Strip format maps have been used as an aid in travel throughout recorded history. The evolution of this map format from Roman times to the present is examined with emphasis on the interaction of map form and function. Particular attention is given to the range in abstractness of strip maps when used with different travel modes or applied to different kinds of travel and the relationship of strip map popularity to restrictions on travel at various points in time. The use of strip maps as spatial process descriptions of the environment is also considered in relation to a variety of travel contexts.

The Evolution, Application and Implications of Strip Format Travel Maps

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INTRODUCTION

Strip format maps have been used as an aid in travel for centuries yet they have been given virtually no attention in the cartographic literature. The tendency of cartographers to want more information than is usually provided on a strip travel map may be responsible, however, the popularity of strip format maps as an aid to navigation from Roman times or before to the present suggests that their role in wayfinding deserves some attention. As a step toward understanding and evaluating strip map usefulness and implications, evolution of this unique form of travel map will be considered. Particular emphasis will be placed on the range in abstractness with which strip maps represent geographic reality, the contrast in kinds of geographic information provided by strip travel maps versus regional highway maps, and what strip map popularity at various points in history tells us about changes in attitudes toward or means for travel. In addition, attention will be given to the present role of strip format maps as a navigation aid, and the questions that should be asked to determine applicability of strip maps to spatial problem solving today.

Strip maps are not simply a subset of all travel maps. Numerous examples exist of strip format maps applied to non-navigational topics (e.g, representation of the Great Wall of China) (Meijer, 1955). It is to navigation, however, that the strip format is most often applied. Although strip maps have been used for coastal navigation and aeronautical charts, they are far more commonly used on land. The focus of the present paper, therefore, will be strip format maps applied to land travel.

Before proceeding further, it is necessary to develop a more formal definition of what is being refered to as a "strip format map". The term implies an elongated map, and many strip maps do have an elongated appearance. Map shape, however, is not sufficient to distinguish strip maps from other forms of cartographic representation. More important is a focus on a narrow band or strip of information. The strip format is best thought of as a continuum of map forms along which a central feature of interest (e.g., a transportation route) is represented with varying degrees of abstraction. The following characteristics, with each successive one generally incorporating those previous to it, represent increasing degrees of "stripness":

(a) linear form omitting geographic detail beyond a central corridor.
(b) orientation with a direction other than north at the top (with a non-cardinal direction being more indicative).
(c) total lack of concern with geographic orientation, oriented in an unconventional direction and no indication of cardinal directions.
(d) relaxation of planimetric accuracy (changes in scale and orientation within map segments to adapt to the linear format).
(e) strict linear representation of a central feature with little consistency of either scale or direction.

These characteristics, when applied to a travel map, result in a map that focuses a map user's attention on an individual route which is presented as a sequence of features and points of decision or intersection with other routes. This focus corresponds to a distinction between process and state description suggested by Downs and Stea (1977). Process descriptions emphasize the process of navigating from one location to another. This process is generally conceived of as a sequence of decision points and corresponding actions. State descriptions, on the other hand, address the overall spatial setting and place a route or several routes in the context of a commonly understood framework. A strip map, by its linear form and identification of key features along a route, is analogous to a verbal process description and will have similar advantages and disadvantages to this kind of

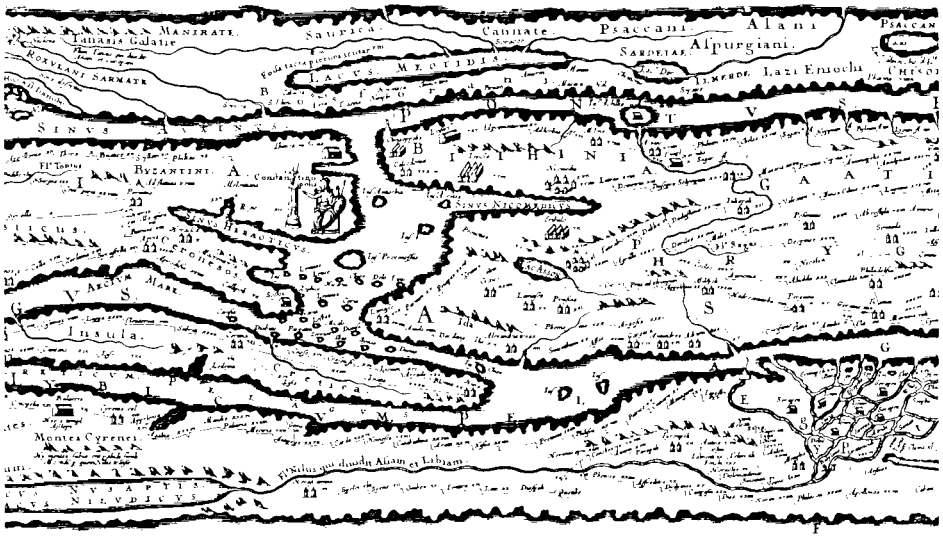

Figure 1. A section of the *Peutinger Table* showing the linear depiction of routes (Brown, 1977, p. 55 ff. Reproduced by permission of Little, Brown, and Company).

description. Specifically, process descriptions provide step by step instructions for following a previously defined route (e.g., go straight through two intersections, turn left at the first opportunity after passing the drug store, etc). The limitation of this aid to navigation is its inflexibility. Routes can not be planned through use of a process description and any change in route may be difficult or impossible to deal with.

In contrast to strip maps, regional highway maps or city street maps provide a state description of the environment. They have the advantage of flexibility lacking in strip maps. In contrast, however, the user must identify his or her own environmental cues for deciding how to progress through that environment. Because standard highway maps attempt to provide an integrated picture of a geographic region, state descriptions often do not contain all of the decision making cues contained in verbal process descriptions or found on strip maps.

