Syracuse Scholar (1979-1991)

Volume 9
Issue 2 *Syracuse Scholar Fall 1988*

Article 6

9-1-1988

Photoengraving, photowires, and microcomputers: technological incentives for journalistic cartography

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PHOTOENGRAVING, PHOTOWIRES, AND MICROCOMPUTERS: TECHNOLOGICAL INCENTIVES FOR JOURNALISTIC CARTOGRAPHY

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This research was funded in part by a fellowship from the John Simon Guggenheim Memorial Foundation during the 1984–85 academic year.

MAPS CAN CONTRIBUTE to the presentation of news, especially when the event is spatially complex or its location significant but little known. The two-dimensional cartographic framework is ideal for portraying distance relationships, describing routes and boundaries, and revealing causal similarities in spatial patterns. Yet in the news media, where the linear structure of printing type dominated for centuries the format of newspapers and magazines, the map's areal organization of symbolically coded information has deterred the widespread use of journalistic cartography. Not surprisingly, the development of reproduction technology that treated the page as a single image, rather than as an array of parallel lines of type, preceded a fuller use of news maps. Moreover, the transition from hot type to cold type, and more recently to electronic pagination and computer graphics, has promoted not only a closer integration of maps and text but also an appreciation of the map as art, to decorate the page as well as to inform the reader.

Smaller newspapers have depended upon low-cost sources of cartographic art. Although a newspaper without a staff artist can photograph published maps and incorporate the crude drawings of resourceful editors and reporters, a more efficient approach is to import centrally produced maps from news syndicates and wire services. In the late nineteenth and early twentieth centuries, maps provided by syndicates were more proficient in illustrating feature stories and addressing persistent trouble spots than in providing the geographic details of breaking news; verbal accounts sent by wire were much more timely than stereoplate mats sent by rail. Refinement of electronic facsimile transmission (pictures by wire) in the 1930s brought timely news pictures to many larger newspapers, and further expansion of photowire networks after World War II extended this service to smaller newspapers as well. Centrally produced news maps transmitted by the Associated Press Wirephoto system and other photowire services were particularly important in the timely reporting of World War II and the Korean War, as well as in locating the sites of serious accidents, natural disasters, and terrorist attacks. Table 1 demonstrates the increased use of news maps since 1920 for four U.S. newspapers.

For decades news maps delivered by photowire had been constrained by their minor role in what largely was a photojournalism service. In the 1980s, as a result of a revolution in newspaper design, news maps gained both administrative and technological independence from news photos. Maps now

are a major part of the work of the separate news graphics services operated by the major wire services and a few newspaper groups and independent feature syndicates. In the mid-1980s, several of these graphics services overcame the technical constraints of image transmission systems designed for news photos by adopting separate electronic distribution channels. Transmitting maps and other news graphics as collections of symbolic objects, rather than as a grid of graytone picture elements, has the added benefit of allowing local newspapers to modify the size, design, and content of centrally produced cartographic artwork.

This paper examines the foregoing theses relating the development of newspaper cartography to progress in reprographics technology and telecommunications. It is a case study that covers the period 1870 through 1987, over which time the principal method for producing news maps shifted from wood-block engraving to pen-and-ink drafting, and more recently to microcomputer and laser printer. Its geographic focus is in the United States, where a sample of twelve daily newspapers in central New York State reflects many of the experiences of the press in small- and medium-sized American cities.

TABLE I
Average Number of Maps Per Issue, Selected Newspapers, 1920–85 [a]

Year [b]	*Christian Science Monitor*	*Wall Street Journal*	*New York Times*		*Syracuse Herald-Journal*	
	(weekdays) [c]	(weekdays) [d]	Mon.-Sat.	Mon.-Sun.	Mon.-Fri.	Mon.-Sun.
1920	.30	.00	.13	.21	.00	.13
1930	.60	.02	.28	.77	.11	.17
1940	.96	.00	1.45	3.09	.74	.76
1950	.54	.16	1.12	2.51	.44	.46
1960	.47	.03	2.81	4.52	.17	.34
1970	1.09	.03	3.08	5.00	.12	.25
1980	.92	.50	2.52	4.80	.34	.42
1985	2.32	.47	2.51	4.26	.67	.91

[a] Rates are based on a sample by the author. Weather maps are excluded to promote comparability; the *Christian Science Monitor* and the *Wall Street Journal* did not include them, and the other two did not use them during the earlier part of the period. Average daily rates were obtained by first computing a mean daily rate for each day of the week the paper was published and then adding the daily rates and dividing by the number of days of the week (five, six, or seven) represented.

[b] Sample based on January and July issues for the year indicated.

[c] The *Christian Science Monitor* published Monday through Saturday until the mid-1970s. For 1980 and 1985, rates are for Monday through Friday.

[d] Rates for the *Wall Street Journal* are for Monday through Saturday for 1950 and earlier years and for Monday through Friday for 1960 and later years; the paper dropped its Saturday edition between 1950 and 1960.

SAMPLING AND MEASUREMENT

A nine-county area in central New York is the geographic focus of this paper. The region contains ten small- to medium-sized cities with a total of twelve daily newspapers (fig. 1). Each of the two larger cities, Syracuse and Utica, has jointly owned but separately edited morning and afternoon newspapers. The daily newspapers in the other eight cities all publish on an afternoon cycle. Circulations range from 7,000 for the *Norwich Evening Sun* to 103,000 for the *Syracuse Herald-Journal,* an afternoon paper.[1] The Syracuse newspapers, which publish five regional editions, are distributed throughout most of the region in Figure 1, and a few other newspapers, particularly the *Watertown Daily Times,* offer home delivery in several adjoining counties. Collectively, these twelve newspapers are representative of the U.S. newspaper industry, in which 54 percent of the nation's 1,676 dailies have circulations between 10,000 and 100,000, with another 26 percent between 5,000 and 10,000.[2]

1. Circulation data are from the *Editor and Publisher International Yearbook.*

2. Percentages are computed from tabulations in the *Editor and Publisher International Yearbook, 1986,* front section, unnumbered page.

Typical of American newspaper publishing, newspaper groups–or "chains," as they prefer not to be called–own a majority of central New York's twelve dailies. Only the *Watertown Daily Times,* the *Rome Daily Sentinel,* and the *Cortland Standard* were independent in 1987. Also typical of the American press, all twelve newspapers received state, national, and international news from one of the major news wires–the Associated Press (AP) or United Press International (UPI). In the mid-1980s, though, two of the smaller papers, the *Norwich Evening Sun* and the *Oneida Daily Dispatch,* did not receive timely, centrally produced news pictures and graphics over the AP or UPI photowire. Like many small dailies, these papers relied upon syndicates supplying general-interest and anticipatory graphics by mail.

Map use by these twelve newspapers was examined for January and July for 1985 and all round-numbered years from 1870 to 1980 that the newspaper published as a daily. Paper or microfilm copies of each day's edition were examined, page by page, and each article with cartographic illustration was noted. Where two or more stories referred to the same map, though, only one was recorded. Weather maps were excluded, as were maps whose principal function clearly was that of a decoration or logo. The sample was intended to reflect discrete, day-to-day editorial decisions to employ maps rather than the incorporation of maplike artwork or regularly appearing, standardized maps in a newspaper's overall design.

Time-series analysis of these data is based on average daily rates computed for each newspaper for each year. Because most of the twelve daily newspapers never published a Sunday edition and because several lack Saturday editions, these rates cover only the period Monday through Friday. Each yearly rate was computed as a composite of five separate daily rates. Dividing the number of cartographically illustrated articles appearing on, say, Wednesday by the number of Wednesdays on which the paper was published during January and July of that year yielded the daily rate for Wednesday. These daily rates compensated for differences between sample years in the number of high-map-use days, such as Wednesdays and Fridays, as well as for the policies of some newspapers not to publish on New Year's Day or Independence Day (4 July). Adding the daily rates for Monday through Friday and dividing by five yielded an estimated average daily rate for the year.

