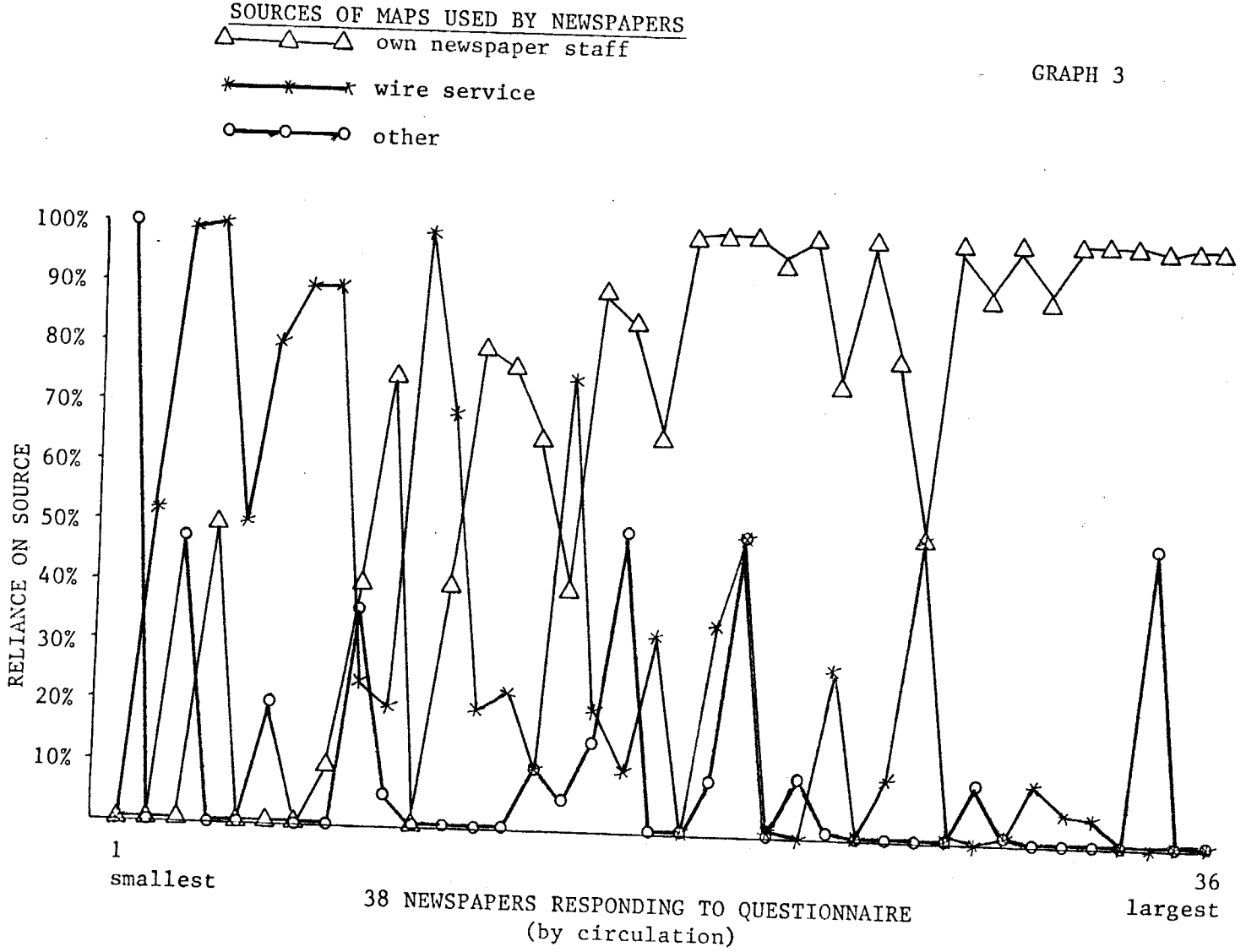
Unknown Sources.

Some maps in newspapers are prepared by a source that is unacknowledged. These may be prepared by any of the previously mentioned sources or reproduced from an unrelated source. Commonly, a large percentage of these maps are prepared by the newspaper itself but other sources include reprints from journals, books, and government publications.

Graph 3 shows by circulation size the sources newspapers rely on for the maps they publish compiled from the questionnaire responses. As would be expected, many of the larger newspapers prepare a high

SOURCES OF MAPS USED BY NEWSPAPERS

GRAPH 3



percentage of their own maps. It is important to remember that most Americans read smaller newspapers and those papers do not prepare a significant number of the maps they publish, indicating the importance of sources such as the wire services and graphic services. All four sources will be referred to throughout the discussion of constraints on newspaper map production.

In examining the preparation of maps for newspapers, three technical constraints become evident. First, maps must be designed and made in a very short time because of strict production deadlines. Second, there is little space allotted for maps in newspapers and consequently they are exceptionally small in size. Third, the speed, frequency, and economy with which newspapers are printed results in the use of less desirable printing techniques and poor quality paper.

## Deadlines on Map Preparation

Newspapers are printed every day and must reflect current, up-to-date news. This means that large portions of a daily paper are prepared in a few hours to be printed and distributed immediately. Deadlines are top priority and are planned to the minute. Because printing of the day's newspaper does not wait, unfinished work is used in its rough form or it is cut, replaced by something else, and considered for a later edition.

Maps prepared by a newspaper staff must be completed in what many cartographers would consider an unrealistic time frame. The responses to the questionnaire revealed that breaking news stories require that

maps be prepared in as much as five hours, but often less than one hour. Maps accompanying general news stories are prepared in anywhere from two hours to a couple of days and maps for feature stories are given anywhere from one day to one week. Wire service maps are also under strict deadlines because they transmit information virtually continuously to newspapers, each with its own printing schedule. Graphic services, unlike newspapers and wire services, often supply maps to their customers only once per week and therefore do not deal with the same deadline problems. The result for newspapers and wire services is an adverse affect on map design, selection of maps to be printed, and the sources consulted.

The necessity to prepare maps in a short period of time forces newspapers to rely on maps they otherwise might not use. Both the wire services and most newspapers have files of maps previously prepared for different stories. If time is short, the most appropriate of these maps will be selected and hastily updated to reflect the current event. The products are neither at optimum size or scale and it is often obvious that they were designed for an unrelated purpose. In addition, newspapers which prefer to prepare their own maps must occassionally print a graphic or wire service map of lower quality than it desires if a news event occurs so quickly that time precludes map preparation.

When preparing maps in a short time, newspapers and wire services are also limited to the sources that are readily available. Questionnaire responses indicate that the common sources for map prepara-

tion are road maps, world atlases, wire services maps, government publications, city or county maps, and encyclopedias. The wire services rely heavily on world atlases, road maps, and government maps. In some cases, maps are prepared from notes or stories completed by reporters. This material is not written by reporters for the purpose of map preparation and often lacks adequate and complete locational information. The time constraint does not allow the map maker to locate or obtain less accessible, but more detailed, accurate or applicable, sources.

Strict deadlines also prohibit contemplation over the details of map scale, type placement, or whether to add further detail. All map design decisions must be quickly made and executed, yet only seven of the thirty-eight newspapers surveyed, and neither AP nor UPI, has written guidelines or policies for the preparation or use of maps. A few newspapers and both wire services acknowledge verbal or conventional design guidelines that they try to follow, but these involve merely a consistent type or pattern use for a particular feature and do not deal with the cartographic decisions of selecting a base map, scale or content. The newspapers that have written policies invariably state the obvious, that maps are important, you need a purpose to make them, and you need to know what that purpose is. Some specify type styles and/or sizes for maps to promote conventions for their particular paper and a few newspapers are in the process of writing or updating and improving guidelines. The haphazard approach of most newspapers to map preparation in conjunction with the limited amount

of time available contributes to the possible publication of simplistic, poorly designed, and inaccurate newspaper maps.

## Map Size Requirements

Regardless of the source of a map, when it is printed in the newspaper, it must conform to strict size limitations. Maps are seldom more than two columns wide and although column sizes vary by newspaper, they are often close to two inches. This means that newspaper maps are usually published at a much smaller size than other cartographic products. One-third of the maps studied were 2½ by 3 inches or smaller, encompassing most of the one-column maps. Three-quarters were $4\frac{3}{4}$ inches square or less, encompassing most of the two-column maps. This is clearly a cartographic constraint and a challenge to map preparation.

Maps prepared by a newspaper staff have a distinct advantage over other maps. Except for the few newspapers that distribute their maps to other papers, the staff preparing its own maps has a fairly accurate idea of the final, printed size. This is essential to good design, allowing decisions about generalization, type size, line width, and patterns to reflect the reduction of the original that will take place. Newspaper staffs also have good access to the stories their maps will accompany, and this is an aid in the selection of map content.

Wire services have virtually no control over how their maps are used. The newspapers that they supply have many different column sizes and a wide diversity of needs with respect to graphics. These

maps are prepared in various sizes, but generally they are transmitted at a scale that requires reduction for a newspaper format. It is then the decision of an individual paper to determine the final dimensions of the published map. According to responses from the questionnaire, newspapers sometimes enlarge maps, often reduce maps, and often use maps at the scale prepared by the service. This forces the wire services to design their maps for the worst possible scenario; the result is simplistic and unsophisticated maps, usually displaying over-sized type and coarse patterns.

Graphic services also have little or no control over how their maps are used and supply papers with a variety of column sizes and graphic needs. A common practice is to print accompanying notes to the editor suggesting possible uses of a particular map and providing background information. The maps are designed to be published at the original or a reduced size. One advantage that many graphic services have is that they supply maps to customers only once per week. This permits conscientious services additional time to design cartographic products that will not be adversely affected by their small final size. Usually graphic services produce maps that are completely legible and less simplistic in their final form than those prepared by the wire services but they generally suffer from a variety of other cartographic problems such as lack of focus and inaccuracy, as exemplified in Examples 3 and 4.

Maps prepared by unknown sources are often made by one of the above-mentioned sources and not acknowledged as such. However, there are maps prepared for uses totally divorced from newspapers, such as road maps, geologic maps, government maps, or maps contained in books or journals, that appear in newspapers. Reproduction of these products must be done with an awareness of the complications resulting from either reproducing only part of the map or reducing the entire map to fit within the size allowed by the newspaper. A map that is well designed at one scale and size does not remain so when the size is altered.

## Printing Techniques and Paper Quality

The printing technique used to reproduce a map is a critical factor in determining various aspects of map design. Originally, newspapers were printed on flatbed presses but the slow process eventually gave way to stereotyping, which produced curved plates to be used in combination with the Bullock rotary letterpress and increased the speed with which papers could be printed. Although today's letterpress presses are fast, disadvantages of this form of printing include wear on the plates and pressure damage to paper fibers. Both factors limit the capabilities to produce fine lines, patterns and textures, and contribute to a deterioration of image quality. However, two financial concerns have delayed the conversion of all newspapers to offset printing.[10] One is the considerable capital invested in printing machinery. This encouraged newspapers to adapt their letterpress presses to photocomposition and cold type by the use of plastic

plates. The second was a concern over increased paper costs due to waste with offset methods. Gradually, however, even the largest newspapers have found that it may be economically feasible to make the transition to offset, making high quality pictures and innovative graphic displays possible. Of the thirty-six newspapers whose maps were reviewed, seventeen use offset printing methods and nineteen use letterpress printing methods, and a few of the letterpress printing papers have plans to convert to offset in the near future.

Original maps vary in their printing and paper quality. Newspaper staffs usually prepare a paste-up of the maps which is then photographed for platemaking. Graphic services such as NEA and News Graphics print their originals offset on high quality, glossy paper and mail them to the newspapers in camera-ready format. With the exception of VEC, which produces prints of filmstrip frames, graphic services produce original maps whose quality exceeds that of the final published map.

Wire services transmit their original maps via satellite and telephone to all their customers. The quality of AP's laserphoto and UPI's Unifax II machines are adequate for reproducing scanned type but cannot transmit fine linework, pattern, or type that would be appropriate on maps. Because of this, and the variety of customer needs, original maps are designed with large type and coarse linework and patterns to facilitate transmission. Even then, some parts of maps can be lost due to interference and in most cases the quality of original maps, and the copies received by newspapers, is low.

Regardless of the sophistication of the printing methods, the final reproduction is done on newsprint, another major investment of the newspaper. Newsprint is groundwood, made by grinding bark-free logs into pulp without any chemical action to remove impurities. The 32 lb paper is low quality and extremely absorbent. Sharp linework using any kind of printing process is difficult and the thinness of the paper increases shadowing from back sides of pages. Ink on newsprint easily smears and is greatly affected by humidity.

Seldom are maps produced with less desirable printing techniques and lower quality paper than those appearing in newspapers and these are formidable constraints on producing high quality cartographic products. The technical constraints of limited preparation time, small final printing size, in conjunction with these less desirable printing techniques and paper, certainly must contribute to the low quality of the cartographic products appearing in U.S. newspapers today.

## Personnel

The preparation of maps for newspapers requires more than a knowledge of cartographic principles and techniques. Personnel involved in making successful newspaper maps must combine cartographic knowledge with a complete understanding of the technical workings of the newspaper and a strong journalistic sense. For a map to succeed in a newspaper, it must first be legible and attractive, drawing the reader to the story. Then its more important purpose, to communicate effectively by increasing the readers' knowledge and comprehension, can

be fulfilled. To accomplish this, cartographic and journalistic skills must be combined throughout the mapmaking process. Even with a thorough understanding of this role, the all important connection between graphics and journalism is sometimes lacking. This forces the map maker to perform the unsatisfactory role of simply filling holes created in newspaper text. The result is less than efficient or effective cartographic communication.

Two factors directly affect a newspaper's ability to produce well designed maps. The first is the size of its staff which affects the priority maps have, the frequency of map use, and the position of the staff member who handles cartographic assignments. The second is the skill, knowledge and experience of the individuals making the map.

The size of a newspaper's graphic/art staff usually indicates the priority given to graphics, including maps. The questionnaire results indicated that, as expected, larger newspapers use maps more frequently and prepare a larger percentage of their own maps. These relationships were previously noted and illustrated on Graphs 2 and 3. The size of the staff also indicates the staff member responsible for map preparation. Of the six smallest newspapers surveyed, four reported that they did not make any of their own maps. The other two indicated that the staff member who prepared their maps was the managing editor. This is in sharp contrast to the larger papers, a few of which have their own staff cartographers or, as in one case, "9 on staff doing only maps and charts." Between these two extremes, the

majority of papers surveyed indicated that the responsibility for map making lay with either an artist (staff, art, editorial, graphic, or news) or the art, graphic, or advertising department.

Although size of graphic staff usually determines who prepares maps, it does not determine the quality of those maps. It is true that papers with their own cartographers or "map/chart specialists" produce some of the best cartographic products in newspapers. However, the majority of the papers surveyed have one or several "artists" doing maps and the combined cartographic and journalistic abilities of any particular artist, whose training may be art, graphics, journalism, advertising, or some unrelated field, is individual. Some newspapers even have one artist producing high quality maps and another who does not handle cartographic assignments as competently. This is also true of the graphic services and quality varies from service to service and, in some cases, from map maker to map maker.

Many smaller newspapers rely on AP and UPI to provide them with maps and the wire service graphic personnel face additional problems. Not only does the skill of staff members vary greatly, but in most cases their work includes the high priority job of photo retouching which some of them were originally hired to do before graphics were even sent over the wires. Today, wire services supply charts, illustrations, maps, graphs, and cartoons in addition to photography and text. All of this work is done by relatively small graphic staffs, a few of whom have seen this transition take place. None of the

staff members on either service has had cartographic training, although some have extensive experience from many years with the service. Both services use a standard and simplistic approach to map design and preparation based on what, in their opinion, is adequate. The lack of either service to prepare high quality maps is due to the combination of many, nearly overwhelming constraints, only one of which is the knowledge and skill of their personnel. Unfortunately, staff members do not have either the knowledge, skill, desire, or conditions necessary to break out of routine map design and preparation.

The relative influences of the technical constraints, such as time, size, and printing and paper quality, and the limitations of personnel, such as lack of knowledge and skill, can be evaluated by systematically studying newspaper maps. By analyzing the recurrent and evident cartographic problems, their causes can be ascertained.

## IV. ANALYSIS OF STRUCTURE, CONTENT, DESIGN, AND FORM

A wide variety of cartographic problems become evident in the systematic study and critique of newspaper maps. At best, there are some hastily prepared maps whose main faults involve less critical matters, such as uneven linework which, except in extreme cases does not prevent the reader from obtaining information from the map. At worst, and far more important, are maps containing critical errors, such as inaccurate information, that severely hamper the map's ability to communicate effectively. Both the minor problems and the critical errors occur far more often than necessary in newspaper maps; they are a direct result of the technical constraints and personnel limitations newspapers face but could, nonetheless, be eliminated.

A four-part map critique was designed to examine the problems revealed in the study of newspaper maps. The parts; map structure, map content, map design, and map form, focused on aspects of the cartographic process and each was outlined as a question or series of questions to be addressed. The questions were then used to evaluate each of 207 newspaper maps. The results indicate how effectively each part of the cartographic process was handled and what specific cartographic problems recurred.

### Map Structure (Size, Scale, and Transformation)

These three primary elements form the foundation for a successful map. Size and scale are, of course, integrally linked and therefore were specifically defined for the map analysis that was conducted.

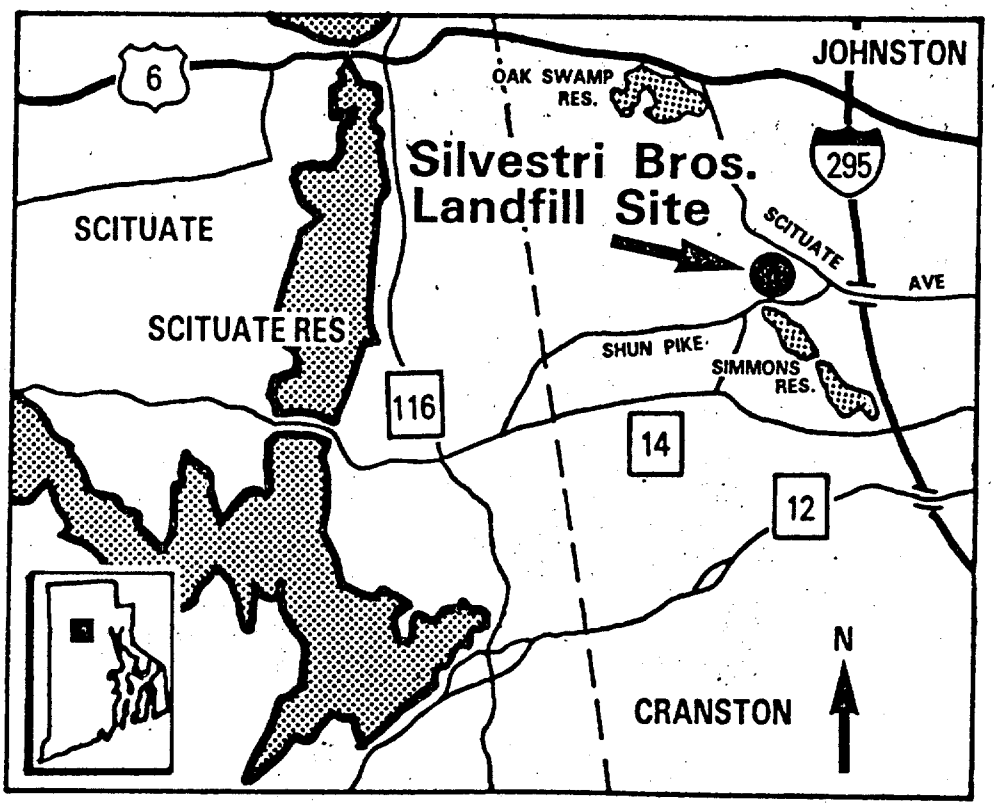
The limited space in newspapers allotted for maps makes optimum size and scale selections imperative. Transformations are seldom noticeable on newspaper maps and therefore seem less critical. However, nearly every map relies on the maintenance of one or two of the basic properties of projections, if only to "look right". A particular transformation can easily distort the map's message if improperly selected. The questions and criteria for evaluating size, scale, and transformation were:

Regardless of the internal content of the map, are the physical dimensions of the map appropriate?