Neither the strip form of representation nor a standard reference map are ideal for land navigation. Both have advantages and limitations that have resulted in continued application of both map forms throughout recorded history. Highway maps, railroad maps, and other state description travel maps have been examined from both a historical and contemporary perspective (e.g., Ristow, 1946; Modelski, 1975 and 1984; Nicholson, 1983). Far less is known about strip format travel maps in either context. As a step toward more complete knowledge of this map form, a description of their evolution, applications, and implications from Roman times to the present will be presented.

EARLY PERIOD

The earliest strip format map designed for land travel known to have survived to the present is the *Peutinger Table*. The only extant version of this map is believed to be an eleventh or twelfth century copy of a third century Roman map (Figure 1). Much of the information incorporated in the original was undoubtedly derived from Marcus Agrippa's detailed survey of Roman highways undertaken over a twenty year period in the first century B.C. (Dilke and Dilke, 1975). This survey included the placing of milestones along the route indicating a vast source of information about distances between locations along the routes.

The *Peutinger Table*, as the extant copy has come to be called after its sixteenth century discoverer Konrad Peutinger, consisted of twelve sections that when combined produced a strip map seven metres long and one third of a metre wide. The first section depicting Britain and the Iberian Penninsula has disappeared. Unlike most strip maps that have followed it, the *Peutinger Table* actually is a collection of many individual strip maps into a single elongated map. The map, or its component parts, typify the abstract form of the strip representation method. Roads are presented as relatively straight line segments with continually varying orientation to fit the dimensions of the maps. Scale also varies considerably throughout the map. In contrast to this apparent inaccuracy, distances between places written in along the route are relatively accurate. The map appears to be a carefully designed process description containing the sequence of important features and distances between them necessary for following a selected route. Included are locations of temples, lighthouses, spas, bathing facilities, imperial residences, and forts. In addition cities are represented in two categories, houses for small cities, and vignettes or medallions for the most important cities.

It is likely that the *Peutinger Table* was an outgrowth of earlier written descriptions or itineraries for individual routes. A written route description represents the classic example of a process versus a state description. Contents of the *Peutinger Table* provide much the same information that would be expected in such verbal process descriptions or itineraries.

That many other of the earliest strip maps were derived from such itineraries is clear. The pilgrimage of medieval Christians to Jerusalem resulted in a number of guidebooks containing verbal descriptions of the routes. Among the first to produce corresponding strip maps to accompany these pilgrim's guides was Matthew Paris, an English Monk who produced the *Chronica Majora* in 1259. This rather crude strip map depicted a complete route from London, through Italy and Sicily to Jerusalem (Figure 2) (Dilke and Dilke, 1975). Although the *Peutinger Table* or other versions of the same map existed at the time Paris was producing his own maps, it is considered unlikely that he made use of it in his own compilation.

The Chronica Majora differs from the *Peutinger Table* in concentrating on a single route rather than the multitude of highways shown on the latter. Paris' map is similar to the *Peutinger Table*, however, in representing routes as relatively straight parallel lines, having variable scale and orientation of routes, and including the details of features along the route that would be necessary for the traveller. In addition to the Chronica Majora, Paris is known to have made similar strip maps for shorter routes within England, including one for the route from Dover to Durham through St. Albans (Wilford, 1981). Although by current standards, the medieval travel maps produced by Paris and others are not highly accurate, they represented a sound cartographic solution to the problem at hand, travel along routes that were unknown to, or little travelled by, the map user. Together with the corresponding portolani (i.e., written coastal sailing guides) and portolan charts for coastal navigation, the strip format travel map was an initial step toward returning cartography to a focus on geographic reality in contrast to the focus on theological concepts that had prevailed for centuries.

A factor in choice of a strip format over other alternatives in both the *Peutinger Table* and pilgrimage maps is restricted access. Access to Europe by Roman armies was restricted due to the lack of roads. The only roads really suitable to moving their large armies and equipment were the ones they built. In the case of later pilgrimages to Jerusalem, travel was again largely restricted to this same road network. With a small set of roads, access to any potential destination was limited and there was little choice of routes. This effectively eliminated the route planning activity often associated with trips. The main function of the map became serving as a guide from origin to destination. It is not surprising, therefore, that process descriptions in the form of strip maps were created to meet this need. In the case of