PHOTOENGRAVING AND NEWS SYNDICATES

During the late nineteenth century daily newspapers in central New York used few maps. Typical of the time, the earliest maps were wood-block engravings, which dominated newspaper illustration through the early 1890s. Figure 2, which appeared in the *Syracuse Sunday Herald* in 1886, is typical of wood-block engravings in its angular lettering and rough linework. This example of a late nineteenth-century map addressing a local news story was found not in the systematic sample but at the county historical society. Indeed, all but one of the six maps found for 1870, 1880, and 1890 were apparently produced not by the newspapers in which they appeared but by a feature syndicate. Illustrations often accompanied the stereoplated text shipped to smaller daily and weekly papers by the numerous newspaper syndicates operating in the United States in the 1880s and 1890s.[3] Available syndicate material was abundant and varied, ranging from serialized fiction to recipes to accounts of explorations in tropical jungles. Publishers using large amounts of this "boiler plate" were said to "edit their newspaper with a saw."[4]

3. For an examination of the growth of newspaper syndicates and the influence of their stereotyped "boiler plate": Elmo Scott Watson, *A History of Newspaper Syndicates in the United States, 1865–1935* (Chicago, 1936).

4. Elmo Scott Watson, *History of Auxiliary Newspaper Service in the United States* (Champaign, IL: Illini Publishing, 1923), 33.

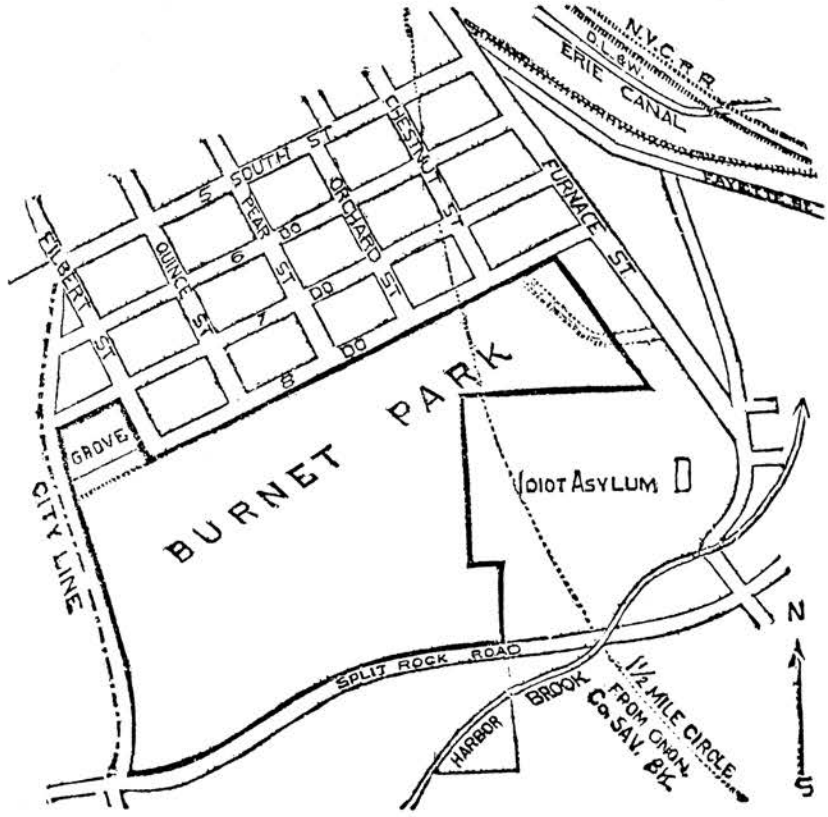

Figure 2. On 20 June 1886, this wood-block engraving, with the title "Map of Burnet Park, the Pleasure Ground That We Have a Chance of Enjoying," accompanied a story in the ***Syracuse Sunday Herald*** *about the donation of a 200-acre farm to the city. Courtesy of the Onondaga Historical Association.*

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Even though all twelve newspapers regularly used halftone photos and line engravings in 1900 or 1910, early in the century smaller dailies still depended upon newspaper syndicates for most illustrations. Syndicate artwork was now provided as cardboard mats, from which relief plates were made in a casting box. Shipping the illustration masters as mats was much cheaper than shipping the heavier metal stereoplates, and syndicate artwork had increased in both volume and variety. Figure 3, a freehand line drawing, is characteristic of the simple, highly generalized maps produced by syndicate artists after 1890. (Note the misspelled label for Illinois.) Photographic line engraving allowed syndicates to capture and reproduce inexpensively thousands of hastily produced pen-and-ink sketches, and many feature stories had not one but several pictures. In addition, small-city dailies often used railway express to send photographs of local officials, brides, and, on occasion, maps to photoengravers in larger cities. The single local-area map published on a weekday in January and July 1900 was used by the *Watertown Daily Times* for a story on the aftermath of a spectacular fire in a nearby village. The artwork probably had been sent to New York City or Buffalo for engraving.

Figure 3. On 23 May 1900, the ***Cortland Standard*** *printed this simple line drawing, which accompanied an article on an anticipated eclipse in the southeast United States. The newspaper did not identify the syndicate supplying both text and map.*

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PHOTOELECTRIC ENGRAVERS, FACSIMILE TRANSMISSION, AND WIRE SERVICES

Rates of map use were uniformly low during the first few decades of the twentieth century (fig. 4). Although the nation's larger newspapers had adopted photographic line engraving in the 1880s and photographic halftone engraving in the 1890s, a small newspaper could not afford the equipment, space, and personnel needed to run its own photoengraving department. Indeed, only the newspapers in Syracuse, Utica, and Watertown ever had their own photochemical photoengraving facilities. Table 2, which lists the first use of timely photographs with stories on local accidents and sporting matches, reveals that six of central New York's daily newspapers were without photoengraving equipment until the late 1940s, when they acquired a Fairchild Scan-A-Graver. Useful for both display ads and news photos, and operated by a single employee, this low-cost scanner-engraver used a photoelectric cell to measure graytone values on a continuous-tone photograph mounted on a rotating drum.[5] A heated, electrically controlled, cone-shaped stylus simultaneously cut a corresponding halftone image on a plastic relief plate mounted on another drum on the same axle. The Scan-A-Graver could also produce press-ready relief cuts for maps and other line drawings.

5. C. A. Harrison, "The Fairchild Photo-Electric Engraver," *Penrose Annual* 45 (1951): 104–5.

TABLE 2

Circulation and Decades During Which Photoengraving and Direct Photowire Service Were Acquired by Twelve Central New York Daily Newspapers

Newspaper (photowire service in 1985)	City Population, 1980 (000s)	Circulation (000s) 1950	1985	Acquisition of Photoengraving	Acquisition of Photowire
Auburn Citizen (UPI)	33	10.0	15.9	1940s[f]	1960s
Cortland Standard (AP)	20	7.4	12.1	1940s[f]	1960s
Ithaca Journal (AP)	29	11.9	19.7	1940s[f]	1950s
Norwich Evening Sun (none)	8	3.4	7.1	1950s	—[n]—
Oneida Daily Dispatch (none)	11	5.3	9.9	1940s[f]	1970s[d]
Oswego Palladium-Times (AP)	20	13.3	9.0	1940s[f]	1950s
Rome Daily Sentinel	44	15.5	19.2	1940s[f]	1950s
Syracuse Newspapers (AP, UPI)	170				
A.M.: ***Post-Standard***		79.0	85.0	1920s	1950s
P.M.: ***Herald-Journal***		126.5	103.2	1900s	1935[w]
Utica Newspapers (AP)	76				
A.M.: ***Daily Press***		23.7	29.5	1930s	1960s
P.M.: ***Observer-Dispatch***		43.4	33.5	1930s	1940s
Watertown Daily Times (AP)	28	42.9	43.0	1930s	1950s

Sources: Back issues bound or on microfilm; *Editor and Publisher Yearbook* (esp. 1951 and 1986).