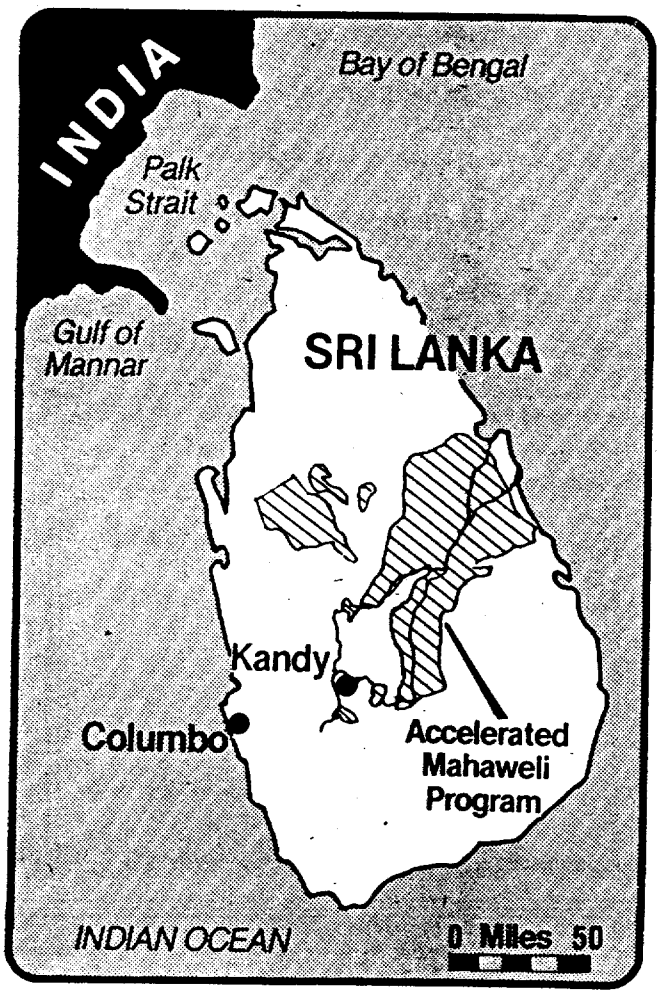
Without regard for the size of the map, would most readers benefit if the map were at a smaller or larger scale?

With respect to the purpose of the map, does the transformation used cause any misconceptions?

A common problem with the size of the newspaper maps reviewed was that they were not reduced enough. Many finished maps exhibited oversized lettering, unnecessarily heavy linework and annoying, coarse patterns. Although reduction alone, without redesign, would not perfect these maps, it would improve many. This problem occurred in some maps prepared by newspaper staffs, such as Example 12, a map of the Silvestri Brothers Landfill site which appeared in the Providence Sunday Journal, April 4, 1982 and Example 13, a map of Sri Lanka from the Christian Science Monitor, March 25, 1982. On what are neat, clear maps, oversized type and coarse patterns are unnecessarily distracting to the reader. Most frequently, the lack of sufficient reduction was


6
JOHNSTON
OAK SWAMP RES.
Silvestri Bros. Landfill Site
295
SCITUATE
SCITUATE AVE
SCITUATE RES.
SHUN PIKE
SIMMONS RES.
116
14
12
N
CRANSTON

EXAMPLE 12




By Susan Ballanger Tyner

EXAMPLE 13

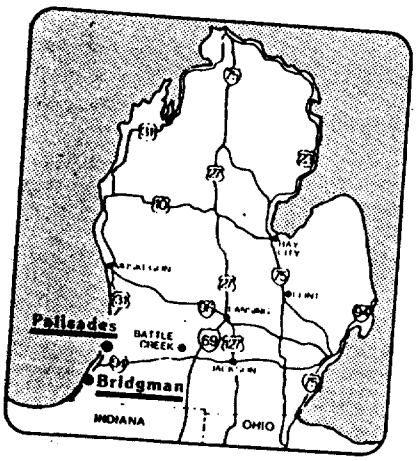
a problem with the maps distributed by the wire services who do not know the final map dimensions. Examples 1 and 2, previously shown, are reproduced exactly as they were transmitted by AP and Example 14, a map of Iran and Iraq, is reproduced exactly as it was transmitted by UPI. Both illustrate the gross exaggeration of wire service maps that newspapers must handle. Example 15, prepared by AP, was published in the Chicago Sun-Times on July 15, 1982, and shows that even when printed at somewhat smaller sizes, the exaggeration is still evident. Increased reduction of this map, along with the other examples presented, would improve their overall appearance by toning down the patterns and lightening the linework and type considerably. In some cases, maps are actually enlarged from the original size. Although this is not common, enlargement may be deemed necessary, especially on maps not prepared by the newspaper staff. These enlargements exhibit a loss of sharpness in the edges of linework, symbols, and type.

Maps that were printed too small were a less common problem. When it did occur, it was almost exclusively caused by over-reduction and resulted in fine linework or patterns being lost and the smallest type sizes becoming illegible. In Example 16, a map of Michigan from the Detroit News of March 31, 1982, and Example 17, a map of Yuma County from the Arizona Republic of March 29, 1982, this problem is exhibited. When lighter type styles are used, such as Example 16, portions of the letters do not reproduce well and when bolder type styles are used, such as Example 17, the letters run together on the newsprint. Although illegibility due to over-reduction must be avoided,


EXAMPLE 14

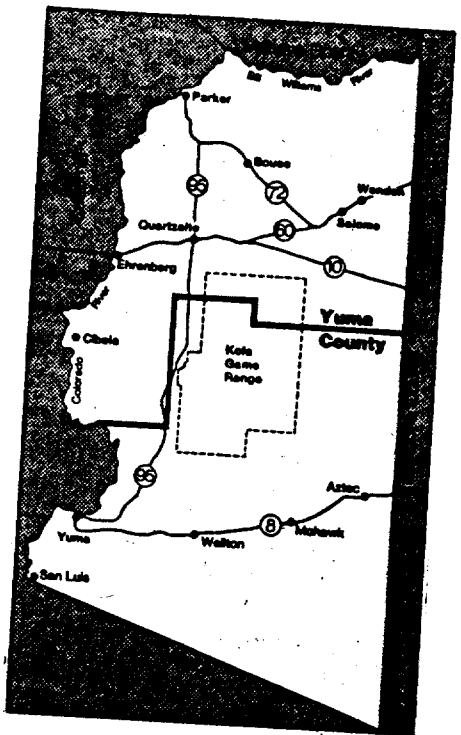
EXAMPLE 15


INVASION: Iranian troops are pushing toward Basra, Iraq's main port. (AP)




NEWS MAP

EXAMPLE 16



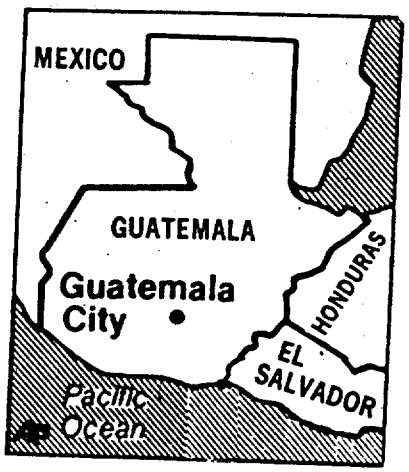

Wendy Govier/Republic

EXAMPLE 17

the newspaper maps studied were generally within the lower size limits of type legibility and printable line weights and patterns.

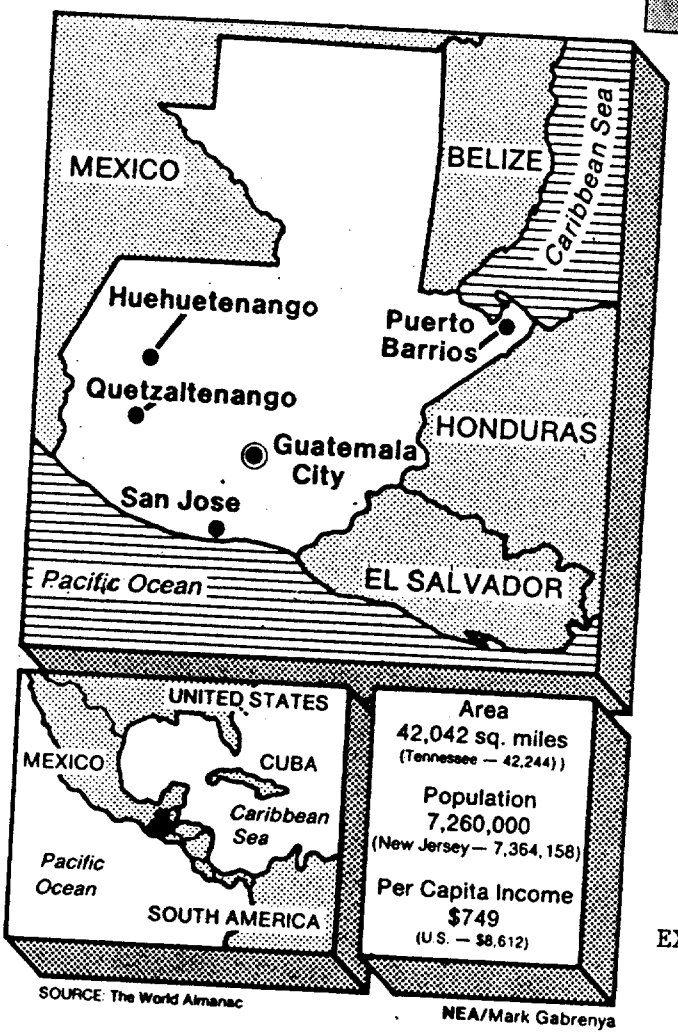
The notorious geographic ignorance among Americans, combined with the limited size allotted to newspaper maps, creates a conflict in map preparation. There is not enough space to show the "big" geographic picture, using a small scale, yet it is doubtful that readers have the knowledge to relate individual pieces of geographic information presented at a large scale to the geographic picture as a whole. Not depicting enough of the earth's surface is a major and consistent problem with newspaper maps, especially those depicting foreign regions.

Central America, often shown on maps in current newspapers, is an example of a region often mapped at too large a scale. Example 18 shows a map whose purpose is to locate Guatemala and Guatemala City. The map was prepared by AP and printed in the Columbus Dispatch on March 31, 1982. It fails to include the border of Belize or label Belize and the Caribbean Sea, but more important, it gives the reader sparse information about the surrounding region. If the reader does not know where Guatemala is located, the depiction of El Salvador, Honduras, and a small section of Mexico will probably be of little assistance. There is not enough regional information shown to be certain that the reader can understand the locational information presented, not to mention comprehending the regional context. It does not seem surprising that a recent study of adult Americans revealed that nearly one-third thought El Salvador was in Africa.[11] The maker of newspaper maps has two options to eleviate this problem, either to




EXAMPLE 18


EXAMPLE 19



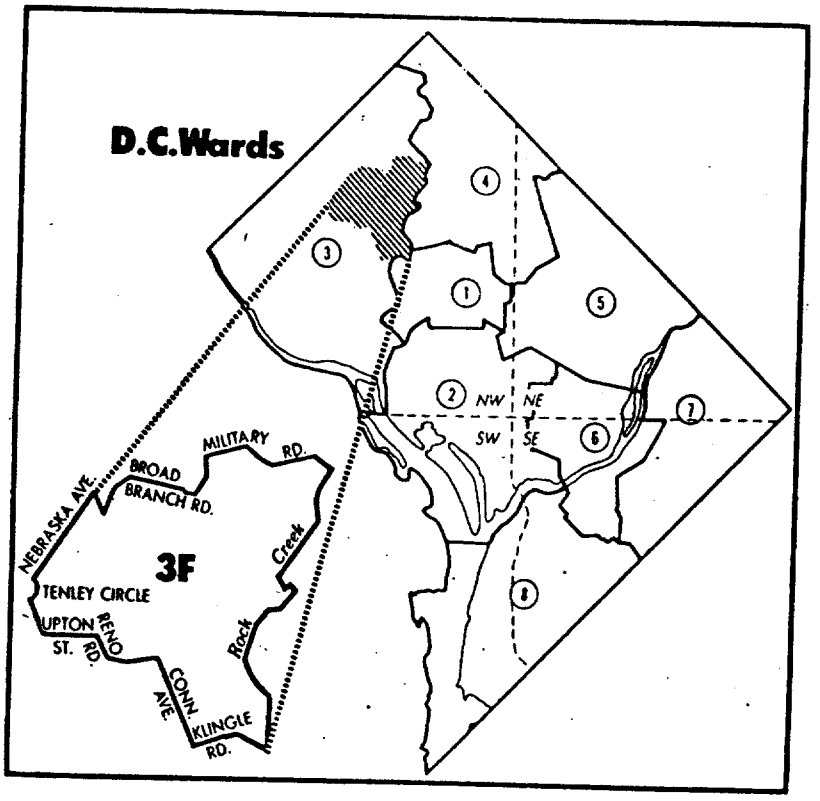

EXAMPLE 20

prepare maps at a smaller scale to include some geographic features that they are certain the reader is familiar with, or to use small scale insets with the main map explicitly depicting the geographic locations. Example 19, from the St. Louis Post Dispatch of February 18, 1982, locates El Salvador using a smaller scale and giving the reader a bigger, and possibly sufficient, regional perspective. Example 20 from the Dickenson Press, March 24, 1982, was prepared by NEA and attempts to accomplish the same goal by using a small scale map accompanying the main map. This is usually a reliable technique, however in this case neither of the two maps has labeled the subject, Guatemala. An excellent map, Example 21 from the Washington Post of February 21, 1982, shows a more complex but successful use of insets. In addition, this map contains information on terrain, regions, and the main road in El Salvador.

An important aspect of inset use is that there be a purpose for the inset and a purpose for the map. Example 22 from the Washington Post of February 18, 1982, shows the effective use of two scales on a local map. The main map locates the wards in Washington D.C. and the larger "blow up" of Ward 3F tells the reader the actual street and river boundaries for that ward. Both parts of the map serve a distinct purpose and sometimes this is not the case with insets on newspaper maps. When using two maps in combination to aid readers it is also essential that the relationship between the maps be explicit. In Example 5, previously shown, the relationship of the two map parts to one another is not obvious and severe misconceptions could result. Whereas


By Richard Furno—The Washington Post

EXAMPLE 21




By RICHARD FURNO—The Washington Post

**ANC 3F: North Cleveland Park-Forest Hills neighborhoods.**

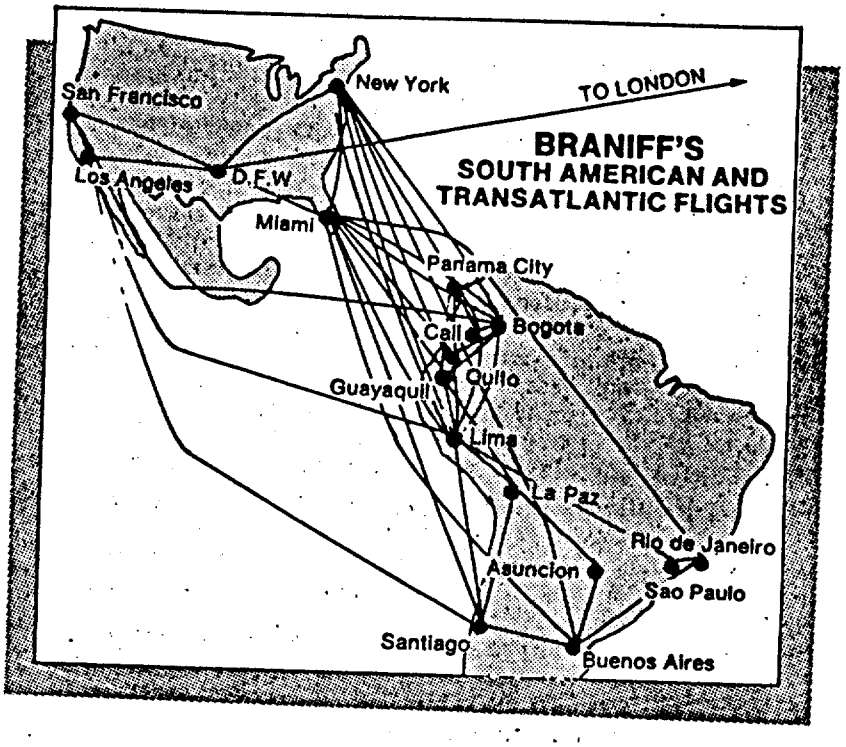
EXAMPLE 22

in Example 22, the relationship between the D.C. wards and Ward 3F is immediately evident.

The importance of including sufficient geographic information is magnified in newspaper maps because often their only message is locational--to show the reader where a city, country, or region is. If the location information is not communicated, the map is a complete failure. On the newspaper maps reviewed, depicting too little of the earth's surface was a consistent problem.

The maps in the study whose transformations prompted comments reflected a variety of situations. Example 23 appeared in the Dallas Morning News on May 13, 1982. It depicts the landmasses of North and South America in a distorted geographic relationship to one another and the complete elimination of Central America. It is important that the lack of realistic portrayal on maps be obvious or acknowledged on the map. In Example 24 from the Chicago Tribune, March 7, 1982, true north varies throughout the map, distorting the shapes and appearances of some countries. The addition of a graticule on the map would acknowledge the distortion and give the reader additional information with which to use the map. Example 25 from the Arizona Republic, March 31, 1982, uses an oblique view of a local area with the scale varying substantially from the bottom to the top of the map. In this case, the story dealt with a distance problem between two airports and the map greatly distorts distance.