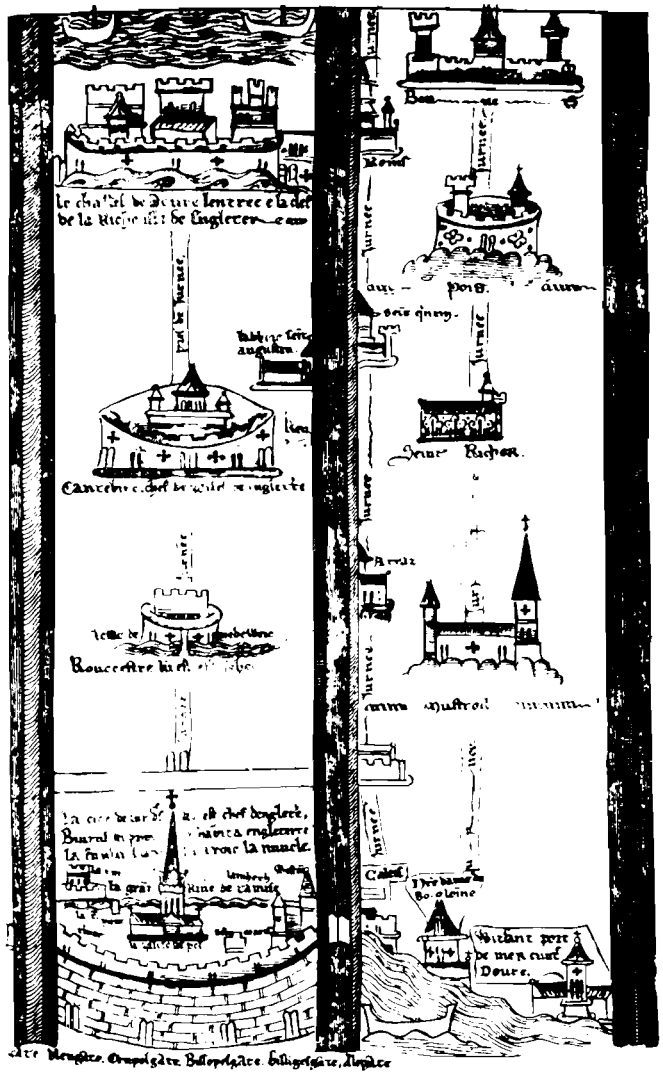

Figure 2. Section of the Map from London to Jerusalem produced by Matthew Paris (circa 1250) to guide pilgrims to Jerusalem (Brown, 1977, p. 102 ff. Reproduced by permission of Little, Brown, and Company).

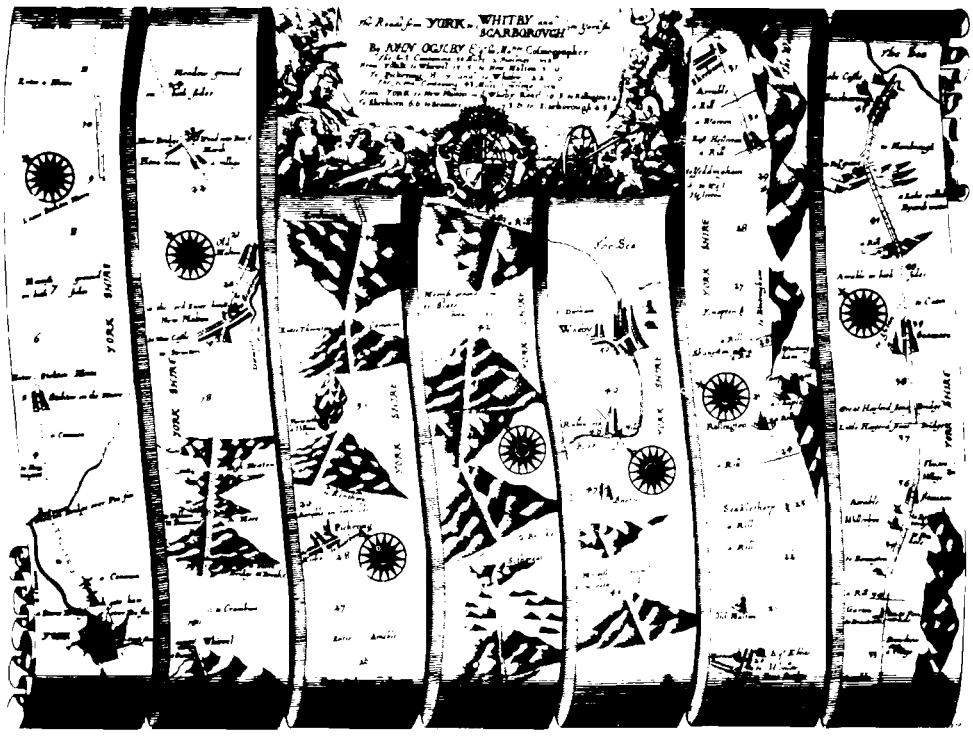

Figure 3. A page from Ogilby's *Britannia* depicting the Road from York to Scarborough (from the 1698 edition) (Booth, 1977, plate 18. Reproduced by permission of Cambridge House Books).

pilgrimage maps, the tendency toward process descriptions was further enhanced because maps were used for single purpose trips to a single destination.

The pattern of strip maps developing to meet the need for a process description can also be found with the evolution of maps for coastal travel. Early ocean navigation consisted primarily of trips along the coast. With the coast generally kept in sight, these trips would almost qualify as land rather than water navigation. As with the pilgrimages, coastal travel was usually single purpose (e.g., for trade) with a predetermined origin and destination. The route was restricted by the need to use landmarks on shore as guides. Again, a process description, rather than a state description of the travel area was needed. Initially the need was met by written descriptions of the coast (i.e., portolani). Gradually, however, these evolved to include profile drawings, and in some cases, strip format maps. This evolution was common to both Europe and Asia.

RENNAISANCE OF WESTERN CARTOGRAPHY

As Arthur Robinson has pointed out, the period of time following the Middle Ages was "revolutionary" in the way people conceived of geographic reality and represented it on maps (Robinson, 1976). There was a shift from a concern with representing theological conceptions of the world to representing geographic location accurately. This concern corresponded with the consolidation of nation states, the subsequent expansion and improvement of the road network, and the development of surveying equipment and methods. As Europe emerged from the Middle Ages, attention had shifted to exploration, navigation in the open ocean, and mapping the relatively unknown lands of the orient and the newly discovered lands in the new world. Few western examples of strip format travel maps seem to have been produced during this time, probably because linear process descriptions were not an appropriate solution to the cartographic problems at hand.

Actually, few maps of any kind produced from the end of the Middle Ages until about 1650 contained roads (Elias, 1982). Most of the roads available between the Middle Ages and the mid-seventeenth century were of poor quality. Travel, even on foot or horseback was difficult due to conditions on the unpaved roads. Wheeled travel was even more unpredictable. With attempts to improve roads beginning throughout western Europe in the early 17th century and the subsequent introduction of stage coach services in England and France in the 1640's, there was a growing interest in travel, road networks, and the inclusion of roads on maps.