[d]Dropped UPI photowire service in the early 1980s.

[f]Fairchild photoelectric Scan-A-Graver.

[n]Never had a direct photowire connection.

[w]Original AP Wirephoto client.

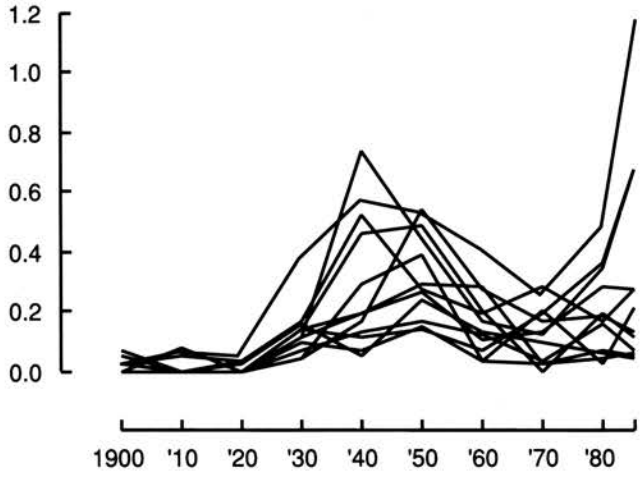

Figure 4. Combined time-series graph showing rates of map use, separately, for the twelve central New York daily newspapers. Rates are based on weekday (Monday through Friday) editions published during January and July of the years sampled.

At most small newspapers, acquisition of a Scan-A-Graver accompanied or preceded by a few years the installation of a photowire receiver, most likely linked to the AP Wirephoto network. In 1941, the AP developed a mechanical engraver for newspaper use and then experimented with an inexpensive photoelectric engraver. Late in the decade the AP turned the project over to the Fairchild Camera and Instrument Corporation for modification, manufacturing, and marketing.[6] AP management saw an expensive, one-person scanner-engraver as essential to extending Wirephoto service to smaller newspapers. Wirephotos were received as continuous-tone prints or negatives, and the Scan-A-Graver was an inexpensive means of converting the Wirephoto image into a halftone engraving for printing. In initiating development of the Scan-A-Graver, the AP indirectly enhanced local photojournalism and encouraged the use of local maps as well as centrally produced cartographic art. During the 1950s and 1960s—decades of unprecedented urban expansion—many of the twelve dailies made their own engravings of zoning and site plans obtained from municipal planners or local developers.

Scanning a picture mounted on a rotating drum had been the dominant imaging sequence in electronic facsimile since 1848, when Frederick Bakewell developed a cylinder-and-screw apparatus for the systematic, row-by-row scanning of pictures with his "copying telegraph."[7] In 1908, the *London Daily Mail* and *L'Illustration,* in Paris, demonstrated the potential of facsimile technology for the timely transmission of news photos by exchanging pictures over telephone lines.[8] Selenium-cell scan-heads and reliable electric motors encouraged the development of commercial facsimile services, and in 1925, AT&T initiated a telephoto message service linking New York, Chicago, and San Francisco.[9] In 1933, the AP asked AT&T and Bell Laboratories to

6. Technical Progress, *APME Red Book* (Associated Press Managing Editors Association) 11 (1958): 40–44.

7. Bakewell's invention came five years after Alexander Bain's graphic telegraph, believed to be the earliest device for facsimile transmission (Daniel M. Costigan, *FAX: The Principles and Practice of Facsimile Communication* [Philadelphia: Chilton Book Co., 1971], 2–5).

8. "Korn's New Telephotographic System," *Scientific American Supplement* 66 (4 July 1908): 14–16.

9. F. W. Reynolds, "A New Telautograph System," *Electrical Engineer* 55 (September 1936): 996–1007.

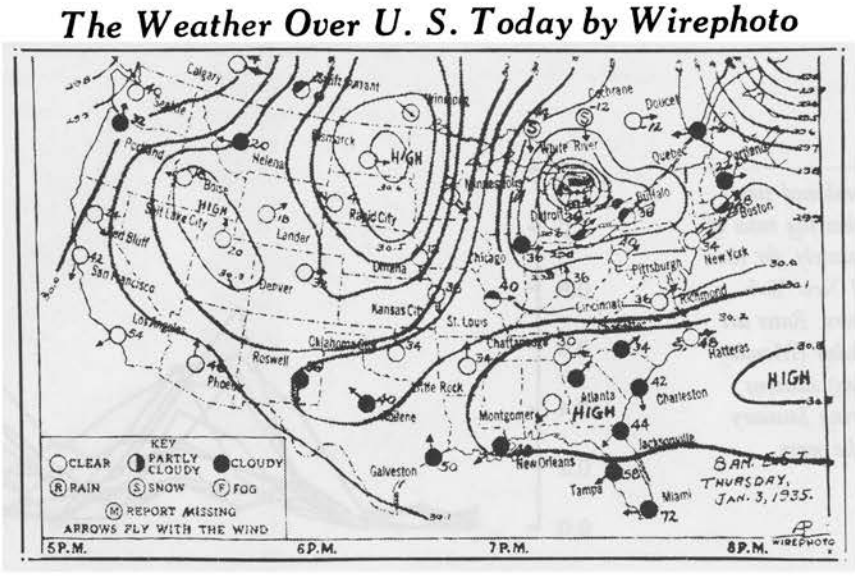

Figure 5. This wirephoto weather map in the 3 January 1935 edition of the ***Syracuse Herald*** *was printed as a halftone photograph, not as a line drawing. Reprinted by permission of the Associated Press.*

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develop a leased-wire facsimile system, and the result was the Wirephoto network, which "moved" its first photos out of the AP's New York headquarters on New Year's Day, 1935.[10] Its early offerings included twice-daily national weather maps redrawn at the AP's Washington, DC offices from maps obtained from the U.S. Weather Bureau.

The *Syracuse Herald* was one of the thirty-nine original Wirephoto customers when the network opened on 1 January 1935.[11] With a resolution of 100 lines per inch (39 lines per cm), the Wirephoto network transmitted the 880,000 picture elements of a typical photo in about eight minutes. Early Wirephoto maps were often engraved as halftones and printed with a grayish background and fuzzy lettering and linework (fig. 5). Their principal advantage was timeliness, and in 1935, the *Herald* used Wirephoto maps to illustrate such breaking news stories as the SS *Havana* hitting a reef 60 miles (100 km) east of Florida (7 January) and severe flooding in northwestern Mississippi (26 January). In addition to daily weather maps, the *Herald* used five Wirephoto maps during the first month of the network's operation.

In the late 1930s, a few years behind the establishment of the AP Wirephoto network, electronic facsimile provided a useful long-distance link for the timely transmission of news photos. Several news picture syndicates, including the Scripps-Howard chain's Acme Newspictures, William Randolph Hearst's International News Photo, and the New York Times's Wide World Photo, were offering a limited facsimile service.[12] In addition, news picture syndicates principally supplying smaller newspapers served as regional distribution centers, receiving news photos by wire and redistributing them by rail as mats to subscribing newspapers within several hundred miles.[13] From New York the Newspaper Enterprise Association (NEA) picture syndicate distributed mats for Acme Telephoto, and from Cleveland the Central Press, an affiliate

10. "(AP)," *Fortune* 15 (February 1937): 88–93, 148–62.

11. "A.P. Wirephotos Flash across Nation," *Editor and Publisher* 67 (5 January 1935): 7.