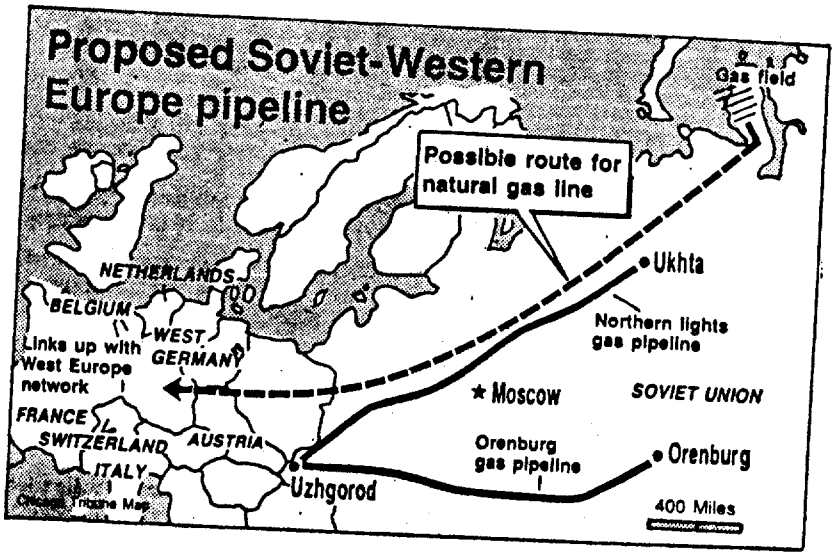
These three examples do not necessarily reflect transformation abuses, but they do point out the importance of considering map distor-



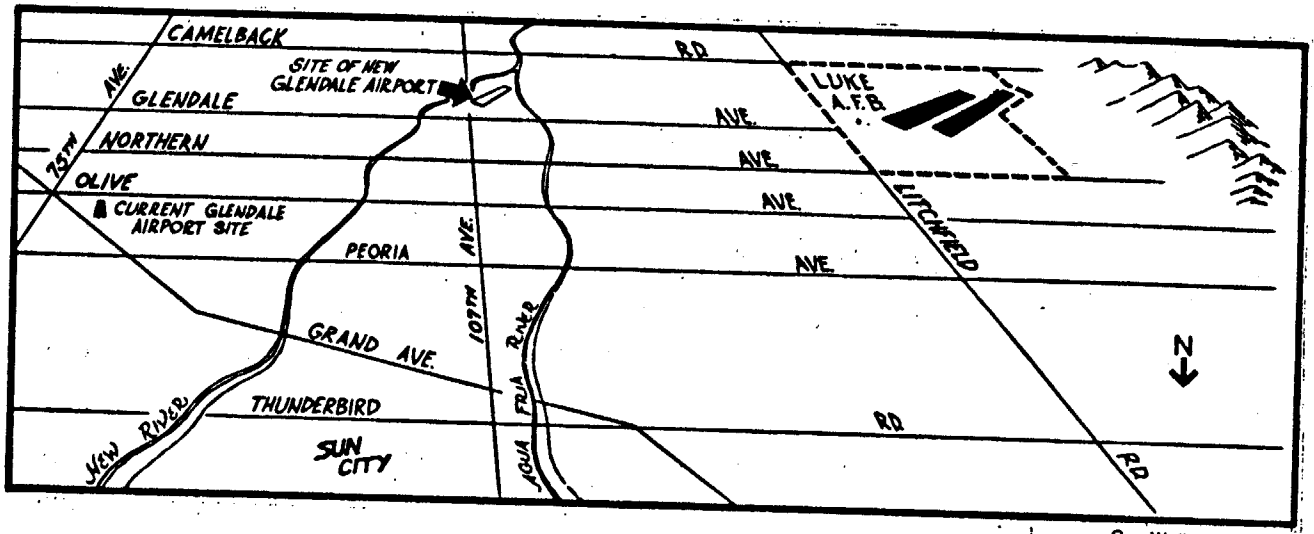

*The Dallas Morning News: Jean Gowan*

**Braniff's international routes are shown. Eastern Airlines is scheduled to take over Braniff's South American routes June 1.**

EXAMPLE 23




EXAMPLE 24

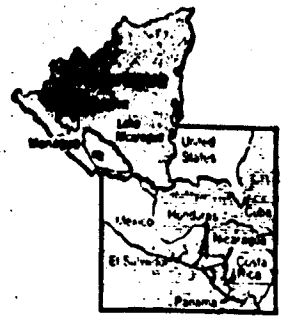



Gus Walker/Republic

**The accidental landing at Luke Air Force Base of a Cessna heading for the nearby Glendale airport, along with the recent collision of a jet and small plane, have led to the reconsideration of a new airport site.**

EXAMPLE 25

EXAMPLE 26



tion even on less complex and precise maps. The map maker must be fully aware of the extent of the distortion and must analyze whether misconceptions are probable. With a complete understanding of transformations, a decision can be conscientiously made to either use a transformation as it is, substitute another transformation, or explain and/or acknowledge on the map the inherent distortion.

## Map Content

The determination of exactly what will be presented on the map and in what form are important cartographic considerations. Many maps present some type of thematic or statistical data on a base map. In these cases, a map critique requires analysis of not only the selected base material, but the methods used to process the data and the techniques selected to display the data on the base material. Because of their simplicity in content and purpose, most newspaper maps function similarly to base material and seldom is a detailed analysis required on data processing or display. About 97% of the maps reviewed portrayed data at only a nominal level and only about 5% showed some type of spatial distribution. In response to this, critique questions and criteria on map content included:

Is any of the map content inaccurate? The primary sources consulted were the Times Atlas of the World (1981), and the National Geographic Atlas of the World (1981).

Is the map content complete and unambiguous? Maps were examined for unidentified or unlabeled polygons, lines or symbols.

Is the type of information presented on the map suitable? Maps were crosschecked with the stories that they accompanied to ascertain if any relevant information had been excluded. In addition, maps were checked against primary sources to determine if additional information would have been appropriate and beneficial.

Did the maps with more complex presentation, either in the depiction of a spatial distribution or in the use of ordinal, interval or ratio data, present that information suitably?

Is the map content such that a source should be acknowledged, and if so, is this done? Source citations were considered unnecessary on maps presenting information that is general knowledge.

Although accuracy is a high priority, a minor problem, such as a misspelled word, can occur in even the most conscientiously proofed maps. Given the time constraints on newspaper map production, the minor map inaccuracies that were discovered were well within reason. However, there were a few major inaccuracies that proved misleading to the map reader. Example 26 comes from the Chicago Sun-Times of July 18, 1982. This is a microfilm copy, reduced approximately 50%, but it can be seen here, and more clearly on the original, that what is actually Guatemala and Belize are identified on the map as El Salvador and that the Mexican state of Oaxaca is delineated for no reason. In this case, completely inaccurate information is presented to the reader, rendering the map cartographically unacceptable and less than useless. Only a small percentage of the newspaper maps

studied contained such inaccuracies and although the problem is serious, it is not common.

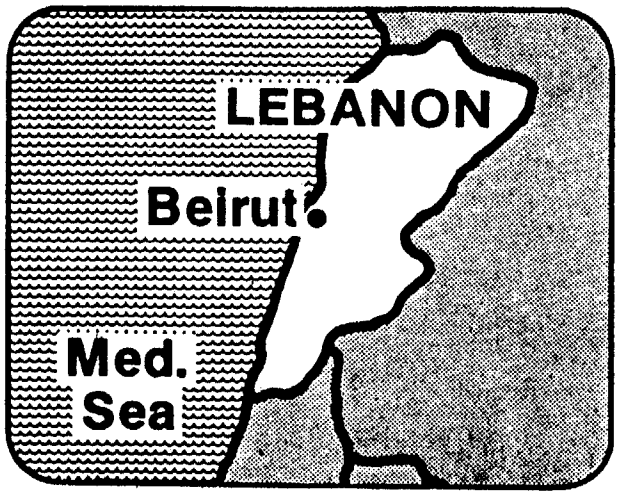
Many maps contain a few, and some maps several, unlabeled polygons and unidentified linework or symbolization. This over-occurrence of map components that are incomplete or ambiguous becomes a major impediment to effective communication.

Examples 27 and 28 show two extreme cases of incomplete information that appeared in the Rochester Post Bulletin on June 22 and 28, 1982, respectively. Both accompanied a short, informative article in a section called FOCUS, devoted to a particular aspect of timely but not breaking news. There is no way to know what information the map maker was trying to convey, but the only information presented is the relative location of the major city within the country identified. The large scale of the maps probably made many readers uncertain of the geographic location, but the failure to identify the surrounding countries virtually assured this.

Incomplete information is also illustrated in Examples 29 and 30 from the Los Angeles Times of February 16, 1982 and the Daily Press of March 19, 1982. The map by the Los Angeles Times, although attractive in the original, omits the border of Newfoundland and Quebec, misleading readers into assuming that all of the Canadian area depicted is Newfoundland. The map of Central America from the Daily Press fails to identify Belize, Honduras, Costa Rica, Mexico, and the Pacific Ocean. Even though the map scale may be sufficiently

EXAMPLE 27

# Focus

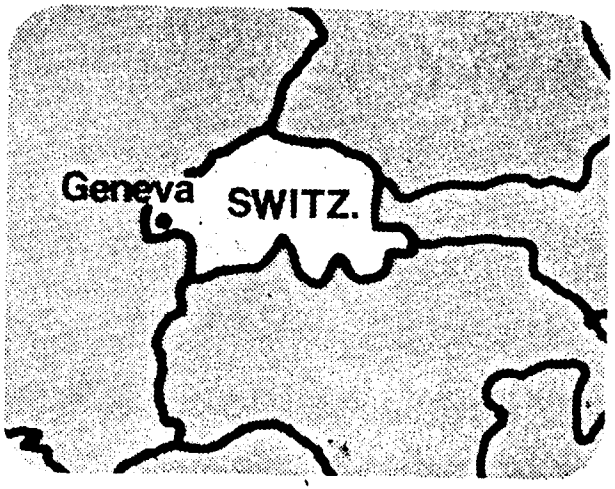



**A Land Laid Low**

Since the time of the Phoenicians, 4,000 years ago, Lebanon has been a financial hub of the Middle East. For years the tiny nation, smaller than Connecticut, was known as the Switzerland of the Mideast. Beirut, its capital city, bustled with business in dozens of languages. But in the past decade, Lebanon has been one of the world's most troubled nations. Its most serious problems began after Jordan's King Hussein forced the Palestine Liberation Organization, which has vowed to destroy Israel, to leave his country. In 1971 PLO leaders and nearly 300,000 Palestinians set up new homes in Lebanon. Since then, PLO terrorist raids on Israel have drawn Lebanon into repeated conflicts.

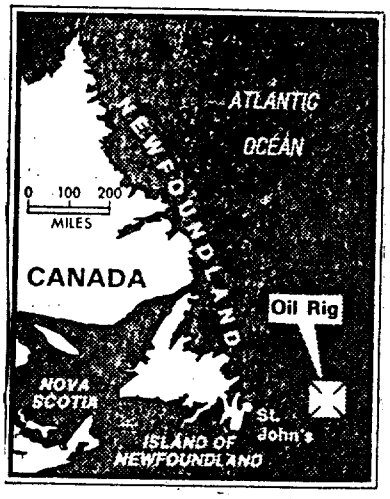
EXAMPLE 28

# Focus




**International City**

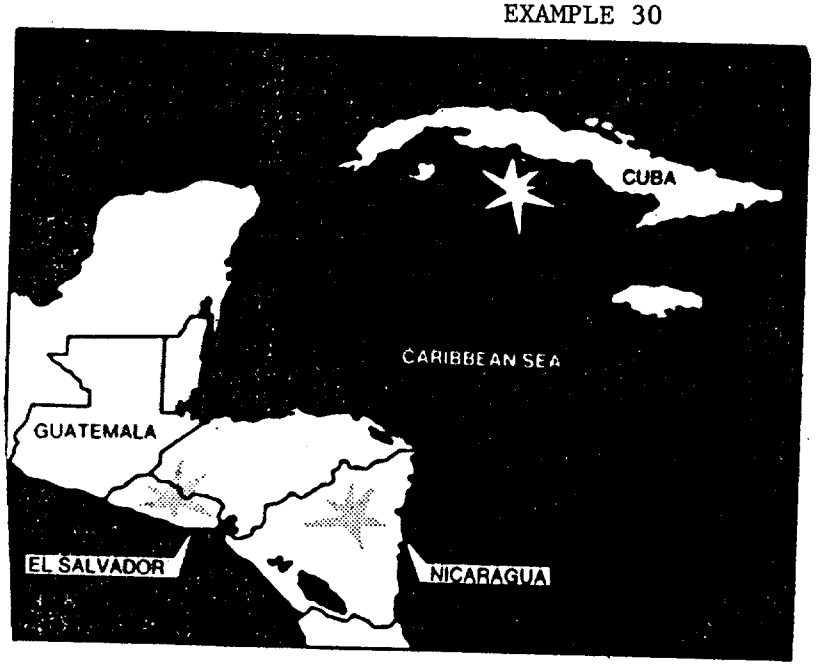
Tomorrow in Geneva, Switzerland, U.S. and Soviet diplomats begin talks about reducing strategic weapons. Switzerland's neutrality, never broken since 1815, has made it a favored site for such meetings. In 1920 Geneva, the nation's third largest city, became the home of the League of Nations. Many world organizations such as the International Red Cross and the World Health Organization are headquartered there. Under the Geneva Accords, reached there in 1954, France withdrew from Indochina. In 1955 the city hosted a major East-West conference. Since November, U.S. and Soviet negotiators have been meeting there to discuss controls on intermediate-range nuclear weapons.




Los Angeles Times

EXAMPLE 29

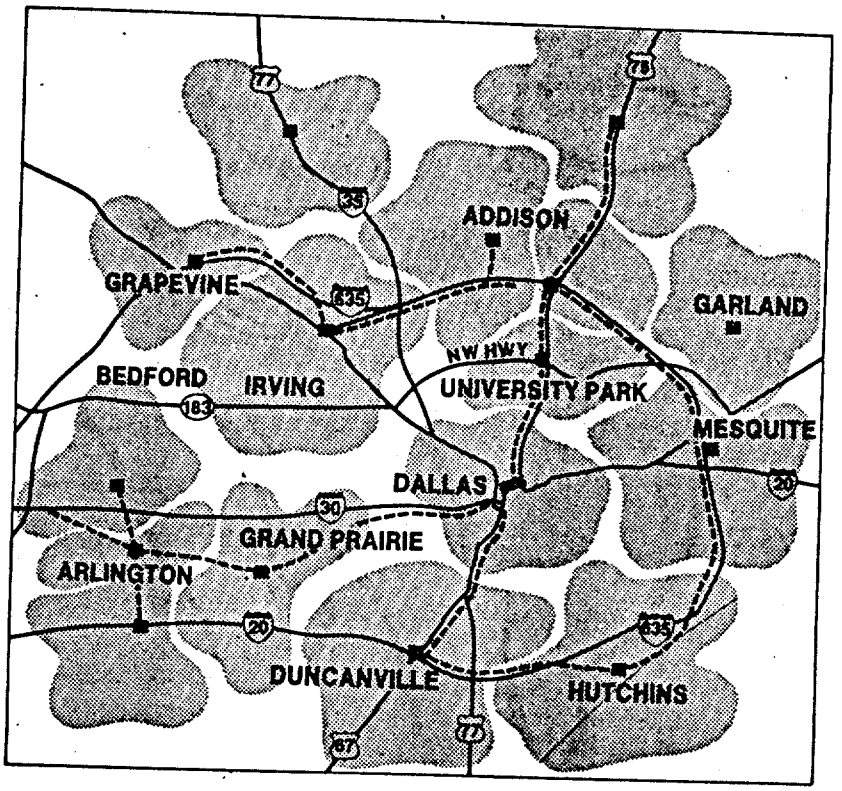
EXAMPLE 30



small for it to contain locations familiar to the reader, this information must be identified for it to be of any use. Although many readers would be aware of the location of Cuba and the Caribbean, the addition of the other information would complete the map, assure comprehension, and increase the amount of information presented to the reader.

Ambiguity, although not as frequent a problem as incompleteness, can result in the same interference with effective communication. Whenever it is unclear what an area, line or symbol represent on the map, the reader is faced with ambiguous information and must attempt to decipher the meaning. Line and point symbols are often the objects of ambiguous portrayal by appearing without explanation or by closely resembling other, similar symbols. Example 31 is reprinted from the Dallas Morning News, May 13, 1982. It accompanied an editorial discussing metropolitan bus service in Dallas in which the writer recommends a new bus service based on commercial nodes to replace the current system centered on the Central Business District. On the map, most of the solid lines are identified as roads, but the dashed lines are unidentified and could represent the city or suburb centers, but upon further examination they may be the current bus nodes or the proposed bus nodes. The dot pattern may represent the commercial nodes on which the proposed new system could be based except that none of the names on the map coincide with any of the commercial areas named in the article. They could also be general suburb divisions corresponding to the names on the map except that some of the patterned

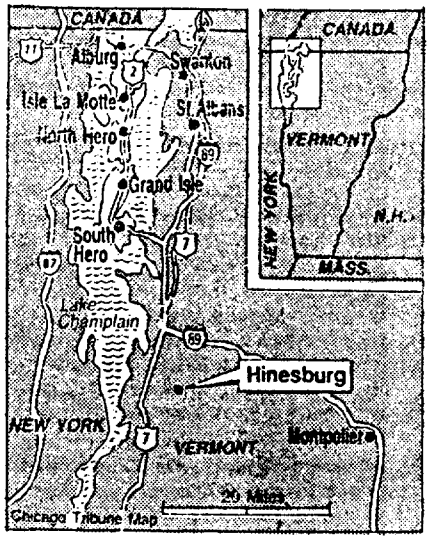
EXAMPLE 31



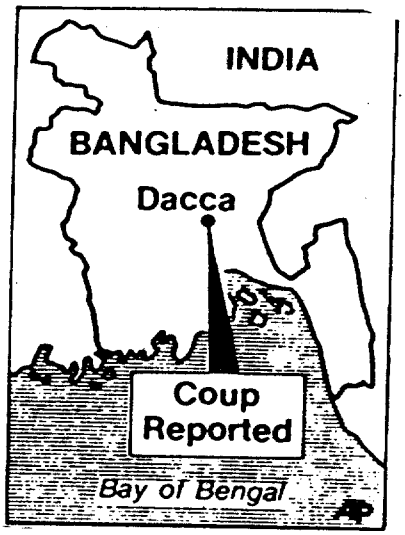

*Dallas Morning News: Jean Gowan*

areas are not identified by name at all, some names do not identify any of the patterned areas (i.e. Bedford), and some names identify several of the patterned areas (i.e. Arlington). Familiarity with the Dallas area would undoubtedly help to decipher some of the confusion, but on this very simple map, the components are ambiguous. Whenever map elements are not explicitly identified, the result is this ambiguity that lessens the efficiency of map communication. Newspaper maps occasionally exhibit this problem.