During the later half of the 17th and first half of the 18th centuries, the French concentrated their mapping efforts on an ambitious plan to create a topographic map series of their entire country. In Great Britain, efforts to produce a national topographic map series were much slower getting under way. Emphasis was on mapping at a more local level and as an aid in travel around the country. Great Britain was on the verge of a significant increase in original cartographic activity as they finally began to break away from the influence of the major cartographic houses of the Netherlands (Lister, 1970). A series of post roads had been built radiating from London and there was a growing interest in travel. It was in this climate of interest in accurate mapping of physical and cultural features, together with an increase in the desire and ability to travel that John Ogilby resurrected the concept of strip format travel maps. With the development of a good system of post roads in Great Britain, Ogilby correctly anticipated a demand for an accurate series of travel maps with publication in 1675 of *Britannia*.

Britannia contained one hundred map sheets, each with several strip maps arranged vertically (Figure 3) (Booth, 1977). The beginning of a route section begins with the bottom of the left hand strip, proceeds to the top, then continues on the bottom of the next strip, and so on across the page. The strips are drawn in such a manner that they communicate an impression of being one continuous scroll. The map strips, themselves, have constantly varied orientation in relation to north so that their orientation on the page is consistently vertical.

To prepare the maps, all roads were carefully surveyed with distances between locations measured by a "perambulator" or measuring wheel (Lynam, 1945). These distances were indicated on the maps by use of numbered dots every furlong. An important decision in the survey and subsequent maps was use of the "statute" mile, rather than "local" miles which varied considerably from place to place. The maps contained a tremendous amount of detail that might be of interest to travellers, including streams, crossroads, bridges, and landmarks of various kinds (including gallows). The roads themselves, differ in line type to indicate whether or not they are fenced. Another unique feature of the maps is the representation of topography. Ogilby resorted to one of the earliest cartographic methods for terrain representation, oblique and profile hill diagrams. He improved on this representation technique by using size and orientation of the diagrams to indicate direction and steepness of slopes.

Van Eerde, in her bibliography of Ogilby, casts some doubt on Ogilby's role in the cartographic decisions incorporated in *Britannia* (VanEerde, 1976). It may be that his use of the "statute mile", or even the strip format, was suggested by one of the cartographers or engravers working for him. Even so, we can credit Ogilby's entrepreneurial skills with making the project a success and stimulating a period of popularity for strip format maps in Europe and later in the U.S.

Even without Ogilby's influence, however, it is likely that strip format travel maps would have seen a resurgence in 18th century Europe. They were simply the right kind of map for the times. As in the previously cited examples, strip maps were suitable at this time in Europe due to an increase in the ability and desire to travel combined with various restrictions on that travel.

Wheeled travel was increasing due to several factors (Elias, 1982). A general increase in trade and administrative activities that required travel was underway. In addition carriages were being improved with changes such as replacement of leather supports by steel springs. Postal administrators had a significant impact on travel behaviour through their introduction of lightweight carriages to convey passengers as well as mail. To these stimuli for travel were added some restrictions on route selection that made the process type description provided by strip format maps more suitable than the state descriptions of general highway maps. First there were a

limited set of post roads that could be travelled easily by carriage. In addition, potential origins and destinations were quite limited, with a significant proportion of trips being to or from London.

Strip format maps were so well suited to the situation in Great Britain during the 18th century that Ogilby's maps were copied directly, or used as a source of information and cartographic style, throughout the entire 18th century and into the 19th (Table 1). During this period in Great Britain, the strip format travel map retained the basic form developed by Ogilby. Changes that occurred were largely cosmetic, with an evolution to a slightly less ornamental format. The scroll-like appearance was gradually de-emphasized until, at the end of the century, strip maps produced had neatly ruled borders (Figure 4) (Booth, 1977). Ogilby's dots in the roads to indicate furlongs disappeared although milemakers erected by the local turnpike authorities were shown with each mile numbered consecutively. Ogilby's oblique hill drawings gradually disappeared, but were sometimes replaced with hachure symbolization to indicate relative slope of the route. In one of the few real attempts at variation in style, Laurie and Whittle in 1808 produced a strip-like map from Hyde Park corner to Salisbury that did not have a distinct border to the strip and included more detail of the connecting routes than was common on the Ogilby-like maps (Ghohm, 1972). This variation was apparently not a popular alternative judging from lack of subsequent editions of the map or other applications of this variation in format.

In spite of the frequent use of itineraries in other parts of Europe (particularly Italy), strip format road maps did not catch on as quickly elsewhere. This was probably due to less emphasis on road improvement and, at least in France, to a preoccupation with a comprehensive topographic mapping effort. By the 1760s, however, strip format maps similar to those in England began to appear. In France, the "Guides des Voyageurs" seem to have been quite popular, with those by Michel and Denos in 1764 and Denis in 1768 being the best known (Elias, 1981). Similar strip maps also were produced for Italy (e.g., Sassi in 1771 and Gravier in 1793) and Germany (e.g., Riedl in 1796). In the latter case, strip maps of post roads were first produced specifically for use of coachmen in following routes, an application where no route planning was needed and a map designed to aid the "process" of route following was clearly most appropriate. As a demand developed, these maps were issued for sale to travellers.