12. "News Pictures by Wire," *Electronics* 10 (November 1937): 12–17, 82–83.

13. Stanley E. Kalish and Clifton C. Edom, *Picture Editing* (New York: Rinehart and Co., 1951), 65–69.

of Hearst's King Features syndicate, disseminated mats for International News Photos. In the 1930s and 1940s, several of the twelve central New York newspapers studied ran photographs labeled "CP Phonephotos" or "CP Soundphotos," so called because standard long-distance telephone circuits carried the images to Central Press's Cleveland offices as acoustic signals. Trans-Atlantic images were labeled "CP Cablephotos."

The Central Press also provided maps as well as news pictures to a number of central New York dailies. The New York Central Railroad, over which frequent express passenger trains covered the 331 miles (533 km) from Cleveland to Syracuse in five to seven hours, was an important link in the Central Press distribution network. Although the Central Press used facsimile transmission for photos from Europe and the West Coast, maps such as the oblique azimuthal view in Figure 6 reveal none of the graphic degradation of photo facsimile transmission and appear to have been delivered largely by rail or, possibly, by air. In contrast, the grayish backgrounds of other maps distributed as halftones by the Central Press suggest that their artwork had been received in Cleveland over the photowire from International News Photos.

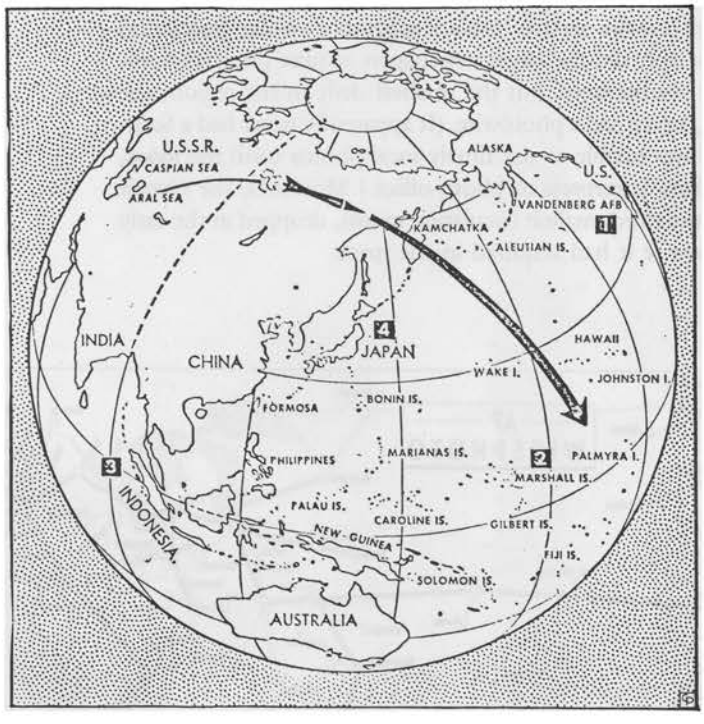

Figure 6. This Central Press map showing the planned 8,000-mile (13,000-km) test flight of a Soviet missile appeared in the ***Norwich Evening Sun*** *on 21 January 1960. Numbers on the map show (1) Vandenberg Air Force Base, from which the United States launched its own test missiles; (2) the Marshall Islands, a U.S. territory near the impact area chosen by the Soviets; (3) Indonesia, which Khrushchev was to visit shortly; and (4) Japan, which protested the missile test. Reprinted by permission of the* ***Norwich Evening Sun.***

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There was a prominent period of photowire expansion during the late 1950s and 1960s, especially among small- and medium-sized newspapers. In 1941, six years after its initiation in 1935, AP Wirephoto service reached only 106 newspapers—less than 6 percent of the nation's dailies and a small minority of the cooperative's member newspapers. Fifty-five newspapers in twenty-nine cities received their Wirephotos directly, over dedicated, leased wires, and another 51 newspapers received an "alternative service," on demand through long-distance telephone circuits. In 1940, Syracuse still was the only city in central New York with direct Wirephoto service (fig. 7). For two decades, the *Syracuse Herald,* which was merged with another local newspaper in 1939 to become the *Herald-Journal,* was the only central New York daily with AP Wirephotos. In the late 1940s, its afternoon counterpart in Utica, the *Observer-Dispatch,* acquired a direct photowire link with Acme Newspictures, whose network included newspapers in Rochester and Binghamton, New York, and in a number of other large- and medium-sized cities in the Northeast.[14] UPI's Telephoto service emerged as a significant second competitor to AP Wirephoto in 1958, when the International News Service merged with the United Press, which had bought Acme in 1952. Not until the 1950s—and in some cases the 1960s or early 1970s—did other daily newspapers in central New York obtain direct photowire service. Table 2 suggests a strong association with circulation: not only did the larger newspapers acquire photowire service earlier than the smaller ones, but the smallest daily in the region, the *Norwich Evening Sun,* never had a photowire. (It apparently never had a Scan-A-Graver either and was unable to use timely local photos until the 1960s, when it converted from letterpress to photo-offset.) Moreover, the *Oneida Daily Dispatch,* with the third smallest circulation in 1985, dropped in the early 1980s the UPI photowire it had acquired in the 1970s.

14. A map of the "Acme Telephoto Network," dated "11-20-48," appears in Acme's promotional booklet *The Story of Acme Telephotos* (New York: Acme Newspictures, n.d.).

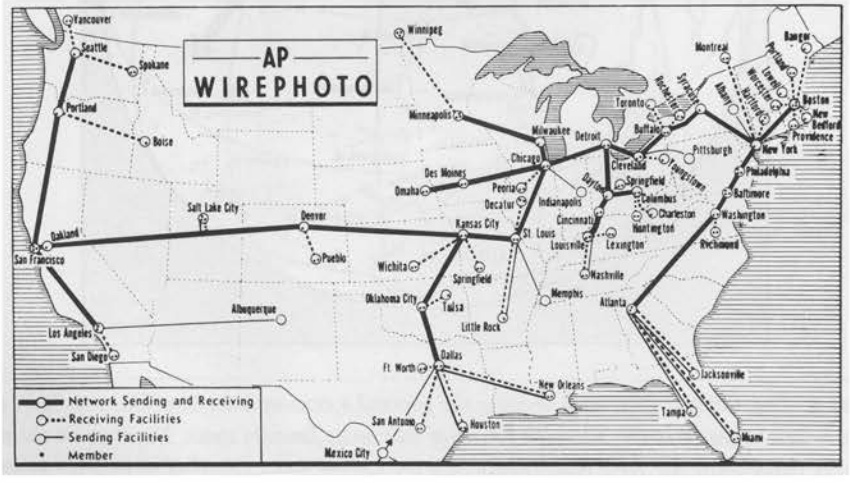

Figure 7. Map of the AP Wirephoto network in late 1940. Source: ***Editor and Publisher*** *74 (4 January 1941): 9. Reprinted by permission of the Associated Press and* ***Editor and Publisher.***

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Figure 8, a graph portraying temporal trends in the proportion of news maps from a syndicate or wire service, demonstrates the continued but declining importance of centrally produced cartographic art among smaller newspapers. Early in the decade, when news maps were rare, the small amount of cartographic material used by central New York dailies tended to be either all from a syndicate or all from local sources. In recent decades, when most newspapers had both photowire service and their own photoengraving facility, a mixed strategy was more common. The Syracuse newspapers, which have had an art department since early in the century, have generated many of their own maps in recent decades. The *Watertown Daily Times,* which has had a staff artist since 1983, registered not only the highest rate of map use for 1985—an average of over one map per day—but also produced all but 38 percent of the maps it published. Many of the maps used by the Watertown daily during January and July of 1985 to illustrate national and foreign news were redrawn to the newspaper's own style and size requirements from maps received over the AP photowire.