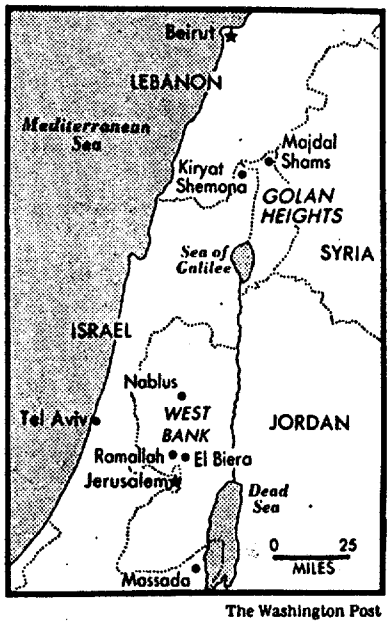
Newspaper maps often present only the bare essentials of information. They are seldom cluttered or complex, and this simplicity can suit the map purpose. Map makers seemed conscientious about including all geographic features mentioned in the accompanying stories, although this sometimes meant only a state boundary and one city. When checking maps with reference materials, however, it was quite common to find features that would be beneficial, to be left off the map. Example 32 shows a section of Vermont and New York from the Chicago Tribune of March 4, 1982. The story the map accompanies discusses the traditional Vermont town meetings using as an example the town of Hinesburg. Although several aspects of this map are prone to criticism, a major error is the omission of Burlington, the largest and perhaps best known city in Vermont. (It is located near the southern intersection of Highways 7 and 87, about 12 miles northwest of Hinesburg.) A similar example is Example 33 of Bangladesh from the from the Burlington Free Press on March 25, 1982 prepared by AP. The




EXAMPLE 32




EXAMPLE 33

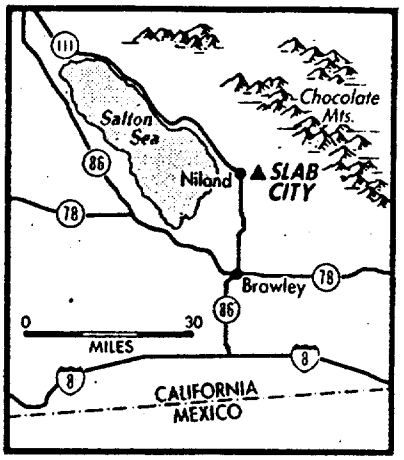



EXAMPLE 34

city of Calcutta, familiar to many readers and the location where the story originated, is not identified on the map. (It is located just north of the Bay of Bengal over the western border of Bangladesh.) Also, the map shows Bangladesh surrounded by India, when in fact it is bordered in the southeast corner by Burma, a fact mentioned in the story.

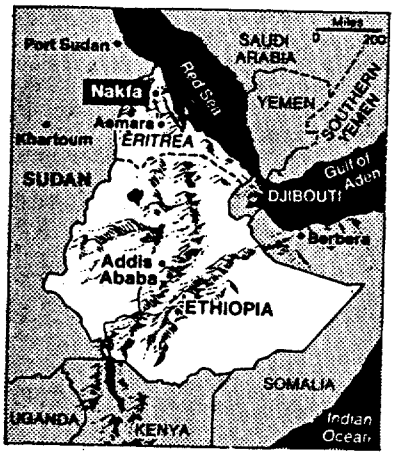
Physical features such as mountains, rivers, or deserts, are seldom depicted on newspaper maps, yet in many cases they would enhance the map and increase the reader's knowledge and understanding if included. In Example 34 from the Washington Post, February 22, 1982, the Middle East is portrayed. The countries of Jordan and Israel are separated by the Jordan River which is not labeled on the map. In cases where physical features, such as a river, form an important political or natural boundary, they should be included and labeled on the map.

Mountains are occasionally portrayed on newspaper maps to give the readers a feel for the landscape. Although simple pictorial symbols are frequently used, they can be effectively employed as Examples 35 and 36 demonstrate. Example 35 is from the Washington Post of February 21, 1982. Less effective is Example 37 from the St. Petersburg Times of June 15, 1982 which uses a variation on contour lines, and Example 38 prepared by AP and printed in the Burlington Free Press on March 26, 1982 as an oblique view of the Space Shuttle Landing Site. In these two examples, the results are not entirely




By Richard Furno—The Washington Post

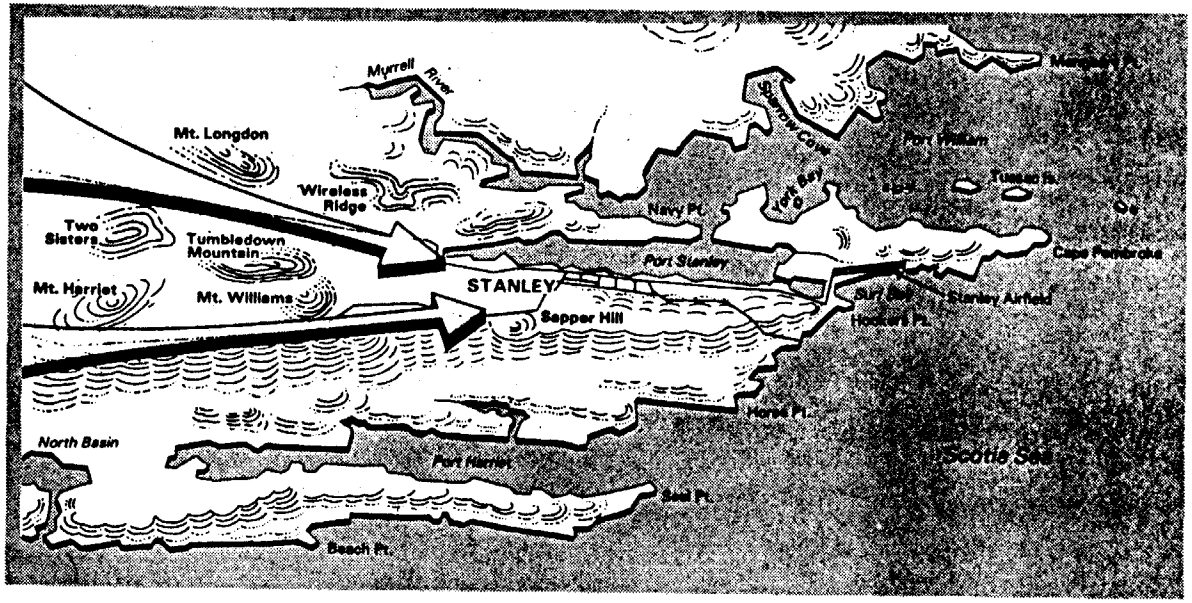
EXAMPLE 35




The New York Times / Feb. 21, 1982

**An Eritrean spokesman said Nakfa was target of Ethiopian offensive.**

EXAMPLE 36

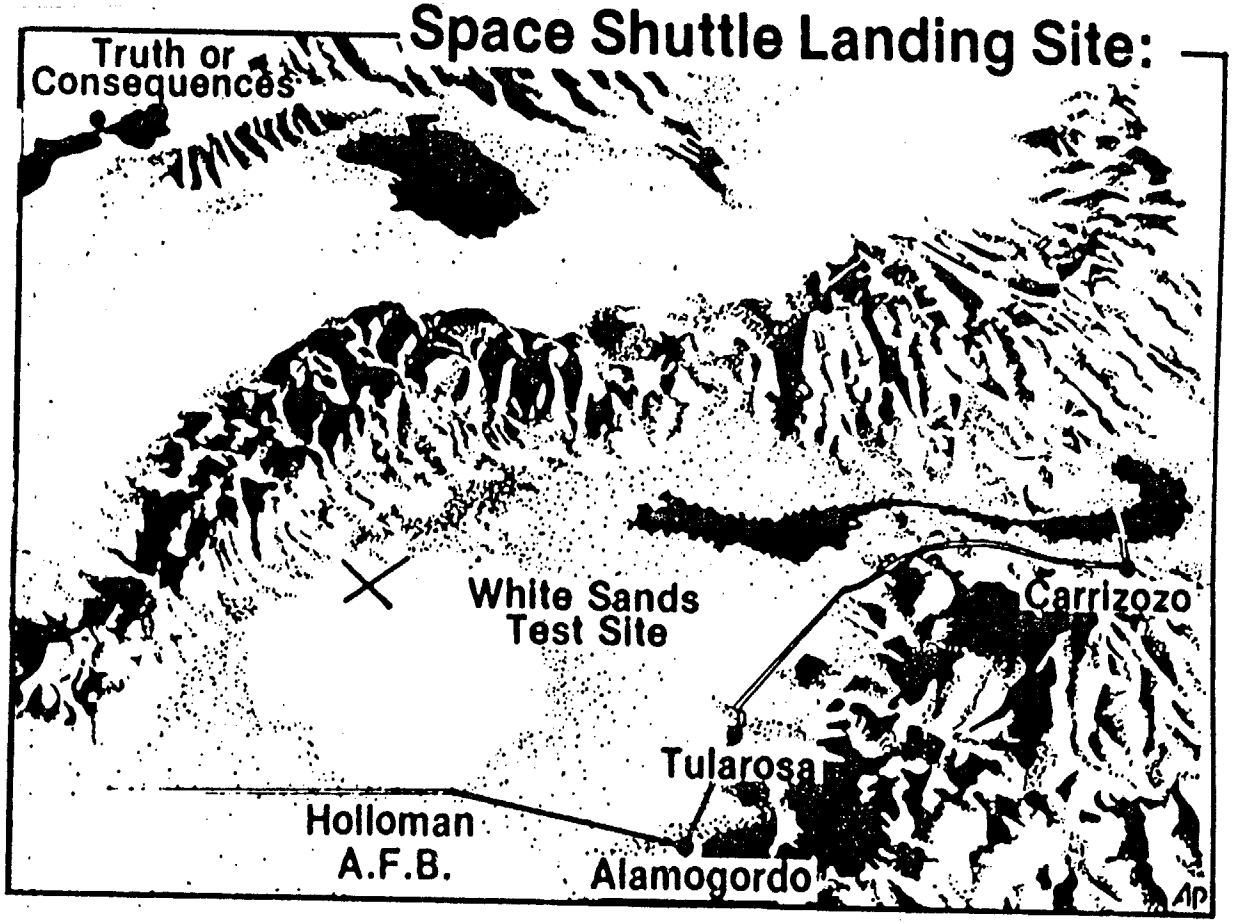



St. Petersburg Times — FRANK PETERS

The British forces overran the main Argentine defensive perimeter at Tumbledown Mountain, Mt. Williams and Wireless Ridge and advanced to just west of Sapper Hill before the cease-fire was declared Monday.

EXAMPLE 37

EXAMPLE 38

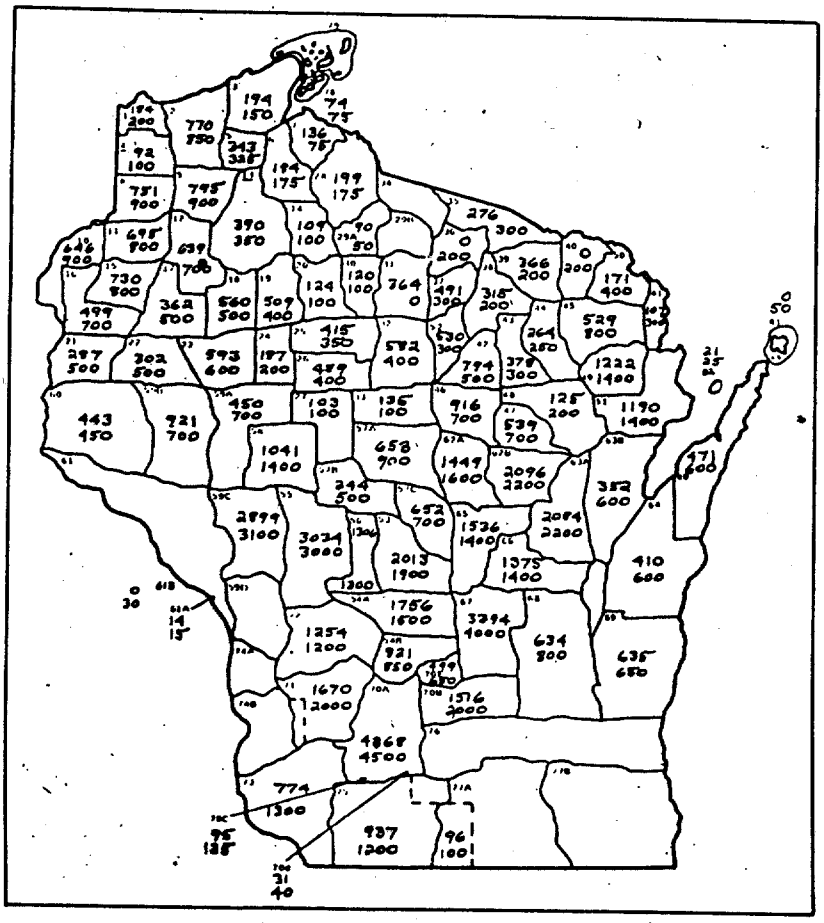



The Associated Press

The dazzling white flats at White Sands Missile Range in New Mexico have been converted into an instant spaceport for the Columbia. The space shuttle is expected to land Monday on the gypsum airfield. Reporters have dubbed the sandy area the 'world's largest open-pit cocaine mine.' **Story on Page 10A.**

satisfactory and in many cases, complex or unconventional attempts to render terrain have been unsuccessful.

Of all the maps reviewed, only 11 showed some sort of distribution and only six presented information on the map at ordinal or interval level (none at ratio level). In one case, the map contained ordinal level data but did not use cartographic methods to portray it. This map, Example 39, was prepared by the Department of Natural Resources and appeared in the Wisconsin State Journal on April 27, 1982. The deer quota map simply lists the numbers in each unit and is functionally similar to Examples 40 and 41 showing maps presented with tables from the Capital Times, February 19, 1982 (The Price of Heat), and the Columbus Citizen Journal, March 24, 1982 (on the Caribbean Basin), both prepared by NEA. Newspapers do not often attempt to present data above a nominal level and when they do, there is a tendency to rely on tables or only the most simple ordinal level mapping techniques to portray it. When more sophisticated techniques were employed, errors were common. Example 42 shows the U.S. House Districts after 1982 from the Louisville Courier Journal, February 17, 1982, reprinted from the Congressional Quarterly, which is not traditionally a source of newspaper maps. The map undermines its interval level portrayal by failing to categorize those states neither losing nor gaining districts, simply lumping them in with states gaining districts. The category of states neither losing nor gaining contains 27 states and would substantially affect the distribution

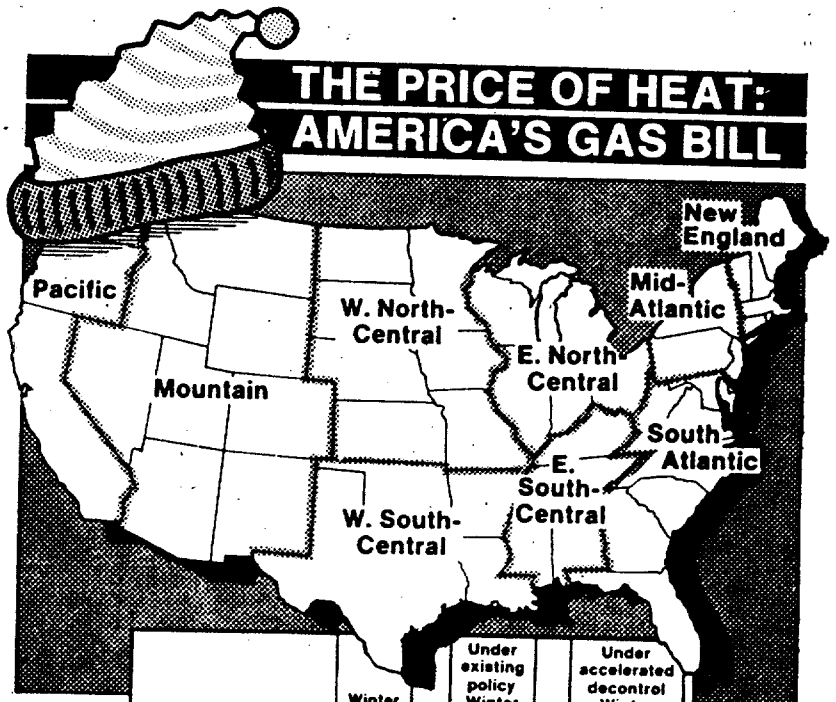


# Proposed deer quotas

**The Department of Natural Resources has proposed quotas for hunter's choice deer permits in Wisconsin's 89 deer management units. The top figure in each unit represents the 1981 harvest by people who had a license allowing them to shoot a buck or a doe. The bottom figure represents the proposed quota for this fall. Units without numbers allow hunters unlimited shooting at either sex.**

*—Department of Natural Resources map*

EXAMPLE 39

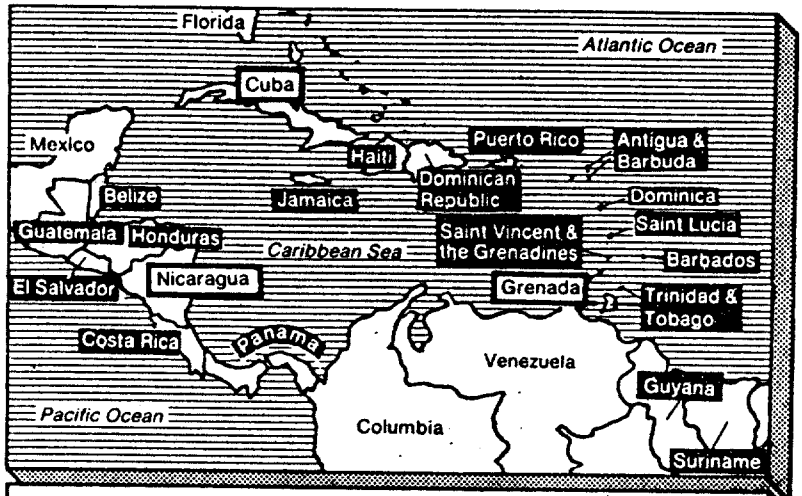



| | Winter 1980-81 | Under existing policy Winter 1981-82 | Under accelerated decontrol Winter 1981-82 |
|---|---|---|---|
| National Average | $313 | $398 | $468 |
| Pacific | 164 | 229 | 337 |
| Mountain | 224 | 360 | 428 |
| W. South-Central | 179 | 210 | 264 |
| W. North-Central | 303 | 473 | 568 |
| E. South-Central | 255 | 321 | 392 |
| E. North-Central | 405 | 518 | 620 |
| New England | 528 | 618 | 674 |
| Mid-Atlantic | 531 | 629 | 709 |
| South Atlantic | 316 | 364 | 424 |

Source: Citizen/Labor Energy Coalition NEA/Mark Gabrenya

Natural gas bills are expected to average $398 this winter nationwide, an increase of $85 over last winter. Current law provides for a gradual rise in natural gas prices with complete decontrol taking effect Jan. 1, 1985. However, several proposals for accelerated decontrol are under consideration in Congress and the White House.