As roads in Scotland and Ireland were improved during the later part of the 18th century, strip maps were produced for these areas. Those by Taylor and Skinner

TABLE 1: REVISIONS OF OGILBY'S *BRITANNIA*

Date of first edition	Cartographer	Title
1719	Thomas Gardner	English Traveller
1719	John Senex	Actual Survey of all the Principal Roads of England and Wales
1720	Emanual Bowen	Britannia Depicta or Ogilby Improved
1790	John Cary	High Roads from London
1814	Edward Mogg	A Survey of the High Roads of England and Wales

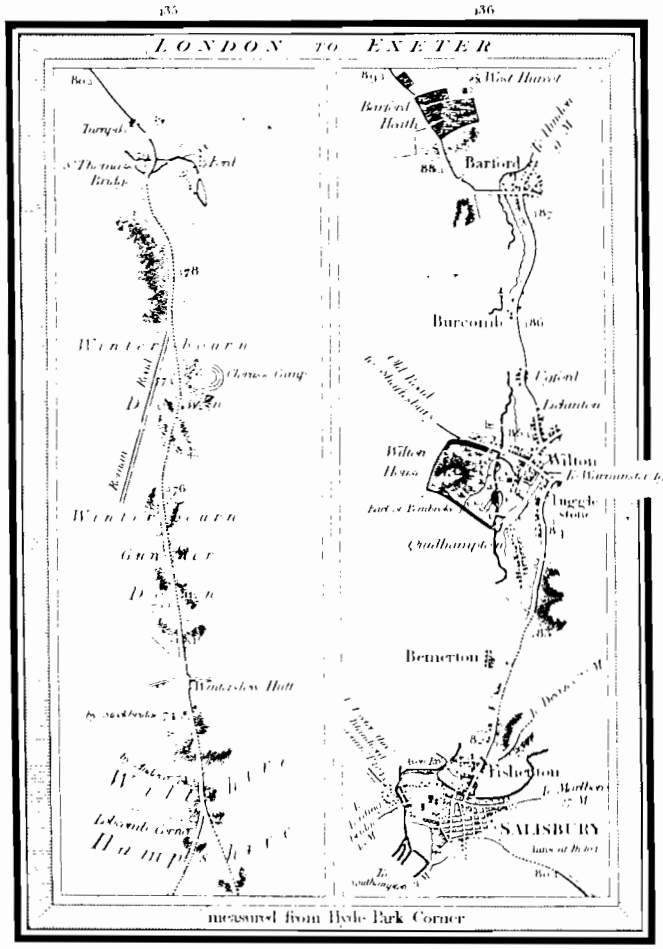

Figure 4. A page from Edward Mogg's "A Survey of the High Roads of England and Wales," 1814, depicting the road from London to Exeter (Booth, 1977, plate 43. Reproduced by permission of Cambridge House Books).

(for Scotland in 1785 and Ireland in 1778) are perhaps the best known because Taylor and Skinner were responsible for the first road surveys and maps of both countries (Fairclough, 1975). As with Ogilby's earlier series for England, however, these maps were widely reproduced in various forms for a number of years (e.g., Dodd's *Traveler's Directory Through Ireland* published in 1801).

In the United States, highway mapping of all kinds was slow to develop because of lack of a substantial road system. As early as 1762, however, at least one strip format map was produced. This manuscript map, of the road from Trenton to Amboy by G. Banker was based on a 1745 survey (Rice, 1981). The original plan for the survey was to print and sell the map. Insufficient subscriptions were obtained to carry the plan through, an indication that the desire and means to travel had not yet reached a level in America that would justify process type maps with their limited emphasis on route following. The manuscript copy of the original survey differed from Ogilby style maps in several ways. The route was shown as one long strip (14 1/2 by 38 inches), was oriented horizontally rather than vertically, and had straight ruled borders rather than the scroll-like borders that Ogilby used.

Other efforts to introduce the strip format map in America before the 19th century also appear to have been failures. A planned road atlas of South Carolina by

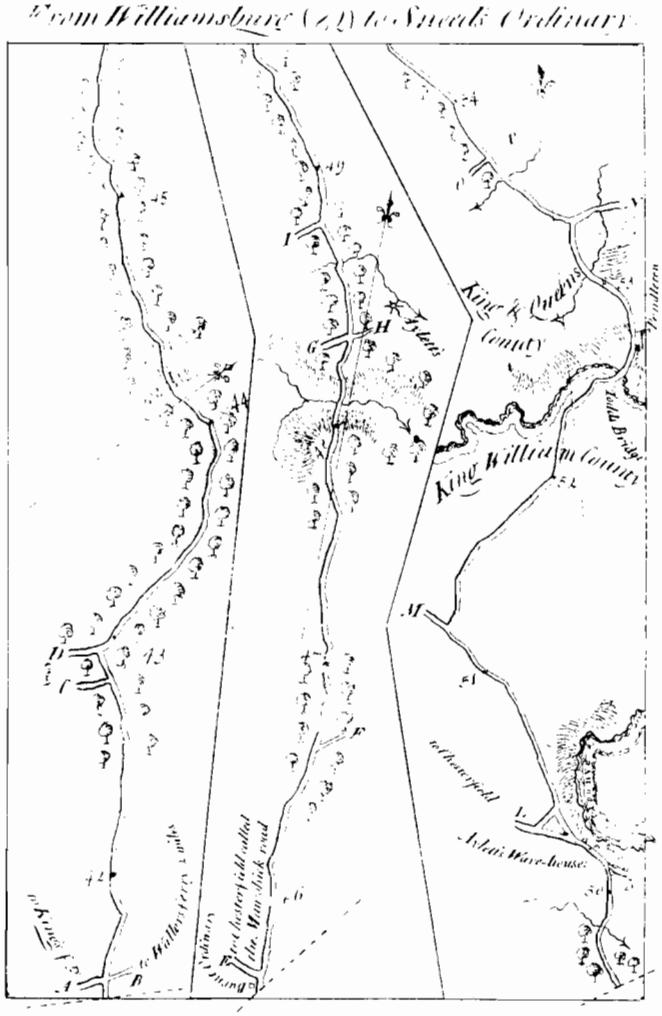

Figure 5. A page from Christopher Colles 1789 *Survey of the Roads of the United States of America* depicting the road from New York to Kingston (Ristow, 1961. Reproduced by permission of The Belknap Press of Harvard University).