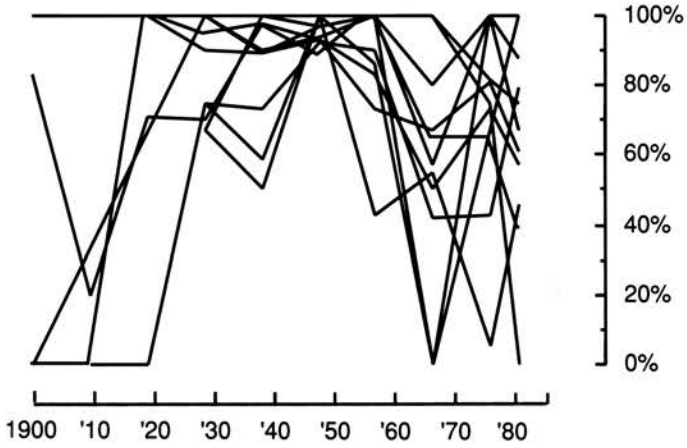

Figure 8. Time-series graph of the percentages of non-weather mapped articles from a news syndicate, wire service, or other external source, separately, for twelve central New York daily newspapers.

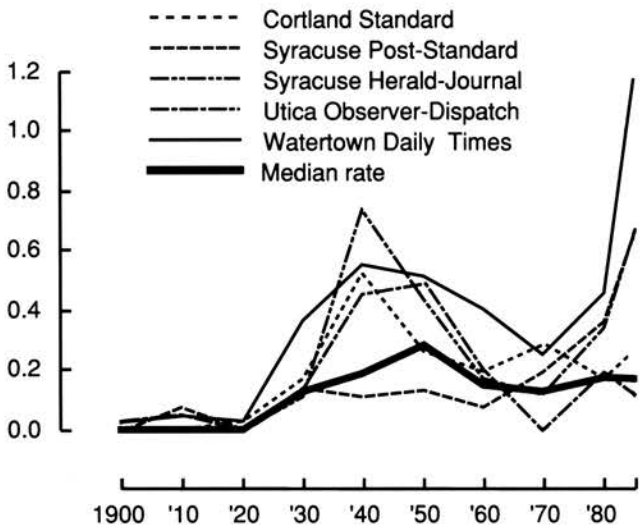

Figure 9. Time-series graph showing the average daily rate of mapped articles for five central New York daily newspapers and the yearly median rate for all twelve newspapers in the sample. Rates reflect weekday (Monday through Friday) editions only, sampled during January and July.

Yet the most prominent aspect of Figure 8 is the wide variety of practice among small- and medium-sized newspapers. Figure 4, a similar composite of individual trends in the rate of map use, also demonstrates wide variation. Although some newspapers, notably those in Syracuse and Watertown, had increased their use of maps in the 1970s and 1980s, the samples for five of the twelve central New York dailies contain fewer mapped articles for 1985 than for 1960. Figure 9 illustrates several idiosyncrasies in the sample, particularly among the larger newspapers. Kept low early in the century by the region's smaller dailies, the median first rose above zero in 1930 and attained a high of more than a map every four days for 1950, only to fall to a lower level for 1960 and subsequent years. Although the Syracuse newspapers reflect some of this pattern, these two largest dailies differ markedly from the regional median, and on occasion from each other. For instance, the *Post-Standard* used fewer maps than average in 1940, 1950, and 1960, while the *Herald-Journal* registered rates well above average for 1940 and 1950. In a sharp departure from the median, both newspapers increased their use of maps substantially between 1980 and 1985. Even more atypical is the *Watertown Daily Times,* which appreciated maps at least as early as 1930 and increased its rate to an average of over one map per day in 1985. Utica's afternoon *Observer-Dispatch,* the region's fourth largest daily, had higher than average rates for 1940 and 1950 but lower rates thereafter. In contrast, the *Cortland Standard,* one of the area's smaller dailies, had rates generally well above the regional median for most of the period.

Temporal trends since 1930 reflect more than the acquisition of photoengraving equipment and a photowire. World War II and the Korean War account for generally high rates for 1940 and 1950, respectively. Because the United States was heavily involved in the Korean conflict in 1950 but had not officially entered World War II in 1940, higher rates for 1950 are not surprising. Indeed, for a few weeks in July 1950, several newspapers carried almost daily a cartographic account of the advance of the Red Army against United Nations forces. Maps such as Figure 10 were updated daily and played the serious role of military scoreboard. In contrast, the Vietnam War of the late 1960s and early 1970s was not fought along well-defined fronts and never received as intense and dramatic a cartographic treatment as earlier wars.

NEWSPAPER DESIGN, MICROCOMPUTERS, AND SATELLITE TRANSMISSION

Another impetus for a greater use of maps, at least among the region's larger newspapers, was the revolution in newspaper design that swept the industry in the 1970s and 1980s.[15] Spurred by the need to make newspapers more attractive to readers and less vulnerable to a new, competing medium—television—the newspaper design movement called for better-organized, "sectionalized" newspapers, with "designed" pages that were both visually appealing and easy to read, and with a generous use of color and decorative artwork. Concern for readability and visual appeal led to a fuller use of maps, which served to signal the location and theme of a story as well as provide a visually efficient structure for articles with a strong spatial element.[16] Medium-sized dailies with their own art department and a larger "news hole" to fill had a greater need for maps and greater resources to meet that need. Whereas the smaller newspapers in the sample obviously have lagged well

15. Gerald C. Stone, John C. Schweitzer, and David H. Weaver, "Adoption of Modern Newspaper Design," *Journalism Quarterly* 55 (Winter 1978): 761–66; William C. Sexton, "The Explosion in Graphics," *Bulletin of the American Society of Newspaper Editors,* no. 547 (January 1971): 16–22; Lenora Williamson, "Management and Staff Must Care," *Editor and Publisher* 119 (7 June 1986): 18–19, 41.

16. For examples of enthusiasm for news maps among newspaper designers: Edmund C. Arnold, "Map Out Future Use of Expository Art," *Publishers' Auxiliary* 121 (22 April 1985): 5; Mario R. Garcia and Lynn Price, "The Front Page: Flexing to Fit the Big News," *Washington Journalism Review* 6 (March 1984): 40–45; Howard S. Shapiro, "Giving a Graphic Example: The Increased Use of Charts and Maps," *Nieman Reports* 36 (Spring 1982): 4–7.

Figure 10. This AP map, used on the front page of the ***Syracuse Herald-Journal*** *for 7 July 1950, illustrates the dramatic cartographic treatment accorded the Korean War. Dark arrows indicate major drives by North Korean forces, and the box shows a defense zone where U.S. forces were digging in. Reprinted by permission of the Associated Press.*

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behind the Syracuse newspapers and the *Watertown Daily Times,* these medium-sized dailies in turn have lagged behind such larger, nationally prominent newspapers as the *New York Times* and the *Washington Post,* which have used maps abundantly at least since the mid-1970s.[17]

Another stimulus for a richer, more frequent journalistic cartography is modern electronic technology, especially in the form of computers, computer graphics systems, laser printers, and satellite communications. The effect of advanced technology in promoting news maps has been both direct and indirect: direct in the case of computer graphics, for instance, and indirect through the influence and example of *USA Today,* a colorful, carefully organized national daily prepared in northern Virginia and sent by satellite to numerous printing sites throughout the United States.[18]

But the single most important recent technological influence for a wider use of journalistic cartography has been the Apple Macintosh microcomputer and Apple's moderately high resolution laser printer, the LaserWriter.[19] For less than $10,000, a newspaper could equip its art or news department with a graphics workstation useful not only for preparing maps and graphs to illustrate local news but also for receiving, through a modem, electronically encoded artwork from the AP, the Knight-Ridder Graphics Network, or, at newspapers belonging to the Gannett group, another Gannett affiliate.[20] Using a dial-in "computer bulletin board," Knight-Ridder customers could "down load" graphics over long-distance telephone wires.[21] The AP employed a similar system for its AP Access service, established in early 1987, but later that year it began sending graphics by satellite directly and automatically to member newspapers.[22] Transmission time dropped from eight

17. Mark Monmonier, "The Rise of Map Use by Elite Newspapers in England, Canada, and the United States," *Imago Mundi* 38 (1986): 46–60.