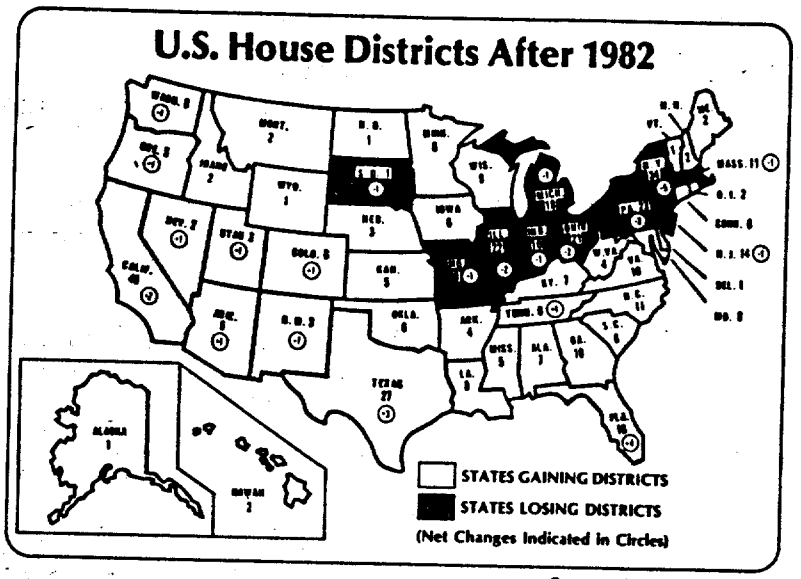
EXAMPLE 40




| Country | Per Capita Income | Country | Per Capita Income |
|---|---|---|---|
| (United States) | ($8,612) | Guyana | $437 |
| Antigua & Barbuda | $540 | Haiti | $260 |
| Barbados | $1,450 | Honduras | $528 |
| Belize | $730 | Jamaica | $1,143 |
| Costa Rica | $1,512 | Nicaragua | $825 |
| Dominica | $460 | Panama | $1,116 |
| Dominican Republic | $841 | Saint Vincent & the Grenadines | $250 |
| El Salvador | $639 | Saint Lucia | $698 |
| Grenada | $500 | Suriname | $1,240 |
| Guatemala | $749 | Trinidad & Tobago | $2,090 |

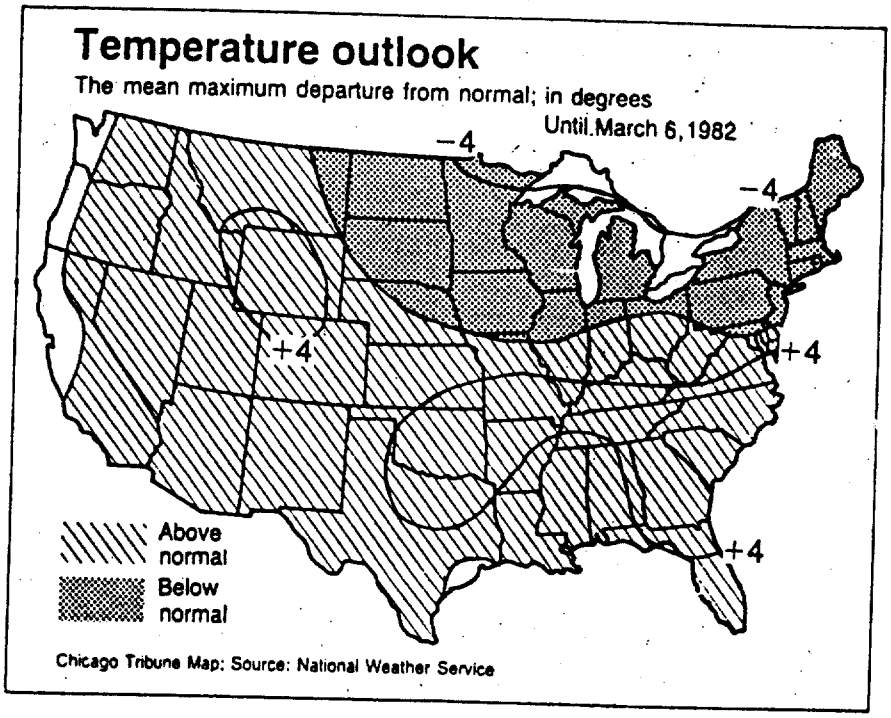
**CARIBBEAN BASIN** — The small nations of the Caribbean and Central America targeted for the Reagan administration's $350 million aid program include some of the world's poorest. Participation of Nicaragua and Grenada is in question because of their ties with Cuba, but Mexico, a donor along with Canada and Venezuela, has objected to the exclusion of any country.

EXAMPLE 41



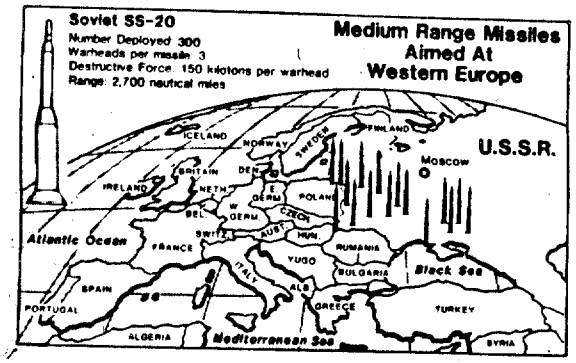

EXAMPLE 42

EXAMPLE 43



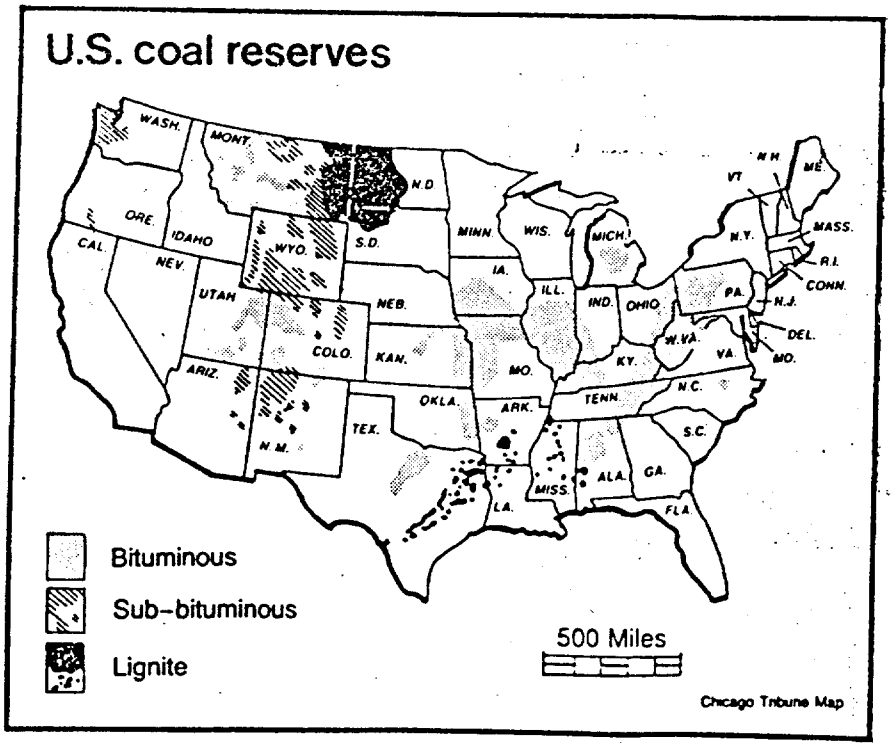
pattern if mapped individually or with the states losing districts. A conscience decision must be made how this group will be mapped and that information must be included in the legend. Example 43 exhibits a similar problem in the Temperature Outlook from the Chicago Tribune of March 3, 1982. The map does not label three of the isolines, two of which form a third category shown in white on the map (along the West Coast and in southeast Texas). The legend simply ignores this category and presents insufficient information to the reader.

The majority of information presented on newspaper maps was in the public domain, requiring no source acknowledgment. About 9% of the maps reviewed cited a source, commonly federal and state government agencies, reference books, or special publications prepared by a wide variety of interest groups. Of the 91% of maps not citing sources, a few contained controversial or questionable data that was not common knowledge. A disturbing example was Example 44 from the Daily Press of March 17, 1982, prepared by the Chicago Tribune Graphic Service. The topic is Soviet SS-20 missiles and the short map text gives the number of missiles deployed (300), the warheads per missile (3), the destructive force (150 kilotons), and the range (2,700 nautical miles). The map shows 16 small missile symbols scattered over western Russia. This prompts several questions: Do each of the missile point symbols represent a specific number of SS-20s, or are they simply an arbitrary sample of some? Are the point symbols located in known SS-20 positions, or are they just




EXAMPLE 44

EXAMPLE 45



randomly placed over the landscape for a visual impression? Does the map tell the reader anything more than the short text in the corner of the maps, and if it does, what is this additional information and how accurate is it? The map needs a legend, relating more information about the point symbols, and a source citation to provide a reference for investigating the data further. A less critical illustration is Example 45 from the Phoenix Gazette, March 31, 1982, also made by the Chicago Tribune Graphic Service. This is a well prepared map depicting U.S. coal reserves at an ordinal level. A source citation would be appropriate with these data, but it is a minor problem on this clear, effectively designed map.

## Map Design

Design is a major component of all cartographic products. Even with carefully selected size, scale, transformation, and map content, the potential of a map to communicate information effectively to readers is severely hampered by poor cartographic design. Regardless of map complexity, good design initially encourages the reader to refer to the map and then aids in map comprehension. Poor design not only fails to accomplish these goals, but can also actually falsify information and mislead readers.

In selecting criteria to assess map design, it became evident that although newspaper maps are simple, in the sense that they present small amounts of information and seldom show distributions or data above a nominal level, the constraints on their production make

them difficult design challenges. Map design was broken down into six topic areas to analyze problems occurring in the newspaper maps studied. Five of the topic areas were the elements of design defined in Elements of Cartography, 4ed., (Robinson, Morrison, Sale, 1981) as clarity and legibility, balance, visual contrast, figure-ground, and hierarchical organization. Because of its dominant influence on newspaper maps, typography was examined individually. As would be expected, these topics overlap in some instances. The following questions and criteria were addressed in the design section of the analysis of newspaper maps:

Are all components of the map clear and legible? Maps were checked to be certain that all elements were large enough to be seen and recognized.

Are the map components visually balanced? The layout of map elements was reviewed to determine if the positioning "looked right" and no parts of the map appeared heavy or light.

Does the map contain sufficient visual contrast of symbolization? Point, line, and area symbols were examined for the contrast between elements and their lack of ambiguity.

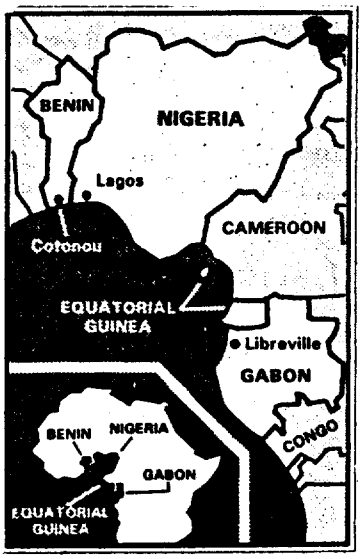
Does the figure stand out unambiguously from the ground? Maps were studied to assess whether the area of concern on the map was apparent and was presented in such a way that the reader could easily focus on that area.

Are hierarchical organizations presented effectively? If hierarchical organization was necessary or suitable, the map was examined to determine how well it was presented.

Is the type on the map appropriate? The size, style, form, and placement of the type of each map was cursorily evaluated.

As illustrated in Examples 16 and 17, newspaper maps sometimes suffer from a lack of clarity and legibility due to over reduction. This is usually most evident in the typography on the map although it has also been seen in point, line, and area symbols. In addition, dot symbols, when drafted with pen and template, occasionally run into other linework or pattern and lose distinct shape. Sometimes linework or pattern is too fine to reproduct clearly and may wash out. In most cases, however, this problem was not evident.

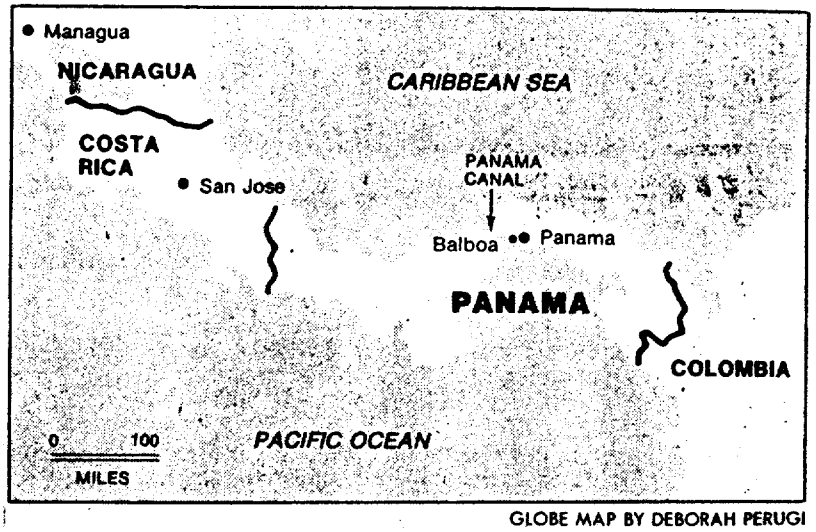
One important aspect of map balance is the layout of non-map elements, such as the title, legend, and scale with respect to the geographic region being shown. Because maps in newspapers seldom use titles, legends or scales, often the only graphic item to be positioned within the map border is the area to be portrayed and good balance is thus directly related to the placement of this geographic region; this was sometimes poorly centered resulting in an unbalanced appearance. A more frequent problem was fragmentation, the occurrence of line segments and small polygons on map borders. Example 46 from the Los Angeles Times, February 18, 1982, illustrates this problem. On the eastern edge of the map several line segments and




Los Angeles Times

EXAMPLE 46

EXAMPLE 48

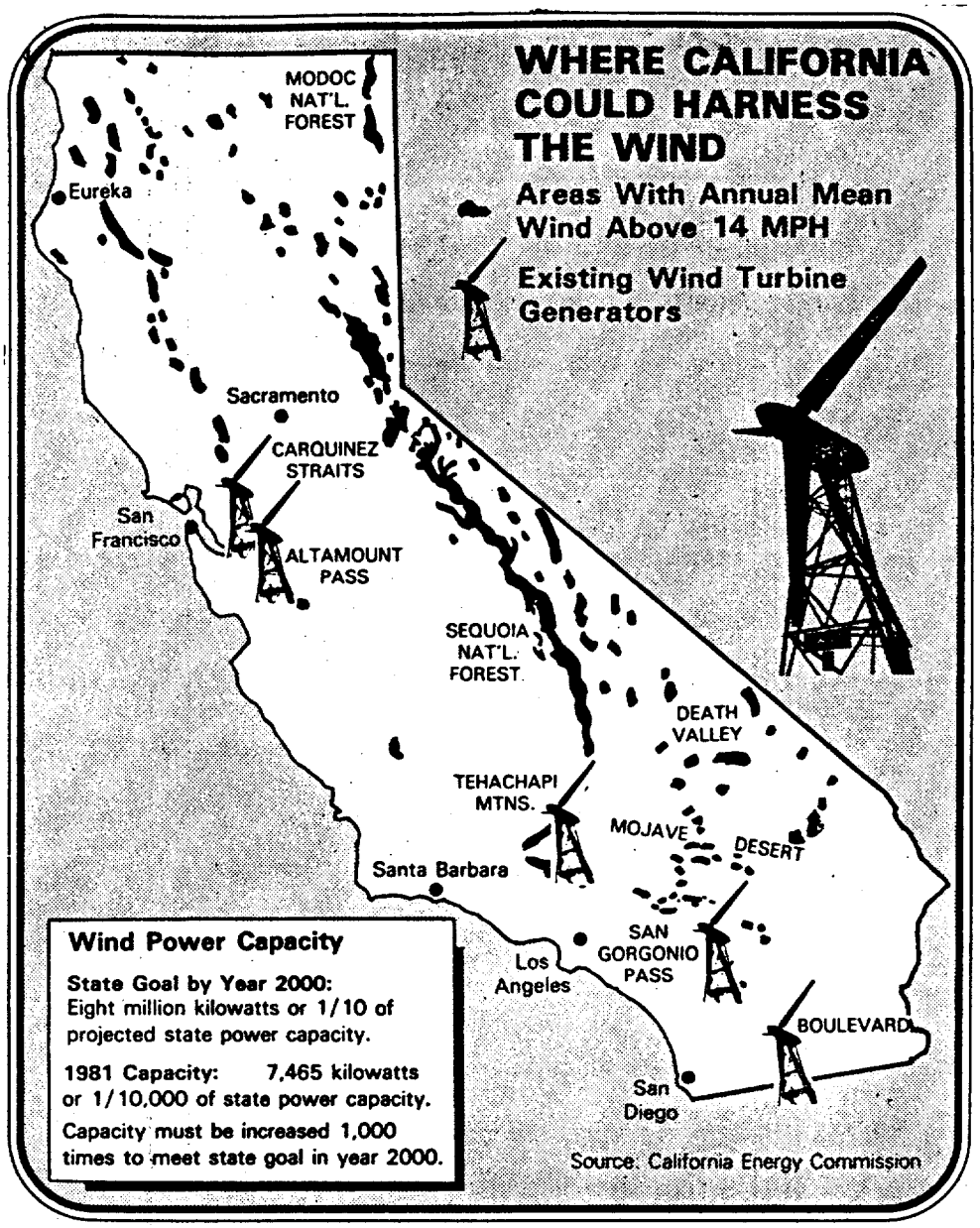



GLOBE MAP BY DEBORAH PERUGI

small polygons occur. This fragmentation not only distracts the reader, but the polygons and linework are impossible to identify.

It is important that the visual contrast on the map be sufficient to distinguish similar elements. Symbolization must be carefully selected to allow the reader to distinguish easily point, line or areal symbols. Crucial problems resulting from poor visual contrast were not common, although some maps could have improved their design by making better use of it. Example 47 shows the distribution of annual mean wind velocity greater than 14 miles per hour in California from the Los Angeles Times, February 21, 1982. The map maker selected black areal symbols for the winds, black point symbols for the cities, and also included several black wind turbine generator symbols on the map. Although shape and size vary, the visual contrast between different map elements is ambiguous in a few sections of the map. Although possibly adequate, greater contrast would improve the readability of the map.

The most frequent use of visual contrast on newspaper maps is the distinction of land from water and/or figure from ground. One 10% dot pattern at 85 lines per inch appeared in two maps. On Example 48 from the Boston Globe, February 18, 1982, it was used on the water and on Example 46, previously shown, it was used on all land except the four countries mentioned in the story (Benin, Nigeria, Equatorial Guinea, and Gabon). In both cases the contrast between non-patterned areas (white) and this screen was insufficient although it is difficult to ascertain on the Xerox copies. In addition to the



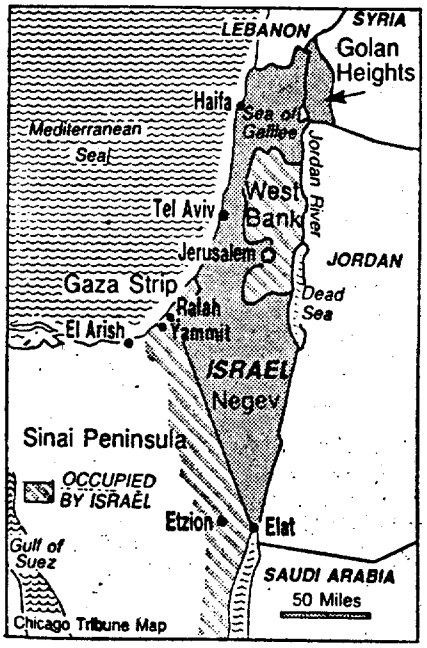

PATRICK LYNCH / Los Angeles Time

EXAMPLE 47

difficulty in distinguishing the pattern from the non-pattern areas, the lack of visual contrast also interfers with the effectiveness of the figure-ground phenomena. This particular screen was one of the few figure-ground problems.