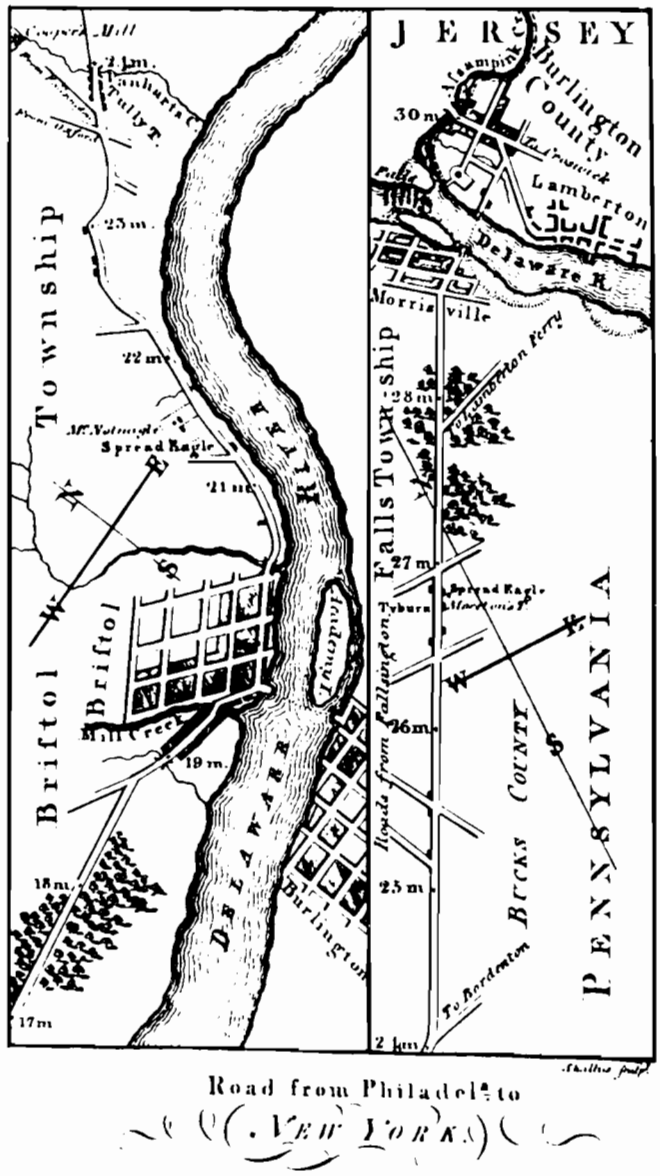

Figure 6. A page from Mathew Carey's 1804 *The Traveller's Companion* showing a section of the road between Philadelphia and New York.

Walker and Abernethie announced in 1787 yielded a single three-strip panel due to lack of subscriptions (Ristow, 1979). Christopher Colles had somewhat better success and produced 83 of 100 promised plates of his *Survey of the Roads of the United States of America* between 1789 and 1792 before his funds ran out (Figure 5) (Colles, 1961). These additional failures emphasize the geographic context within which the strip format is or is not appropriate. Three factors appear to be necessary for success:

1. an adequate route or set of routes for frequent travel.
2. the desire and ability to travel by a large group of people.
3. restrictions on travel, either in terms of a limited set of routes acceptable for the preferred mode of transportation, and/or a limited set of origins and destinations with emphasis on single purpose trips.

Prior to the 19th century in America, roads were poor and travel and commerce were oriented to the coast and ports rather than inland via roads. Inland carriage travel of the kind prevalent in England at the time was simply not common enough to support commercial production of travel guides of any kind. It was not until Mathew Carey's *The Traveller's Directory*, published in 1804, that an American road atlas was financially successful. Carey, in this guide, adopted a format with two strips per page. The style was similar to that developing in England at the same time, but even less ornamental with somewhat more detail surrounding the route (Figure 6).

THE ORIENTAL PERSPECTIVE

The use of strip maps to provide process descriptions, particularly for limited routes or single purpose trips, followed a similar evolution in oriental cartography to that described for western cartography. In the orient, however, the link between strip maps for coastal navigation and later strip maps of land routes is even more apparent. Mills (1954) has provided detailed descriptions of twelve coastal strip maps produced by the Chinese between 1422 and 1884. These maps provide various details of the character of the coastline itself, as

well as topographic features likely to be visible from sea and thus useful in navigating along the coast.

The Chinese strip maps, unlike their European counterparts, were produced as single horizontal strips folded accordion-fashion or on a scroll. This format leads to a more abstract strip map with a constantly varying orientation similar to that found on pilgrimage maps of medieval Europe, rather than the varied, but constant, orientation of the individual strips of Ogilby-like maps. As in Europe, some of the early applications of the strip concept to mapping land routes were associated with pilgrimages. In this case, it was the pilgrimage of Chinese Emperors to the tombs of their ancestors (Rudnev, 1955). Again, the strip map was applied to a single purpose trip in which following the route is the primary purpose of the map. A strip (process-type) description was ideally suited to the task.

With the evolution of a more complete highway network, oriental cartographers recognized the same advantages of the strip format identified by European cartographers. In cases where travel was restricted to a limited number of good routes, strip maps were the preferred solution. An example from Japan produced in 1780 by Nakasendo represents one of five main national highways of Japan. The 536 kilometre highway is represented on a scroll map 19.20 metres by 27 cm. The route is presented in an oblique rather than plan view emphasizing the topography and 68 stations along the route (Macchi, 1980).