18. On *USA Today* and its influence on newspaper design: Richard A. Curtis, "Doing Graphics for Your Readers," *Proceedings of the American Society of Newspaper Editors,* 1983 Convention, 291–302; George Garneau, "Color Quality Control: How It's Done at *USA Today*," *Editor and Publisher* 118 (19 January 1985): 11, 22–23; Philip C. Geraci, "Comparison of Graphic Design and Illustration Use in Three Washington, D.C. Newspapers," *Newspaper Research Journal* 5 (Winter 1983): 29–39.

19. On the use of the Apple Macintosh at newspapers: Stuart Silverstone, "Newspapers Turn to Mac's Graphics," *Computer Graphics World* 10 (May 1987): 81–86; Stuart Silverstone and Craig L. Webb, "Many Newspapers, Small and Large, Turn to 'The Mac,'" *Presstime* 8 (April 1986): 23–26.

minutes to one minute, the member paper could customize the map to suit its own style guidelines and the space available, and "wire service" maps no longer were shackled to a transmission system designed for photographic images rather than line drawings.

Newsrooms and art departments responding enthusiastically to the Macintosh also increased their use of locally produced news maps. Figure 11, which compares rates of map use for 1985 and 1987 among the five newspapers shown in Figure 9, reveals how dramatic that increase often was. Map use changed little for the two newspapers that had not yet adopted the Macintosh: in both years the *Cortland Standard* used few news maps and the *Watertown Daily Times* used maps frequently. In contrast, the three papers using a Macintosh in 1987 had increased markedly their use of cartographic illustrations, over one-half of which now were composed on the Macintosh. Having a staff artist or art department was also important, as demonstrated by the *Utica Observer-Dispatch,* which had hired a staff artist between 1985 and 1987, and increased its use of maps by over 500 percent. The low proportion of Macintosh maps for 1987 reflects the Utica paper's more recent acquisition of a microcomputer: its artist was using the Macintosh in July 1987 but not in January.

As earlier news maps reflect their artists' tools and the method of reproduction, Macintosh graphics carry the imprint of computer software—in this case MacDraw or its popular competitor, Cricket Draw.[23] Figure 12 illustrates several characteristics of Macintosh cartography of the mid-1980s: gray lines generated without recourse to reproduction separates and photographic screening; drop shadows produced almost effortlessly by duplicating, shifting, and darkening a group of symbols; and rigidly horizontal or vertical labels, even for diagonally oriented or curvilinear features. After improved software inevitably permits more flexible lettering and after newspaper artists lose much of their faddish enthusiasm for superfluous drop shadows, the microcomputer will have revolutionized journalistic cartography by promoting inexpensive,

20. On the reception of the Apple Macintosh by newspaper graphics networks: Louis Mintz, "Graphics Networks," *Presstime* 8 (September 1986): 12–14.

21. "Knight-Ridder Launches Computer Graphics Network," *Editor and Publisher* 118 (7 September 1985): 30.

22. George Garneau, "Improving Wire Service Graphics," *Editor and Publisher* 120 (21 March 1987): 44; "AP Will Also Be Delivering News Graphics Faster," *Editor and Publisher* 120 (6 June 1987): 126.

23. For discussion of the use of MacDraw and Cricket Draw for producing newspaper graphics: Steve Segal, *Graphically Sound and Factually Fit: A Newspaper Guide to Information Graphics on the Apple Macintosh* (Lawrence, MA: Eagle-Tribune Printing, 1987).

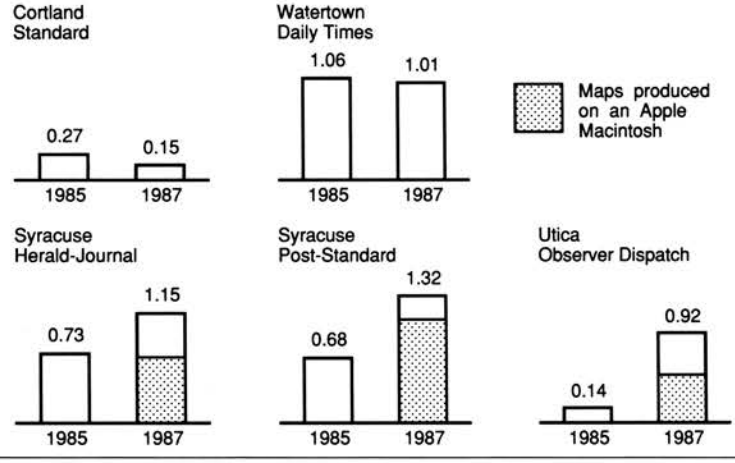

Figure 11. Graphs comparing nonweather mapped articles for five central New York daily newspapers, for January and July, 1985 and 1987. Average daily rates of map use cover the period Monday through Saturday, shared by all five dailies. For the three newspapers using a microcomputer and laser printer in the later year, shading shows proportion of the 1987 sample produced with a Macintosh.

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aesthetically pleasing, easily revised and updated maps composed by reporters and editors as well as by artists. Although readily exploited to create sloppy or seriously distorted drawings, the microcomputer nonetheless offers a great opportunity for news maps that are both abundant and journalistically relevant.

Figure 12 illustrates another change promoted by microcomputer graphics systems—an increased use of supplementary illustrations that in some cases merely decorate the map but in others explain the phenomenon portrayed and thus make the map more meaningful to the reader. This Knight-Ridder graphic depicting the Iraqi attack on the USS *Stark* provides two spatial facts: where the missile hit the ship and where in the Persian Gulf the attack occurred. Additional data about the ship lead the reader to perceive correctly that the *Stark* was a major warship, longer than a football field and with a crew of over 200 sailors. By making the map more interesting, these details attract to the entire graphic the casual reader not interested in the locational facts of the story. Such supplementary information can also encourage use of a map by a news editor or layout editor who might otherwise prefer either no illustration or the photograph of an enraged politician.

EVENT-DRIVEN OR TECHNOLOGY-DRIVEN?

Is the increased use of news maps primarily a response to a technology that makes timely maps readily available at comparatively low cost, or a response to a deeper, heretofore unsatisfied need in the news industry for cartographic illustration? Does an improved ability to create news maps explain their increased use more than the occurrence of news events—local, national, or international—that are far better explained with maps than without them?

Figure 12. News map produced on a Macintosh microcomputer with the MacDraw program illustrates the high graphic quality of centrally produced maps and information graphics that could be sent rapidly over long-distance telephone lines. Courtesy of the Knight-Ridder Graphics Network.

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Any study of the development and impact of new technology inevitably raises such questions about the relative importance of "technology-push" and "demand-pull."[24] These questions have added significance for the present study, in which the calculated rates of map use might reflect the chance occurrence of events with an extraordinarily prominent geographic dimension during January and July of the years sampled.

24. See, for example, Giovanni Dosi, *Technical Change and Industrial Transformation* (New York: St. Martin's Press, 1984), 7–22.