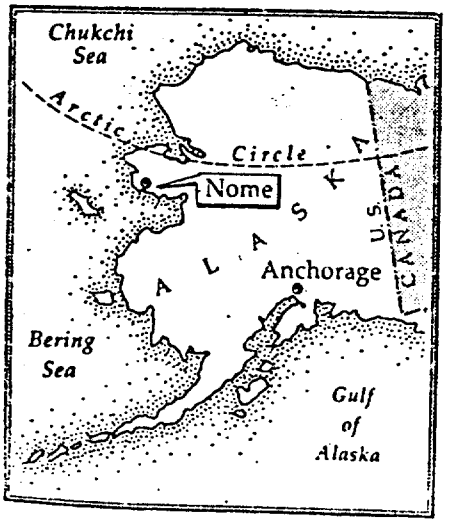
Generally, the figure-ground relationship on newspaper maps is straightforward and in most of the maps reviewed it was adequately portrayed. Example 49 is a good example from the Chicago Tribune, March 3, 1982, of the traditional method of figure-ground distinction using standard patterns or screens. Two other techniques occurred less frequently, and are illustrated in Examples 50 to 52. The map of Alaska, Example 50, from the Wall Street Journal, March 1, 1982, uses an old technique of stippling on the seaward side. Newspapers using the method, which proved consistently successful, usually stippled around the figure, such as Example 51 from the Milwaukee Journal, July 13, 1982, and did not limit the technique to the separation of land and water. A second technique, apparent in several maps, was the shading on one edge of the figure. The effect of the figure sitting "above" the ground is illustrated in Example 52 of Honduras from the Providence Sunday Journal, April 4, 1982. Although the scale selected is too large and the actual information presented sparse, the figure-ground relationship is effectively contrasted.

Because of the locational purpose of most newspaper maps, hierarchical organization can usually only be applied to forms of simple base information. Roads, cities, and boundaries can be structured by size or importance and this is often done using hierarchies of

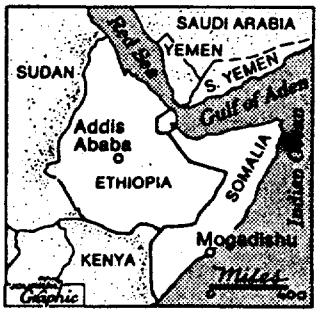


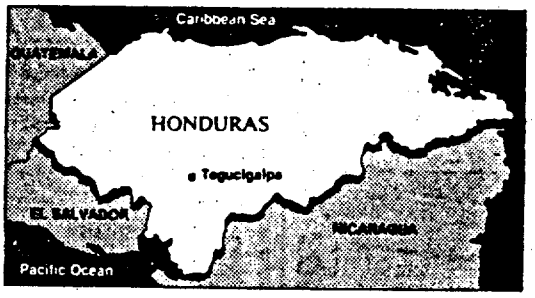

EXAMPLE 49

EXAMPLE 50




EXAMPLE 51



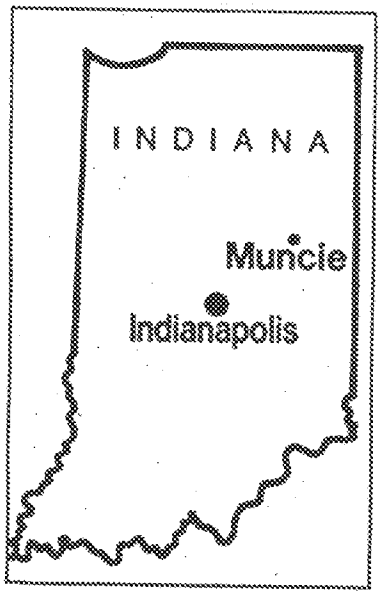

EXAMPLE 52

symbols and typography. However, many newspaper maps ignore opportunities to use hierarchies to give readers additional, relevant information. When several cities appear on a newspaper map, they are usually each depicted by the same point symbols and type size. In some cases, when point symbol size and type size vary, there is no logic to the variation. Example 53 from the Louisville Courier Journal, February 22, 1982, shows the extreme case where type and symbol size vary inversely to one another posing difficult questions for map users. More commonly, maps are less simplistic but still present all symbol and type sizes identically, failing to even denote capital cities. Example 54 from the Detroit Free Press of March 25, 1982, does not vary the type size for different cities and although symbol sizes vary slightly, it is difficult to determine how many different sizes there are because of their lack of consistent shape.

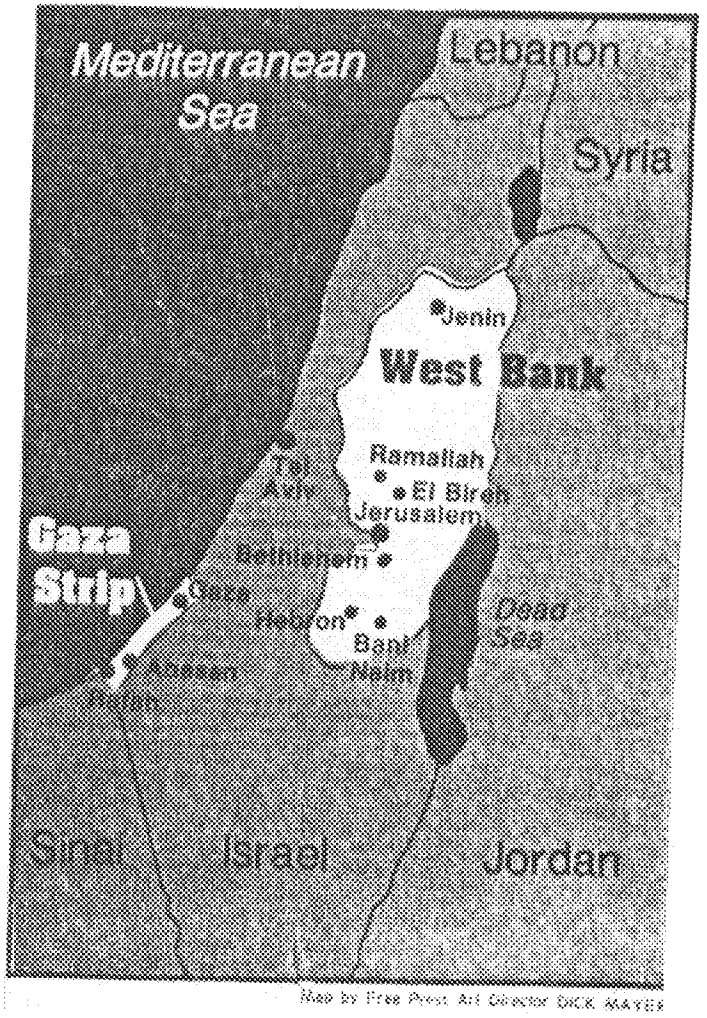
There are opportunities to use hierarchical organization of line symbolization on some maps. Example 55, a map from the Chicago Tribune, March 7, 1982, uses different lineweights in conjunction with different symbols to depict the hierarchy of road type. In this case the lightest lineweights do not reproduce well and the interstate highways do not stand out as the largest road systems. Example 56 from the Milwaukee Journal, July 16, 1982, makes no attempt to vary lineweights of the line symbols but gives hierarchy to the road network by varying only the type of symbol used to label the road. In all cases, the importance of the hierarchy of the network must be


EXAMPLE 53


EXAMPLE 54



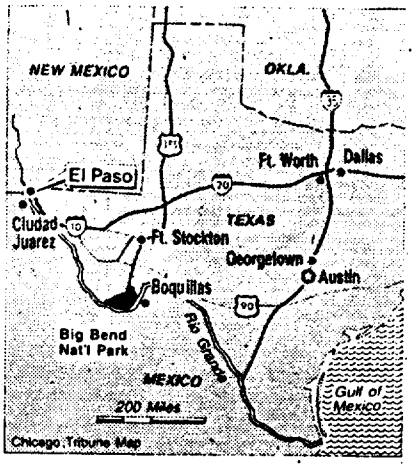

EXAMPLE 53

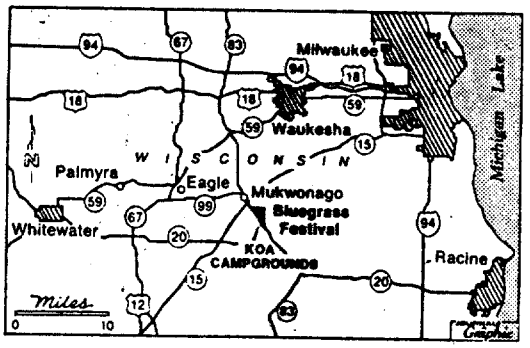



Map by Free Press Art Director DICK MAYER

EXAMPLE 54

EXAMPLE 55



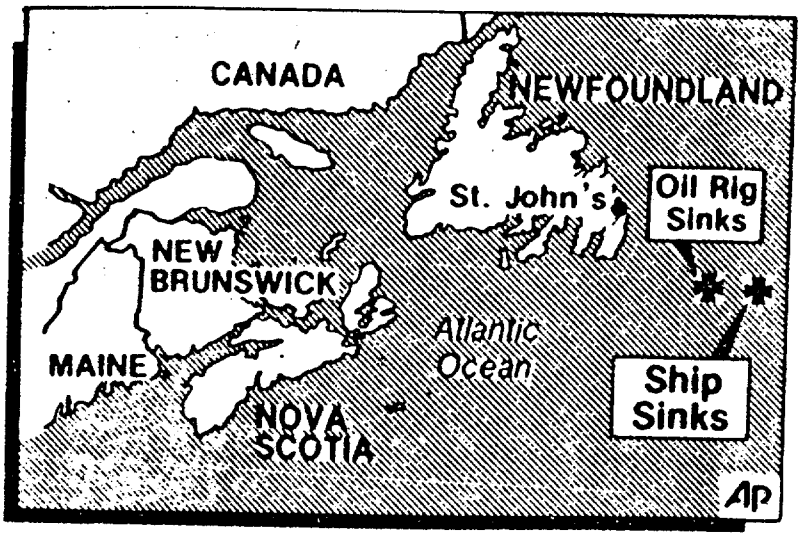




EXAMPLE 56

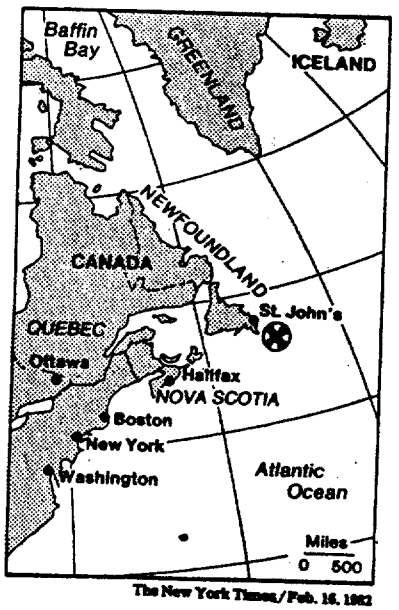
weighed against the work involved, and possible success of portraying it, to decide whether it is necessary or desirable.

Political boundaries, often very important information for the map user, present another opportunity to use hierarchy. Example 57 from the Louisville Courier Journal, February 16, 1982, was prepared by AP. The type sizes and boundaries for Canada, its provinces, and the U.S. are all the same, yet the line symbols and type styles and/or sizes should identify the various different political units. Compare the AP map with Example 58 from the New York Times, February 16, 1982. Although there are problems with the New York Times map, the type does, in most cases, reflect the hierarchy of the locations depicted.

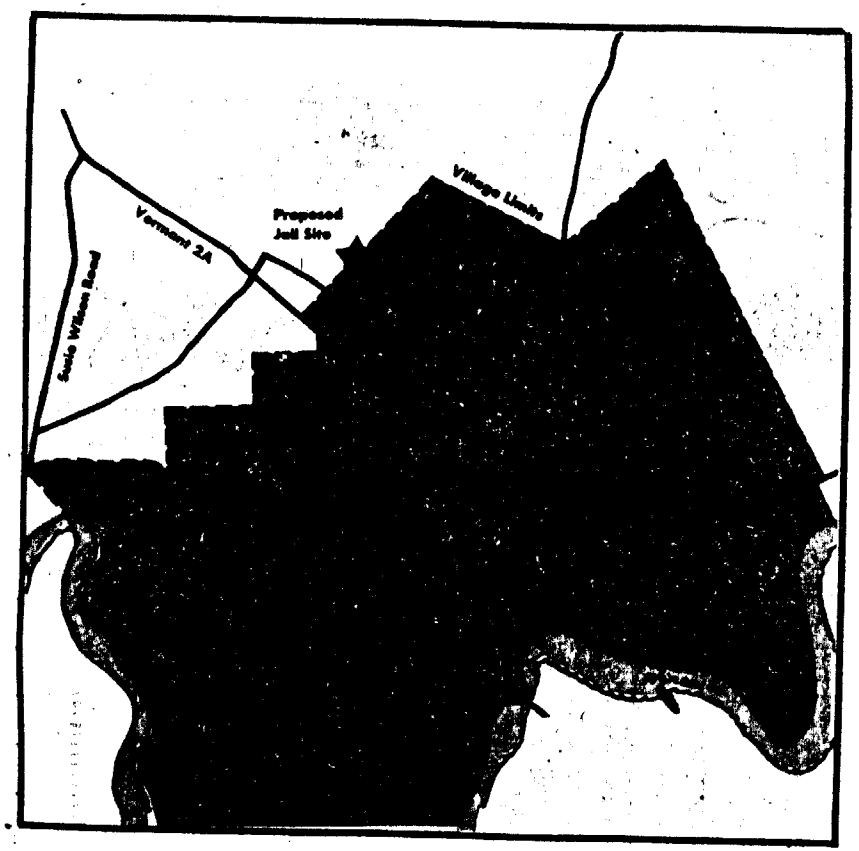
It should be noted that the effective use of color on maps can improve visual contrast, figure-ground, and/or hierarchical portrayals. Although 23 of the maps reviewed were in color (approximately 10%), eight of those used only one highlighting color and 18 of the 23 represented only three newspapers. One newspaper, the St. Petersburg Times, published 11 color maps in the week surveyed. Most newspaper maps use color to attract readers and enhance nominal differentiation such as Examples 9 and 10, previously shown. Examples 59 and 60, from the Burlington Free Press, March 25, 1982, and the Detroit News, March 25, 1982, attempt to accomplish the same goal; however, both present intense color that distracts rather than enhances the map's appearance. As color becomes used more effectively and frequently, map makers can begin to utilize it in more sophisti-




EXAMPLE 57



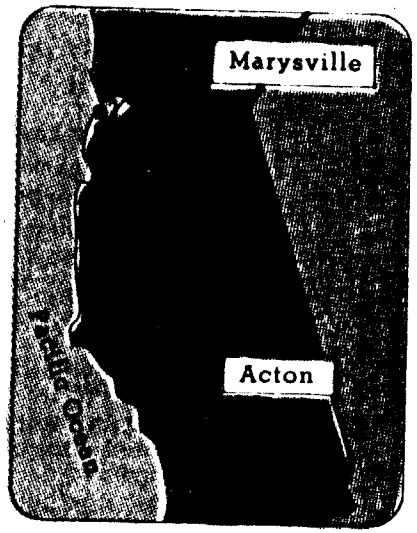

EXAMPLE 58




Free Press Map by TOM BORGMAN

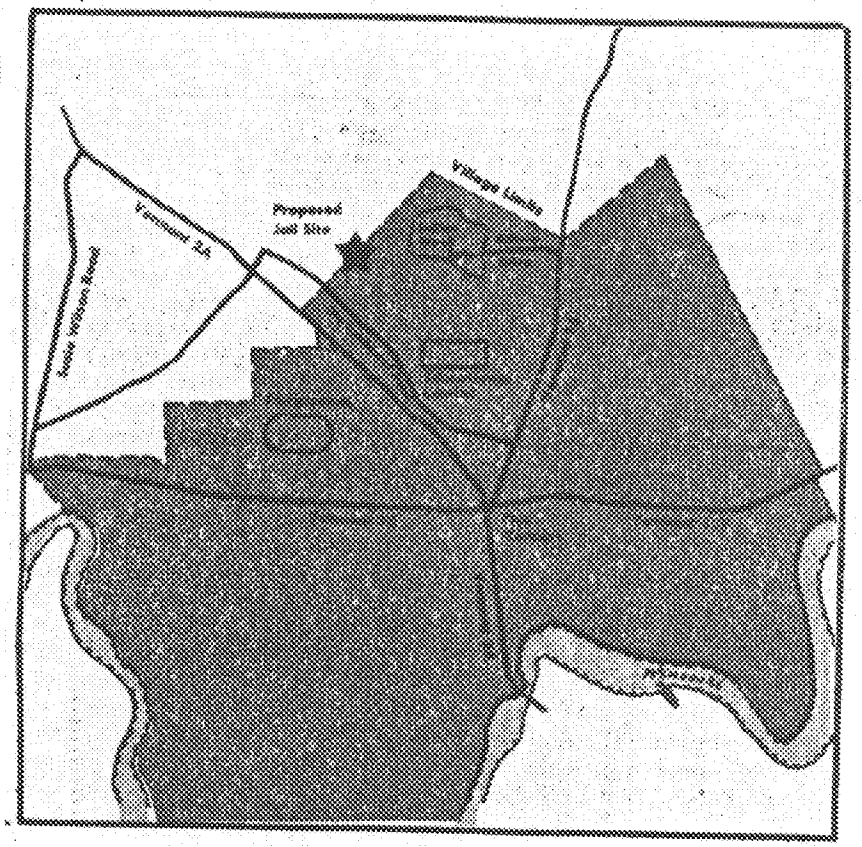
**The House Institutions Committee favors locating the state's proposed juvenile jail on a site off Old Colchester Road in Essex. The 100-acre site is owned by the Vermont Forest and Parks Department.**

EXAMPLE 59




NEWS MAP / JOHN B. WALTERS

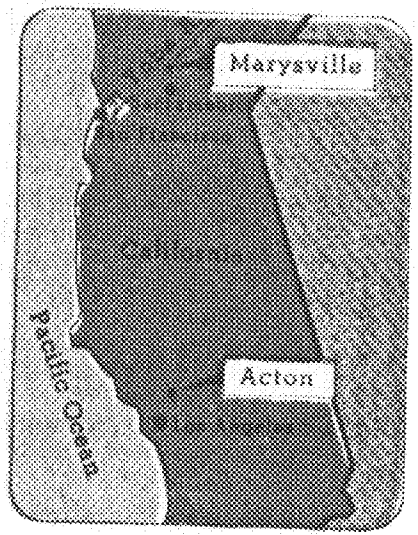
EXAMPLE 60




Free Press Map by TOM BORGMAN

The House Institutions Committee favors locating the state's proposed juvenile jail on a site off Old Colchester Road in Essex. The 100-acre site is owned by the Vermont Forest and Parks Department.