THE ADVENT OF MECHANIZED TRAVEL

As the road network of many countries began to fill in, the number of route choices increased, as did the potential origins and destinations for travel. This change increased the need for state descriptions of the highway networks as travellers had to devote more time and effort to route planning. As a result, strip format maps decreased in popularity because they were ill suited to performing this extra task.

Rail Travel

With the advent of mechanized travel, travellers were again suddenly faced with a restricted set of suitable routes. In the case of rail travel, routes were actually fixed beyond control of the traveller. Maps of railroad lines were ideal candidates for strip format maps, and these maps were frequently used during the early railroad years. Among the railroad maps identified by Modelski, at least 15 can be considered strip in format (Modelski, 1984).

The reasons for strip map use for railroads may differ from those leading to use of strip maps for highway travel. When travelling by rail, the traveller has little need for a detailed process description to help them follow the route. Instead, the traveller simply needs to know the order of, and relative distance between, stops. This suggests that a more schematic strip map would be suitable for rail travel than for highway travel. Actual early railroad maps, however, were usually less rather than more schematic.

Two factors might explain the seemingly unnecessary accuracy found on early railroad strip maps. First, the earliest railroad maps were produced not as a travel aid, but to depict surveys of potential routes (Figure 7). Maps were in strip format, therefore, not because a process description was needed, but because the mapped area was linear. Once the format had been established, it may have been retained on later route following maps because it had become conventional.

Secondly, because travellers were not required to make route following decisions other than what stop to disembark at and when to prepare to disembark, many maps were created primarily to describe the passing environment to the traveller. Guidebooks produced by the U.S. Geological Survey in the early 1900s, provide a good example of this use of strip maps as well as the influence of topographic mapping strategies on map format (e.g., Part D. The Shasta Route and Coast Line by J. S. Diller and others [1915]). Drawing on information compiled for topographic mapping in the west, the Geological Survey prepared a series of guidebooks and maps covering four of the "older" railroad routes west of Mississippi. The maps provided a strip map coverage of the area bounding the railroad (Figure 8). This strip was broken into rectangular panels that were bound into the

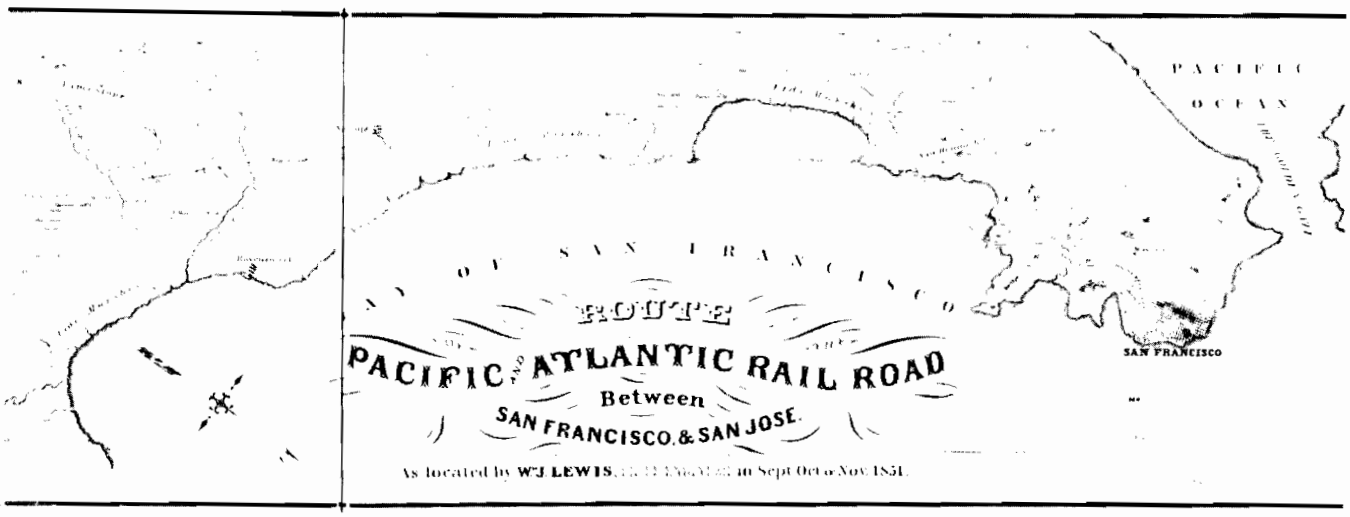

Figure 7. A portion of the "Topographical plan & profile of the Philadelphia and Reading Railroad (1838). The complete map is 25 × 81 cm in size (Modelski, 1984. Reproduced by permission of the Library of Congress).