News events themselves can be an important incentive for journalistic cartography, and some types of news events seem to have called for a more frequent and widespread use of maps than others. Most prominent in Figures 4 and 9, for example, is a marked increase in the use of news maps between the samples for 1930 and 1940, when the events of World War II had become the dominant visual focus of the day's news. Although only the *Syracuse Herald-Journal* had direct photowire service in 1940, maps often accompanied syndicated weekly news summaries and feature stories about the war. Because several newspapers without photowire service used news maps supplied by a syndicate, the advent of AP Wirephoto service in 1935 explains little of the increase from 1930 to 1940. Yet in 1970, when all but two of the twelve newspapers belonged to a photowire network, technology was providing many more maps than central New York's editors were willing to use. Events of January and July 1970, Vietnam included, did not persuade editors to use as many maps as did the mix of news events two and three decades earlier. Photowire technology alone clearly was less important an inducement for journalistic cartography than the computer graphics technology of the 1980s.

How event-driven, then, was journalistic cartography in the mid-1980s? Were most mapped events recognized as geographically significant by many of the region's newspapers, or were editors idiosyncratic in their decisions to employ news maps? A comparison of the twelve dailies suggests little similarity: of the ninety-six separate nonlocal news stories accorded a map by any paper during January and July 1985, only twenty-four (a mere 25 percent) were illustrated cartographically by more than one newspaper.[25] And agreement was not high: only two newspapers used a map for slightly over one-half (thirteen) of these twenty-four stories, and only three employed a map for another one-quarter (six). Most frequently mapped—by seven newspapers—was the 2 January crash in Bolivia of an Eastern Airlines jet; the event was serious, with twenty-nine presumed dead, and no photographs were yet available as illustrations of wreckage, victims, or rescuers. Six papers used a map with a story about a Soviet missile that went astray, crossed Norway, and crashed in Finland; five papers displayed a map for a train wreck believed to have killed 392 people in Ethiopia; and four used a map in their coverage of a successful Ugandan army coup. Agreement seemed highest for sensational events in remote, little-known areas, not easily accessible to photographers. Yet the seventy-two other nonlocal events illustrated cartographically by only one paper suggest that few mappable events demand maps in the regional press. Demand for news maps among editors is more unique than common and seems more likely to arise from a perceived need for an illustration to balance visually the layout of a particular page than from a shared recognition of cartographic imperatives.

25. These tabulations exclude travel stories and other nontimely news features.

Institutional factors are important as well, for map use clearly is highest among newspapers with staff artists. In 1987, for instance, the newspapers in Syracuse, Utica, and Watertown used far more maps than those without an

artist, and sharp increases in the rate of map use between 1980 and 1985 for the *Watertown Daily Times* and between 1985 and 1987 for the Utica dailies reflect the hiring of an artist. Moreover, high map use also is comparatively regular map use, but not so regular and frequent as to suggest conscious or unconscious quotas (fig. 13). Indeed, artists at small- and medium-sized newspapers have a variety of other duties, which can include page layout, illustration, and drawing statistical charts and other explanatory graphics. At newspapers with a new Macintosh graphics system, the art staff might devote considerable time to learning how to use the software and to developing a local cartographic database. Furthermore, an artist might produce maps for feature articles days or weeks ahead of their publication, especially at newspapers with a Sunday edition or a special weekly section focused on regional tourism and recreation. During the summer of 1987, for instance, the *Watertown Daily Times* regularly used several maps in its "Summer Fun" section, published on Thursdays. Although hiring an artist and adopting microcomputer graphics raise the newspaper's ability to illustrate the geographic facts of local news, the patterns of map use in Figure 13 suggest that having this capacity is no more an imperative for using maps daily than having a photowire or subscribing to a graphics service. Technology and personnel enable editors to use more maps each week and each month, but on a day-to-day basis journalistic cartography remains largely event-driven.

TECHNOLOGY, EDITORIAL ATTITUDES, AND INDUSTRY EXEMPLARS

What factors, then, account for management decisions to hire graphics specialists and invest in computer graphics? Although both foreign and domestic travel has increased significantly in the past decade or so and the United States has become firmly tied to the global economy, the present mix of foreign, national, and local news events is not markedly more geographically demanding. Because a change in news events alone cannot account for recent increases in the use of news maps, a suitable explanation might be sought in the interaction of two factors deeply affecting the news industry—technology and a fuller appreciation of information graphics.

The role of technology in promoting journalistic cartography becomes clearer when adoption of microcomputer graphics is seen as yet another step in a wave of technological innovations in newspaper publishing.[26] Some advances have been largely electronic. The two most prominent examples are the shift from hot-metal typesetting to computer-generated "cold-type" and the related adoption of computerized editorial front-end systems, which have replaced typewriters with visual display units (VDUs) and eliminated the need for typographers. Others have been only marginally electronic, as in the shift from letterpress to photo-offset printing and the increased use of color. Photo-offset printing allowed almost instant reproduction of any line drawing, including maps, but because offset provided outstanding reproduction for local and wire photos, the artwork used in smaller newspapers tilted toward photography. Letterflex printing was a somewhat similar boon to intermediate-sized dailies, such as the Syracuse papers, which could defer a full and expensive conversion to offset printing yet reap the advantages of rapid, less expensive reproduction of artwork, photos, and page layouts. Not as good as offset in reproducing photographs, Letterflex did allow the use of spot

26. For an overview of technological changes affecting the newspaper industry: Phillip Ritzenberg, "The Coming Effects of Technology," *Design, The Journal of the Society of Newspaper Design*, no. 3 (September 1980): 8–9; Anthony Smith, *Goodbye Gutenberg: The Newspaper Revolution of the 1980s* (New York: Oxford University Press, 1980).