EXAMPLE 59

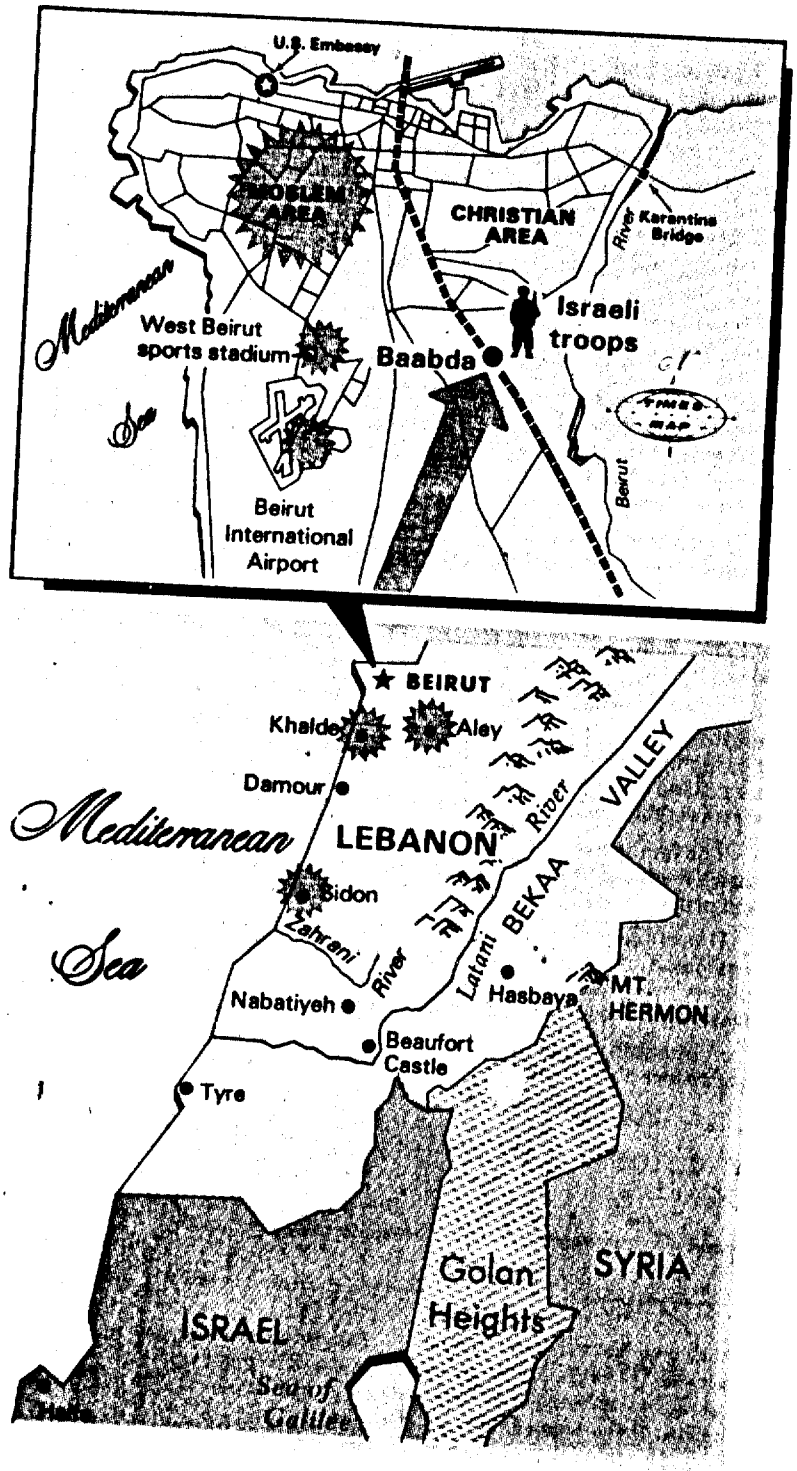



NEWS MAP/JOHN B. WALTERS

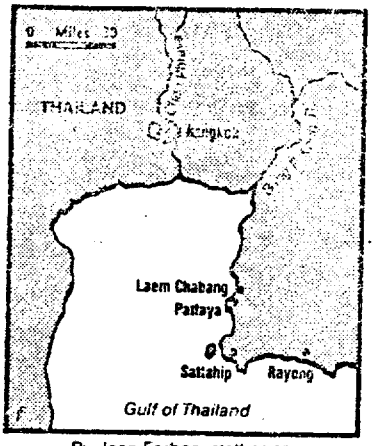
EXAMPLE 60

cated and complex portrayals. Example 61, St. Petersburg Times, June 14, 1982, shows the beginning of a more advanced use of color in the depiction of a disputed region, the Golan Heights, by a combination of the colors of the countries involved in the dispute.

The importance of type is magnified on newspaper maps because few other elements appear. A look at type styles and forms on the maps detected only minor flaws. The style options for most newspaper map makers are very limited and although type form did not always follow cartographic convention, it did not often impede communication or detract from the map's appearance either. Some of the more substantial typographic problems have already been eluded to or discussed. In the hierarchical organization of any map components, type plays a vital role, and on newspaper maps it is not always used as such. Another typographic problem concerns the legibility and visual contrast of type over patterns and type reversed to print white letters on a black background. The use of small upper and lower case italic print over some dot screens can cause legibility problems. In this combination, often used on water bodies, the fine ascenders and descenders on the type become confused in the pattern. In Example 62, the labeling of rivers illustrates this problem. The map is from the Christian Science Monitor of March 23, 1982. Reversal of type for emphasis can also be unsatisfactory. In Example 63, New York Times, February 15, 1982, the type over the water is too fine to hold on the newsprint against the black background. Care must be exer-

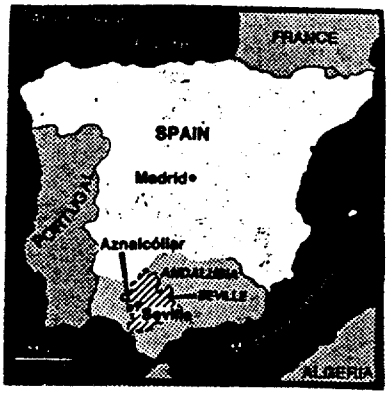

U.S. Embassy
MOSLEM AREA
CHRISTIAN AREA
Karantina Bridge
Mediterranean
West Beirut sports stadium
Baabda
Israeli troops
Sea
Beirut International Airport
Beirut
BEIRUT
Khalde
Aley
Damour
Mediterranean
LEBANON
River
VALLEY
Sidon
Zahrani
River
Litani
BEKAA
Sea
Nabatiyeh
Hasbaya
MT. HERMON
Beaufort Castle
Tyre
Golan Heights
SYRIA
ISRAEL
Sea of Galilee

EXAMPLE 61




By Joan Forbes, staff cartographer

EXAMPLE 62




EXAMPLE 63

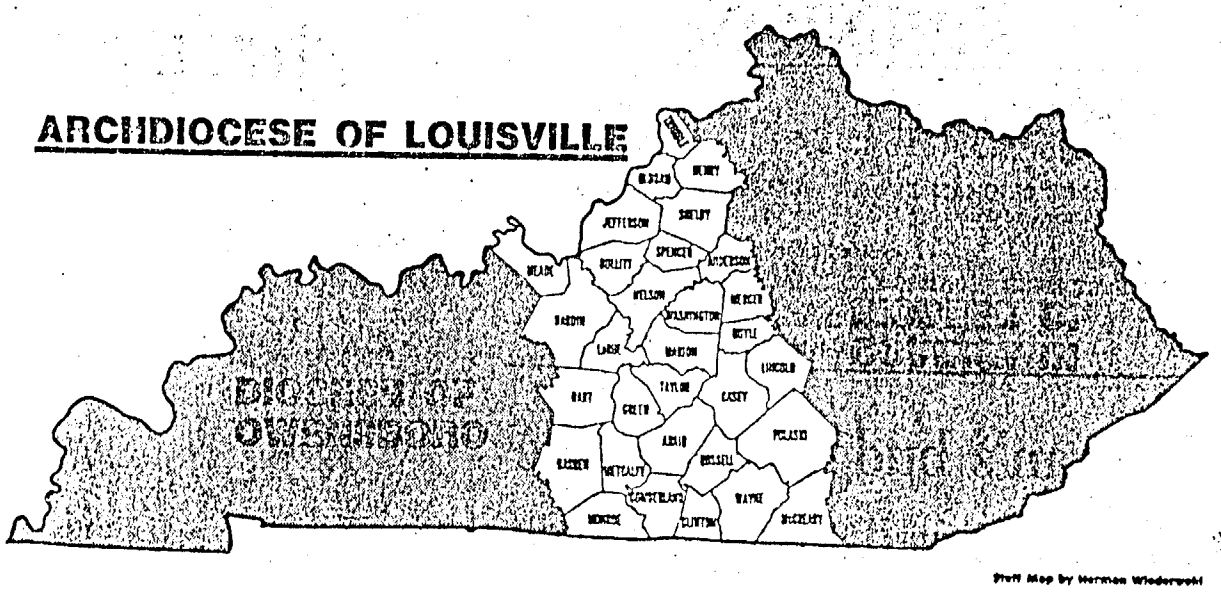
cised when using either of these two type/background combinations, especially with italic type.

By far the most common design problem associated with typography on newspaper maps was its placement and virtually every map could have been improved in this regard. Common problems included inappropriate breaking of linework, failure to break patterns when necessary, unsuitable horizontal placement, and type for areas not being letterspaced when appropriate. Poor type placement usually did not ruin near perfect maps, but consistently made good maps merely adequate and adequate maps less satisfactory. A review of many of the examples previously shown indicates that most would have benefited from improved type placement.

## Overall Evaluation

An overall evaluation of each map facilitated two purposes. One was to pinpoint problems on the map not related to the previously examined aspects of map preparation. Secondly, the overall impression of the map and its execution were reviewed.

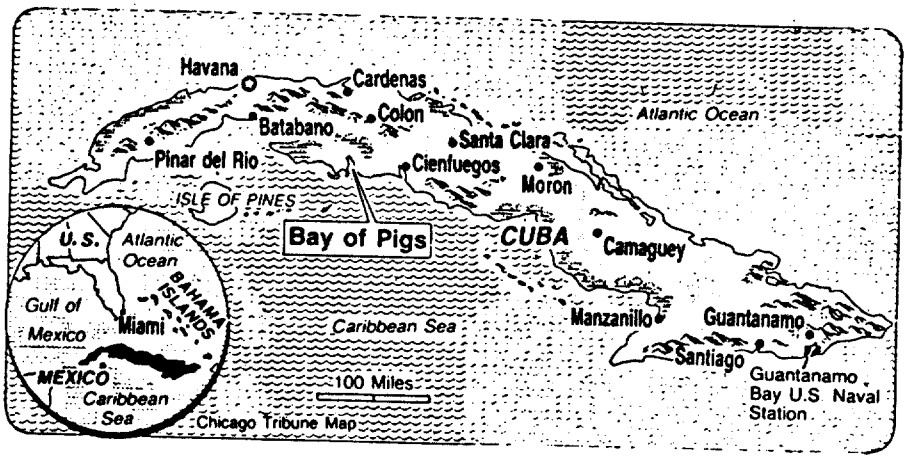
Some newspaper maps lack sharpness that is the result of the absorbency of newsprint. Ink is also easily smeared and some maps contain ink marks from the facing page. In addition, because maps have more white or light areas than text, shadowing from the reverse side of the page can also be a problem. Example 64 from the Louisville Courier Journal, February 19, 1982, shows how this shadowing




EXAMPLE 64 (reduced 26%)

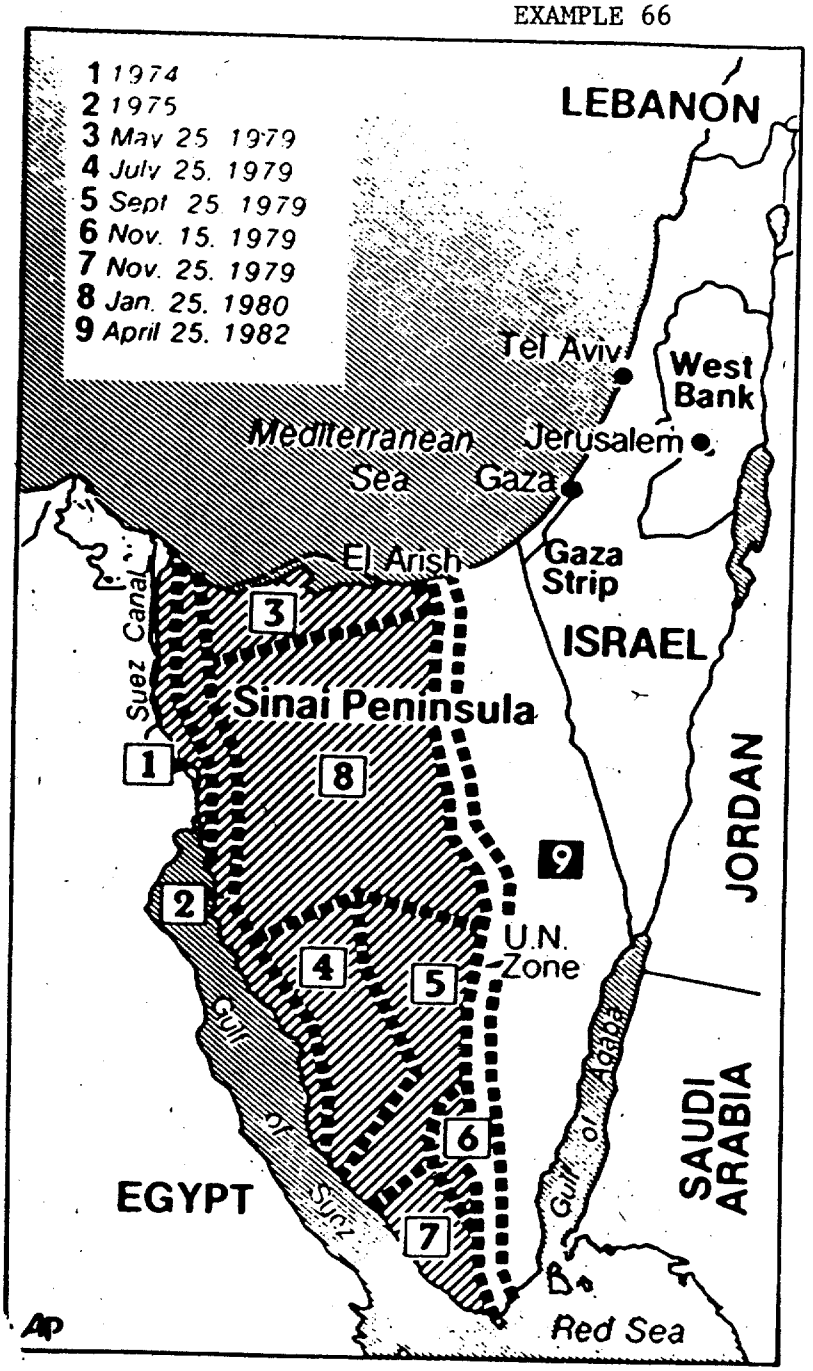
adversely affects the map's appearance. Washout can also occur on maps because of the speed of printing or, if a map is obtained from another source, part of it may be lost or distorted in transmission. Examples 65 and 66 illustrate this type of poor reproduction. Example 65 was prepared by the Chicago Tribune Graphic Service and printed in the Providence Sunday Journal, April 4, 1982, while Example 66 was prepared by AP and printed in the Wisconsin State Journal on April 26, 1982. Electronic transmission, printing speed, newsprint and ink quality all affect the final appearance of the map and cannot be extensively controlled.

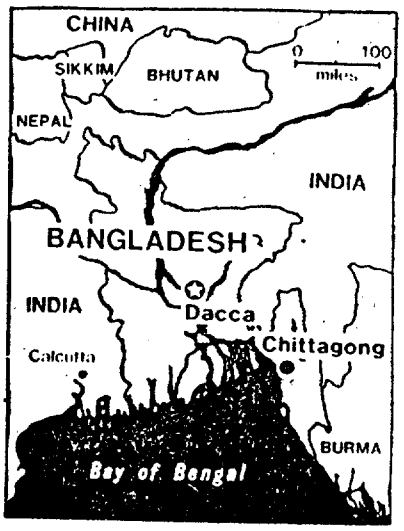
Once a map is planned and designed, the manual aspects of its preparation are often taken for granted. The actual execution of the map, the drafting, cutting of patterns, preparing overlays, and setting type is done by a diversity of newspaper personnel and some of the resulting maps are untidy. The desire for neat, clean, and crisp appearing maps is too frequently met with uneven, unfinished linework, ink blobs for point symbols, poorly cut patterns, and occasional registry problems. Examples 67 to 69 include a map of Bangladesh published in the Flint Journal, March 24, 1982, a map of Milwaukee from the Wisconsin State Journal of April 21, 1982, and a map of the city of Norfolk from the Virginia Pilot of March 25, 1982. All illustrate the detracting effect of poor execution, most often found on maps in medium and large newspapers and wire service maps.


Havana
Cardenas
Colon
Batabano
Atlantic Ocean
Santa Clara
Pinar del Rio
Cienfuegos
Moron
ISLE OF PINES
Bay of Pigs
CUBA
Camaguey
U.S.
Atlantic Ocean
BAHAMA ISLANDS
Gulf of Mexico
Miami
Caribbean Sea
Manzanillo
Guantanamo
Santiago
MEXICO
Caribbean Sea
100 Miles
Guantanamo Bay U.S. Naval Station
Chicago Tribune Map

EXAMPLE 65

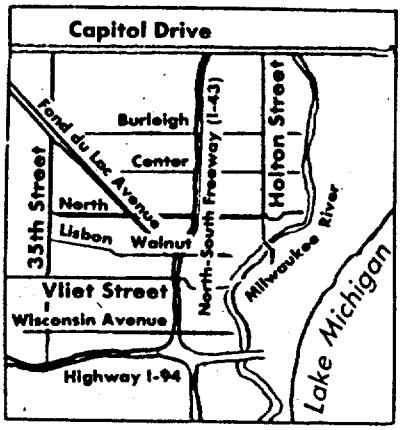
EXAMPLE 66

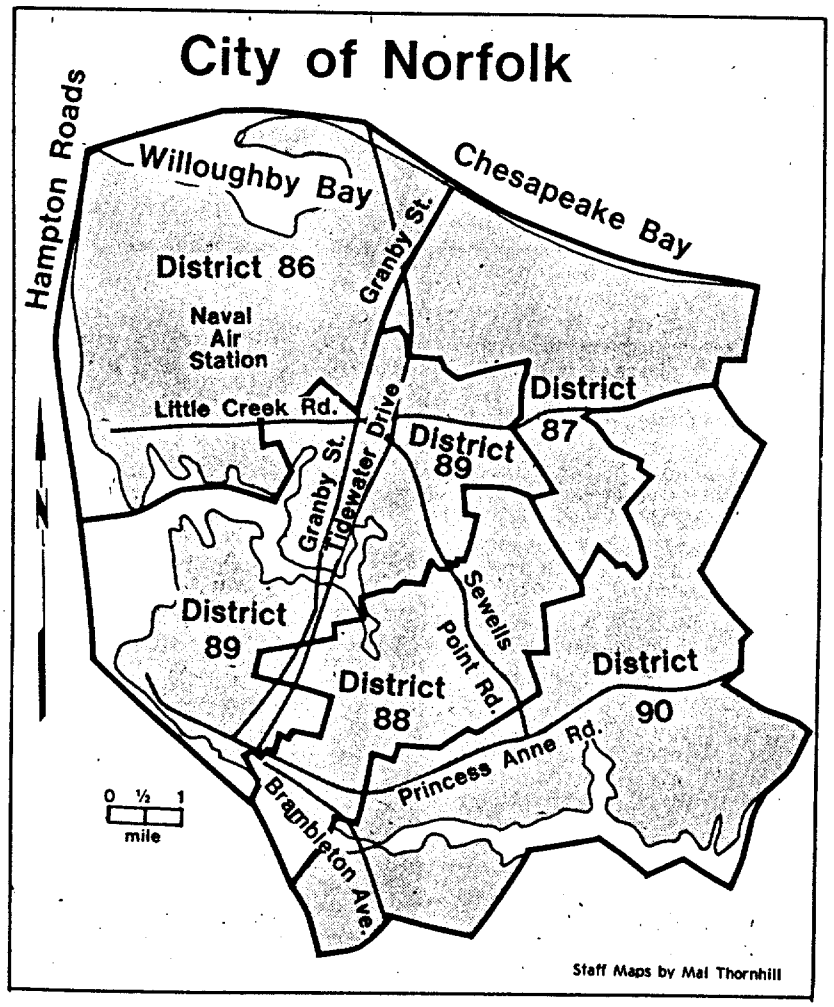

1 1974
2 1975
3 May 25 1979
4 July 25. 1979
5 Sept 25. 1979
6 Nov. 15. 1979
7 Nov. 25. 1979
8 Jan. 25. 1980
9 April 25. 1982
LEBANON
Tel Aviv
West Bank
Jerusalem
Mediterranean Sea
Gaza
El Arish
Gaza Strip
ISRAEL
Suez Canal
Sinai Peninsula
JORDAN
U.N. Zone
Gulf of Suez
Gulf of Aqaba
SAUDI ARABIA
EGYPT
Red Sea
AP




EXAMPLE 67

EXAMPLE 68

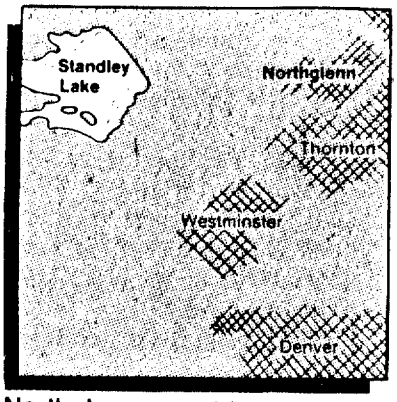



EXAMPLE 69

There were a few examples of maps whose exact purpose was obscure. In these cases, such as those presented in Examples 70 and 71 from the Flint Journal, March 30, 1982 and the Denver Post, February 13, 1982, a map may not have been necessary at all. Overall, however, the maps made were generally needed but the vast majority were mediocre, each having several problems. Very few were totally effective in their function; those that were, usually reflected the excellent work being done by a specific newspaper with a strong graphic commitment.