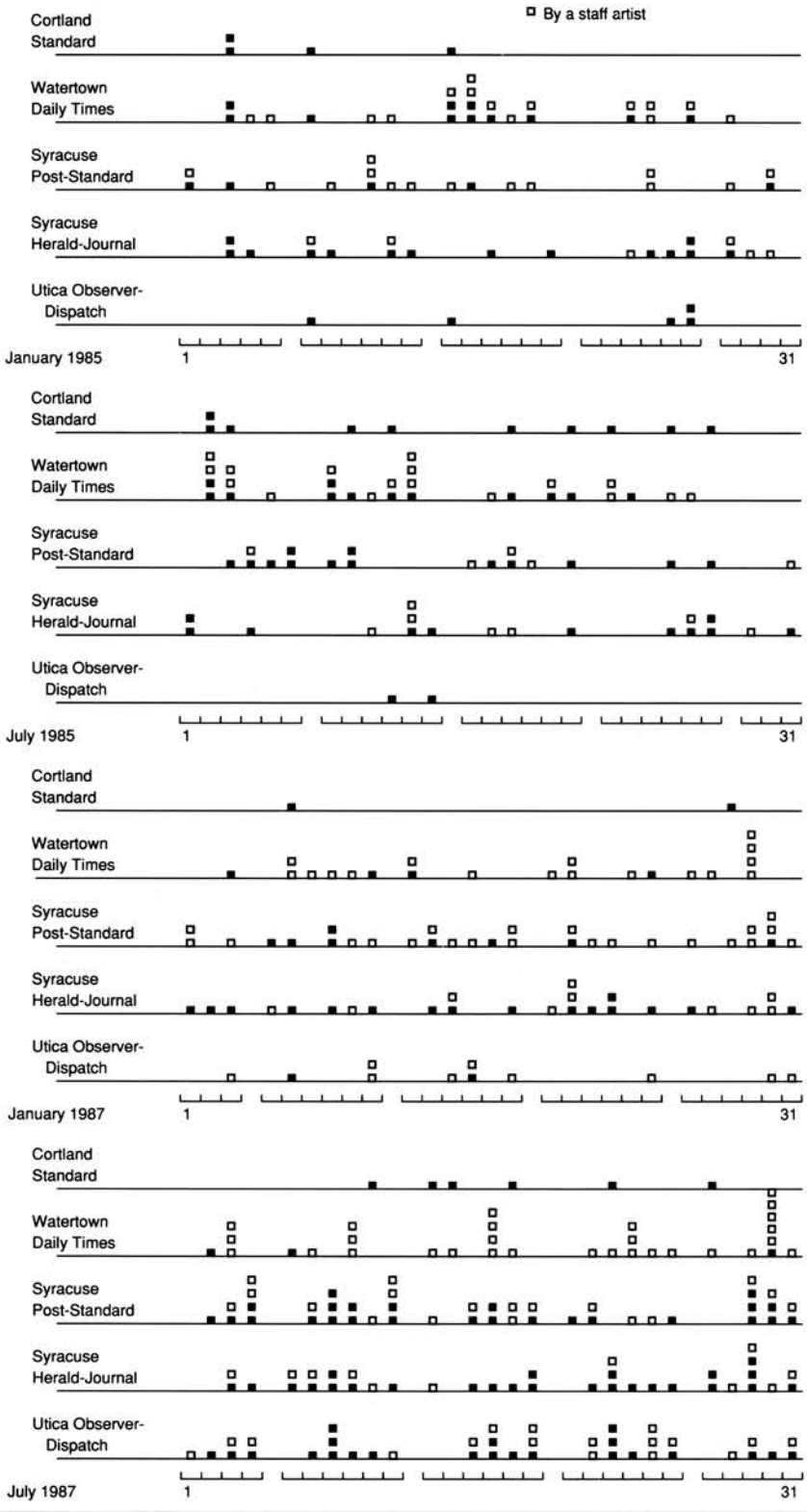

Figure 13. Time-series graphs depict the day-to-day pattern of map use by five daily newspapers throughout January and July for 1985 and 1987. Open boxes represent maps drawn by a newspaper employee.

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color on line art—an attraction discovered earlier at offset papers, at which spot color already paid for by an advertiser could be used for maps. Having successfully used technology to contain rising production costs, large, medium-sized, and even small newspaper publishers quite naturally accepted relatively low-cost, menu-driven Macintosh workstations. Moreover, for those with color presses, the map has proven a more manageable vehicle than the photograph for using color on the front page.

Of no less importance, though, has been a revolutionary change in publishers' and editors' attitudes toward page layout, information graphics, and the organization and visual appearance of the newspaper. Little more than a decade ago, most editors could be described succinctly as "word people," intolerant or suspicious of pictures, which many considered irrelevant decorations or a regrettable waste of space.[27] In the late 1970s and 1980s, though, many influential journalists developed a more holistic attitude toward news presentation, including a recognition and respect for the role of graphics and photojournalism.[28] Moreover, as many newspapers created the position of "graphics editor," information graphics attained an identity distinct from both decorative illustration and photojournalism.[29] Discussion of the use of maps and information graphics at meetings of journalists and managers, in the trade press, and in textbooks on newspaper design made editors and publishers, even at small newspapers, more aware of the contribution maps might make to both explanation and page design.

In adopting a new standard for an effective newspaper, the news industry underwent what historian of science Thomas Kuhn called an *exemplar shift,* a change in accepted model problem-solutions.[30] Evidence of this shift can be found in any good reference library or large municipal library, where back issues on microfilm permit a comparison of contemporary newspapers with those of the 1950s or 1960s, for example. As occurs in science, success of a novel competing problem-solution led to dismay and introspection in the print media, which was threatened in the 1950s and 1960s by the growth of television and a decline in newspaper reading.[31] As the number of television stations grew, many daily newspapers closed completely or merged with another local daily.[32] Two significantly different exemplars emerged, one represented by the *New York Times* and the other by *USA Today.*[33] Comprehensive coverage of major news stories, special sections with attractively designed front pages, and richly detailed explanatory graphics characterize the *New York Times* exemplar, whereas short articles, spectacular graphics, and a lavish use of carefully reproduced color are the most prominent traits of *USA Today*'s approach to news presentation. Both newspapers use news maps frequently, to locate unfamiliar places and to describe spatially complex news events. These exemplars are not alone; the list of cartographically rich newspapers acclaimed for their content and design includes the *Washington Post,* the *St. Petersburg Times,* the *Christian Science Monitor,* the *Chicago Tribune,* and the *Los Angeles Times.*

Technology has operated both directly and circuitously to increase the use of maps in reporting and explaining the news. The succession of technologies promoting the use of inexpensive, centrally produced cartographic art by smaller newspapers extends from stereoplating and the railway to laser printing and the communications satellite. Technologies encouraging a fuller use of maps to illustrate local stories include photoelectric engraving and Macin-

27. George S. Crandall, "Now, as to the Matter of Newspaper Pictures," *Bulletin of the American Society of Newspaper Editors,* no. 86 (16 November 1934): 3–4; Harry Stapler, "Attitudes on Design," *Design, The Journal of the Society of Newspaper Design,* no. 3 (September 1980): 17–18.

28. For example: Mario R. Garcia, *Contemporary Newspaper Design: A Structural Approach,* 2d ed. (Englewood Cliffs, NJ: Prentice-Hall, 1987), 19–21; Eugene C. Patterson, "Newspapers' Bottom-Line Mentality Threatens Vigorous Journalism," *Presstime* 9 (July 1987): 49–50.

29. On the role of the graphics editor: Howard I. Finberg, "In the Beginning, Graphics Editors Were As Popular As OPEC," *Design, The Journal of the Society of Newspaper Design,* no. 17 (Fall 1984): 4–6.

30. T. S. Kuhn, *The Structure of Scientific Revolutions,* 2d ed., enl. (Chicago: University of Chicago Press, 1970), 186–87. For an example of the application of Kuhn's concept of the exemplar shift to the history of cartography: Anne Godlewska, "Curiosity and the French Mapping of Egypt and Algeria" (Presented at the Twelfth International Conference on the History of Cartography, Paris, 7–11 September 1987).

31. Newspaper readership is estimated to have declined from an average of twenty-eight minutes per day in 1966 to an average of only twenty-one minutes per day in 1976 (John P. Robinson, "Daily News Habits of the American Public," *ANPA News Research Center Studies* [American Newspaper Publishers Association], no. 15 [22 September 1987]: 5).

32. Between 1950 and 1957, the number of American homes with a television receiver rose from 3.1 to 41.0 million—an increase from 7 to 82 percent of all households. Between 1945 and 1960, the number of television stations operating in the U.S. increased from 6 to over 500, while between 1950 and 1980, the number of daily newspapers declined from 1,894 to 1,744. On the effects of television on newspapers: Leo Bogart, *The Age of Television,* 3d ed. (New York: Frederick Unger Publishing, 1972), 8–13, 149–61.

tosh computer graphics. But technology has had a number of equally important indirect effects, economic and attitudinal, many of which reflect the success of television broadcasting. Newspapers operating in large- and medium-sized cities without local print media competition can afford new technology, and newspapers threatened by television or a colorful national daily such as *USA Today* often respond with both carefully planned, more appealing packaging and a richer, more complete coverage of local news. Moreover, journalists who appreciate newspaper design and value graphics are replacing older, "word person" reporters, editors, and publishers. Attitudes change slowly, though, and the consensus that maps and charts are good has not yet led to a consensus on either map worthiness or the role of information graphics in the training of journalists and their day-to-day duties. Technology, which has fostered a closer integration of pictorial and verbal images, soon will encourage a much closer integration of graphing and writing. Whether attitudes and institutions change sufficiently to combine these roles will determine ultimately whether journalistic cartography attains its fullest potential.

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33. Richard Curtis (interviewed), "The Evolution of *USA Today*," *Design, The Journal of the Society of Newspaper Design*, no. 9 (Fall 1982): 5–12; Louis Silverstein, "The *New York Times*," *Design, The Journal of the Society of Newspaper Design*, no. 7 (September 1981): 4–5.