EXAMPLE 70




Northglenn would take water from Standley Lake and return it to farmers as treated sewage effluent.

EXAMPLE 71

# V. CONCLUSIONS

There is no doubt that graphics, and maps specifically, will continue as a vital component of U.S. newspapers. It is unclear, however, what function they will serve and how effectively they will communicate. Currently, the information newspaper maps present, and the techniques they use to present it, could be vastly improved. This is not to say that there are not high quality cartographic products being published in newspapers. This study included samples of most of the cartographic products available to, and used by, American newspapers and a few were exceptionally good maps (including Examples 21, 36 and 45). These high quality maps are usually prepared by larger newspapers with a strong graphic commitment, a high circulation, and a skilled, experienced staff. However, these maps are not common and certainly are not seen by the majority of newspaper readers in America. Maps prepared by professional graphic services, wire services, and most newspaper staffs are of lower quality and yet are the most prevalent cartographic products in newspapers.

Both the technical constraints and the limited knowledge of personnel contribute to the poor quality of newspaper maps. Tight deadlines on the preparation of maps adversely affect the manual execution of the map, limit the amount of research possible, and cause newspapers to rely heavily on less desirable map sources. The small size of maps, the printing techniques used, and the poor quality of newsprint restricts the function of the map and hampers design

potential. Some problems exhibited in the newspaper maps reviewed were exclusively caused by technical limitations. Examples 65 and 66 illustrate the difficulties caused by the reproduction processes used. Example 64 shows how the poor quality of newsprint adversely affects the appearance of the final map by allowing shadowing from the back of the page and smearing from the facing page. These problems cannot be avoided or consistently predicted, and are associated with the printing processes and newsprint quality. There are also problems evidenced in newspaper maps that were caused only by ignorance of the personnel making the map such as the failure of many maps to include a scale when suitable, such as Example 11, or the improper use of legends, such as Examples 42 and 43. However, the problems caused exclusively by technical constraints or exclusively by limitations of personnel were few. Most frequently, newspaper maps evidenced recurrent problems that, although initially influenced by technical constraints, were actually caused by, and could be easily eliminated by, personnel with rudimentary cartographic knowledge and skill combined with common sense. On maps that would otherwise be simple cartographic tasks because of their limited purpose and lack of complexity, the size restrictions and tight deadlines of newspapers present preparation problems that are not being effectively solved by most of the personnel making these maps. The four most commonly recurrent cartographic problems in the study of newspaper maps were examples of this phenomenon: maps being published at too

large a scale, the presence of incomplete or ambiguous information, poor use of typography, and untidy map execution.

The presentation of insufficient information does not allow newspaper readers, who often lack geographical knowledge, to grasp the "big picture" and fully comprehend and understand the map. This is commonly the result of publishing maps at too large a scale as illustrated in Example 18. The restrictive dimensions of newspaper maps forces all map material into a small format and this is an initial cause of the problem. However, it has been overcome by the effective use of insets or smaller scales, such as Example 21, but only on a small number of newspaper maps. Most frequently, the map makers are either unaware of the problem or have chosen inadequate cartographic methods to deal with it, such as Examples 5, 13, 20, 22, 35, and 52. This inability to respond appropriately to the scale problem is mainly caused by the lack of cartographic knowledge and skill of the map making personnel.

Incomplete or ambiguous information confuses and distracts readers while also depriving them of additional information that may be of help or necessary in using the map. Small map size greatly inhibits the amount of labeling possible and the printing processes and quality of newsprint limit the variety of usable symbols and patterns. However, careful design by knowledgeable map makers could easily clarify Example 31 and eliminate fragmentation on Example 46. Thinking cartographically, in conjunction with common sense, would

convince the maker of Examples 27 and 28 that they were incomplete and also that they may have been prepared at too large a scale.

Problems with typography on newspaper maps are magnified because these maps seldom include many other elements. This emphasizes the importance of careful selection of style, form, size, and placement. The technical constraints of map size and the limited availability of type styles both restrict the optimum use of typography and may be the cause of poor selection of styles, forms, and sizes of type that sometimes occurs. However, a recurrent and more common problem with type was its placement on the map. Type placement is a matter of skill, cartographic knowledge, and common sense which were again lacking in the preparation of many of the newspaper maps reviewed.

The untidy appearance of many newspaper maps lessens their credibility and indicates to the readers that they are prepared haphazardly. The printing processes used and the attributes of newsprint both contribute to less sharp, clean maps, however, most of the messy looking maps reviewed were a result of a lack of drafting skill on the part of the map maker, such as Examples 67, 68, and 69, and did not reflect technical problems related to reproduction or poor newsprint quality. Clean, crisp maps with even linework can be produced with good drafting techniques, as illustrated by Examples 21, 34, 36, and 51, even if the map exhibits other cartographic problems.

Almost every recurrent cartographic problem evidenced in newspaper maps reflected the limitations of the map making personnel.

Although most problems could be traced to a technical constraint, each could have been easily overcome with rudimentary cartographic knowledge and/or skill. The vast majority of the newspaper maps do not reflect this skill or knowledge, even though the ability of newspaper map makers to think cartographically is evident in the few high quality maps that are published.

The evaluation of newspaper map problems and the conclusions on their causes were approached from the review of newspaper maps and newspaper production techniques. The results indicate how newspaper maps can be made to conform to more cartographically acceptable standards. The research did not address the issue of the map user, and merely speculated on reader response. Additional research into the way newspaper readers utilize and comprehend these maps would be logical and valuable, providing information on the map's communicative abilities and effectiveness for actual users. Several questions need to be investigated. How successful are the newspaper maps currently printed and do readers even use these maps? Do readers gain accurate geographic knowledge and information from newspaper maps? As far as map users are concerned, what are optimum scales for different types of maps appearing in newspapers? Do the maps identified as cartographically "good" actually communicate better than those identified as cartographically "bad"? Does color affect map usage or effectiveness? How intelligant are average newspaper readers, and how sophisticated a cartographic product could they utilize? If these

questions could be researched and answered, the newspaper maps that reach millions of people daily could be further refined to not only comply with cartographic standards for content and design, but to implement methods that would make them more useful to their specific audience, American newspaper readers.

Some of the changes anticipated in the next decade of newspaper publishing will undoubtedly encourage newspapers to produce a higher quality cartographic product. This will occur in some small ways, such as minor improvements in printing and paper quality, new audiences for some American newspapers, and a continued graphic emphasis. However, as these changes occur, the ability of newspapers to respond will be complicated by some major changes expected in newspaper production including the adoption of television as a medium to transmit newspapers and the extensive integration of computer technology into graphic aspects of newspaper production. All of these factors will have some affect on the future appearance, utilization, and quality of newspaper maps.

As more and more newspapers switch to offset printing methods, some better quality printing and color reproduction will result. Even newspapers that have maintained letterpress machinery have made use of recent platemaking technology to increase the quality of their letterpress printed products. Although presses are not expected to change much in the near future, platemaking technology should continue to advance. It is expected that laser scanners and laser

plate engravers will become economically feasible in the not too distant future or possibly computer controlled ink jets, eliminating press plates entirely.[12] Methods for making newsprint are also expected to improve and better quality but lighter weight paper is being developed.

The traditional role of the American newspaper is also changing. If newspapers like USA Today are successful, nationwide distribution may be attempted by more newspapers. Satellite and microwave technology will permit a newspaper to maintain small printing plants staffed by a few individuals in many parts of the U.S. and economically produce and distribute a high quality product. If USA Today is any example, maps and the extensive use of color will be vital components in newspapers.

The role of the map itself may even be advanced, especially by professional graphic services with more time for research and less emphasis on providing an immediate product. The locator maps that currently dominate U.S. newspapers may be improved to contain relevant additional data, increasing their communicative abilities and making them more useful. More importantly, if newspaper map makers realize the informative and educational potential and responsibility of newspaper maps, they could function on a more sophisticated level and branch out from the simple "X marks the spot" locator maps to statistical and thematic maps on more diverse topics. The subjects that could be successfully portrayed cartographically are endless

and may start to be explored more fully by some newspapers and graphic services.

A more influential and possibly complicating factor on map appearance in the future will be the use of television to transmit newspapers. This is already being done in one metropolitan area and some Americans currently receive their daily newspaper via cable on their TV sets. As this becomes more and more popular, the types of maps published and their quality and appearance will undoubtedly be affected.

The most influential factor likely to affect newspaper maps in the next decade will be greater computer use. Interviews with newspaper staff members indicated that the adaptation of computer technology to the graphic departments of newspapers has begun. One newspaper specifically discussed the purchase of new equipment to completely computerize their graphics department in the near future, and another mentioned current research into the graphic capabilities of the computer equipment they already own. The emphasis on computerization indicates the elimination of paste-up originals, and it may provide the resources necessary for more sophisticated products. It also undoubtedly encourages the possibilities of greater cartographic abuse. This research indicates that currently map makers do not implement the most rudimentary cartographic methods and seldom successfully employ more complex techniques. This situation could lead to graphic computers being programmed to produce low quality,

oversimplified, and poorly designed maps far below the computer's capability.

All of these factors emphasize the necessity for attention to newspaper maps in the near future and conscious efforts toward their improvement. Although the technical constaints on newspaper production are restrictive, and anticipated changes in production will complicate matters, cartographically knowledgeable personnel can overcome these constraints to produce high quality products. With more extensive cartographic skills and greater understanding of the newspaper map reader, the potential of newspaper maps could be vastly increased.

LIST OF FOOTNOTES

[1]John Brademas, "The Importance of Learning about the Rest of the World," Chronicle of Higher Education, Vol. 26, No. 8, p. 48.
Association of American Geographers Newsletter, Vol. 17, No. 8, (October 1, 1982), pp. 1, 3.

[2]Mary Elson, "America's View of World Geography is in a Sorry State," Chicago Tribune, July 15, 1982, Tempo pp. 1-2.

[3]Tim Innes, Untitled, unpublished paper on wire service graphics, February 1, 1982, p. 1.

[4]Walter Ristow, "Journalistic Cartography," Surveying and Mapping, Vol. 17, No. 4, p. 369.

[5]Tim Innes, Untitled, p. 2.

[6]Chilton Bush, ed., Newspaper Research for Better Newspapers, (New York, 1964-1974).

[7]Mario Garcia, Contemporary Newspaper Design, A Structural Approach, (New Jersey, 1981).

[8]Harold Evans, Newspaper Design, An Illustrated Guide to Layout, (New York, 1973).
Harold Evans, Pictures on a Page, Photo-Journalism, Graphics and Picture Editing, (New York, 1978).
Mario Garcia, Contemporary Newspaper Design, A Structural Approach.

[9]Allen Hutt, Newspaper Design, (London, 1960).

[10]Jon Udell, The Economics of the American Newspaper, (New York, 1978), p. 89.

[11]Mary Elson, "America's View of World Geography is in a Sorry State," (Chicago, 1982), Tempo p. 2.

[12]Jon Udell, The Economics of the American Newspaper, p. 145.

Does your paper have any written policies or guidelines about the use or preparation of maps for a story?

YES_____ NO_____

(If YES, please enclose a copy)

Approximately how many maps, per week, does your paper run with stories?_____

Who is involved in the decision to run a map with a story?_____

_____

How much time is there to prepare or obtain a map after the decision is made to use one?

with a breaking story?_____

with a general news story?_____

with a feature story?_____

Approximately what percent of the maps you print are prepared by someone on the newspaper staff?_____%

Who on your staff prepares maps?_____

_____

What sources materials are commonly used?_____

_____

Approximately what percent of the maps you print are obtained from a wire or news service?_____%

What wire or news service(s)?_____

_____

Approximately what percent of the maps you print are obtained from any other source?
_____%

What other source(s)?_____

_____

How many people are on the graphics/art department staff?_____

Comments?

Who on your staff could I contact for more information about the use of maps in your newspaper? NAME_____

BUS. PHONE (  )_____ BUS. HOURS_____

Thanks again.

Approximately how many US newspapers receive your graphic service?_____

Excluding daily weather maps, approximately what percent of the graphics you prepare are maps? _____%

Do you prepare daily weather maps? YES_____ NO_____

How often do you send maps to your customers?

_____less then once a week

_____once a week

_____once a day

_____more often then once a day

In what form are the maps you send?_____

_____

Are your maps reduced, enlarged, or used at the size you prepare them by most newspapers? (check all that apply)

_____often reduced by newspapers for printing

_____often enlarged by newspapers for printing

_____often used at the prepared size by the newspapers

When a customer uses one of your maps is it identified as being prepared by your service?

_____always identified as prepared by our service

_____may or may not be identified as prepared by our service

_____not identified as prepared by our service

Approximately how many people are on your graphics staff?_____

Approximately how many of these people prepare maps?_____

What source materials are commonly used?_____

_____

Who is involved in deciding specifically what maps will be prepared?_____

_____

Does your service have specific guidelines for the preparation of maps?

YES_____ NO_____

(If YES, please enclose a copy)

If at all possible, please enclose a few copies of some of the maps you have prepared.

Who on your staff could I contact for more information about your preparation of maps?

NAME_____ BUS. PHONE (___)_____

BUS. HOURS_____

Comments?

APPENDIX A

*Arizona Republic
Phoenix, AZ

Birmingham Post-Herald
Birmingham, AL

*Boston Globe
Boston, MA

*Bowling Green Sentinel-Tribune
Bowling Green, OH

*Burlington Free Press
Burlington, VT

*Capital Times
Madison, WI

*Chicago Sun-Times
Chicago, IL

*Chicago Tribune
Chicago, IL

*Christian Science Monitor
Boston, MA

Cleveland Plain Dealer
Cleveland, OH

Daily Intelligencer
Doylestown, PA

Deming Headlight
Deming, NM

Des Moines Register
Des Moines, IA

*Detroit Free Press
Detroit, MI

*Dickenson Press
Dickenson, ND

Ellensburg Daily Record
Ellensburg, WA

*Flint Journal
Flint, MI

*Fort Worth Star-Telegram
Fort Worth, TX

Idaho Statesman
Boise, ID

*Iowa City Press-Citizen
Iowa City, IA

Long Island Newsday
Long Island, NY

*Los Angeles Times
Los Angeles, CA

*Louisville Courier-Journal
Louisville, KY

*Milwaukee Journal
Milwaukee, WI

Napa Register
Napa, CA

Nashville Banner
Nashville, TN

New York Daily News
New York, NY

*New York Times
New York, NY

*Norman Transcript
Norman, OK

*Phoenix Gazette
Phoenix, AZ

*Providence Journal
Providence, RI

*Rochester Post Bulletin
Rochester, MN

*St. Louis Post Dispatch
St. Louis, MO

*St. Petersburg Times
St. Petersburg, FL

*San Francisco Chronicle
San Francisco, CA

Savannah Morning News
Savannah, GA

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* indicates the newspaper was part of the sample for the Detailed Study of Newspaper Maps.

APPENDIX A (continued)

*Wall Street Journal
New York, NY

*Washington Post
Washington, DC

APPENDIX B

Associated Press (AP)
New York, NY

Chicago Tribune Graphic Service
Chicago, IL

Christian Science Monitor News Service (Los Angeles Times Syndicate)
Los Angeles, CA

Dispatch News Service
New York, NY

Gemini Maps
New York, NY

News Graphics
New Tripoli, PA

Newspaper Enterprise Association
New York, NY

United Press International (UPI)
New York, NY

Visual Education Consultants (VEC)
Middleton, WI

APPENDIX C

*Arizona Republic
Phoenix, AZ

Atlanta Constitution
Atlanta, GA

*Boston Globe
Boston, MA

*Bowling Green Sentinel-Tribune
Bowling Green, OH

*Burlington Free Press
Burlington, VT

*Capital Times
Madison, WI

*Chicago Sun-Times
Chicago, IL

*Chicago Tribune
Chicago, IL

*Christian Science Monitor
Boston, MA

Columbus Citizen-Journal
Columbus, OH

Daily Press
Newport News-Hampton, VA

Dallas Morning News
Dallas, TX

Denver Post
Denver, CO

*Detroit Free Press
Detroit, MI

Detroit News
Detroit, MI

*Dickenson Press
Dickenson, ND

*Flint Journal
Flint, MI

*Fort Worth Star-Telegram
Fort Worth, TX

*Iowa City Press-Citizen
Iowa City, IA

*Los Angeles Times
Los Angeles, CA

*Louisville Courier-Journal
Louisville, KY

*Milwaukee Journal
Milwaukee, WI

Milwaukee Sentinel
Milwaukee, WI

*New York Times
New York, NY

*Norman Transcript
Norman, OK

Oklahoma City Times
Oklahoma City, OK

*Phoenix Gazette
Phoenix, AZ

*Providence Evening Bulletin
and Sunday Journal
Providence, RI

*Rochester Post Bulletin
Rochester, MN

*St. Louis Post Dispatch
St. Louis, MO

*St. Petersburg Times
St. Petersburg, FL

*San Francisco Chronicle
San Francisco, CA

Virginia Pilot
Norfolk, VA

*Wall Street Journal
New York, NY

*Washington Post
Washington, DC

Wisconsin State Journal
Madison, WI

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* indicates the newspaper responded to the Questionnaire to Newspapers.

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APPROVED David Wormald

PROFESSOR

DATE 16 December 1982