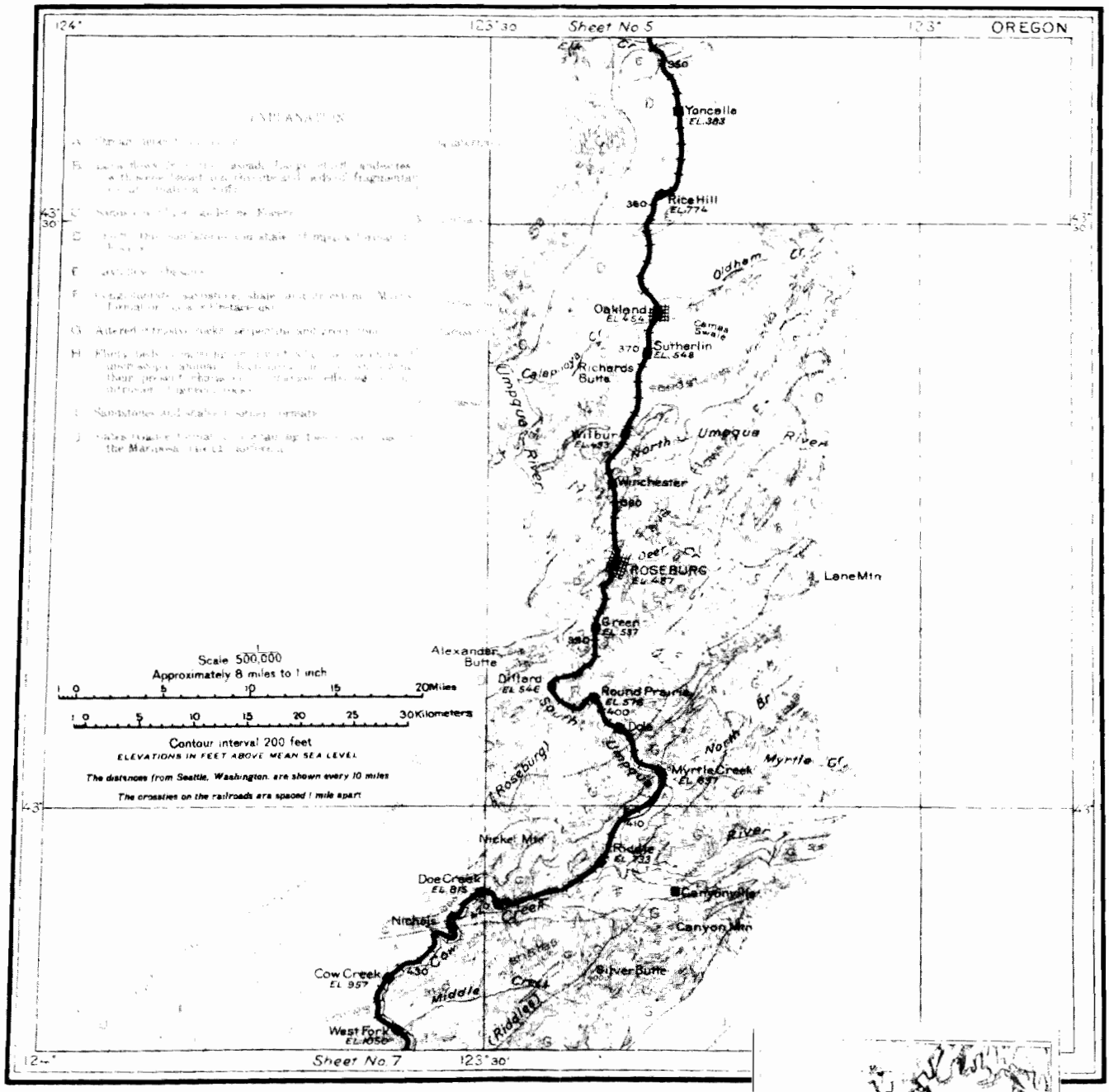

Figure 9. Map Sheet 6 from the U.S.G.S. guide described (Diller, 1915). (above).

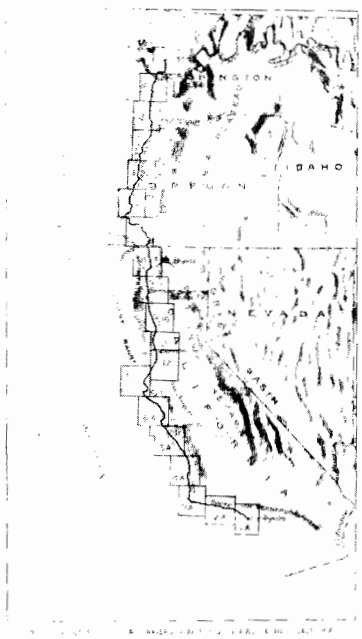

Figure 8. Key to the strip map sections from the 1915 U.S. Geological Survey *Guidebook of the Western United States, Part D. The Shasta Route and Coastline* (Diller, 1915). (right).

guide with text describing each individual route section (Figure 9). The front of each guide included a key to location of the map sections and depicted the strip organization of the panels when joined. The stated purpose of the guides and maps included was for both education and entertainment of the traveller. The guides were to make what was seen from the road more interesting and to provide the basis for appreciating and understanding the cultural and physical features of the landscape being traversed.

Bicycle and automobile travel, 1890–1925

The advent of mechanized highway travel, by both bicycle and automobile, led to renewed popularity of highway travel and associated maps. The strip format, however, did not immediately return. Although routes were restricted to those suitable for the kind of vehicle used, they were less severely limited than with rail travel. Early automobile travel was, in fact, seen as an escape from the regimen of train travel with its strictly limited routes and precise timetables (Belasco, 1979). The automobile allowed the traveller freedom to explore the countryside. Much early auto travel was solely for pleasure. The desire to have flexibility in routes and the corresponding variability in origins and destinations favoured state rather than process descriptions and regional rather than strip maps.

For bicycle travel there were a few commercially produced strip format maps (e.g, Gall and Inglis's Cycling Strip Route Map) but these were a distinct minority of the maps produced (Nicholson, 1983). Strip highway maps were also produced to guide the early automobile traveller, but met with little enthusiasm. In England, where strip maps had been popular for two centuries, they continued to be produced (e.g., Gall and Inglis's The Motor Strip Map (an update of the bicycle map), and Philip's Finger-Post Strip Maps, 1909), but were overshadowed by regional maps better suited to casual touring.

It was in the U.S. that strip format highway maps again began to prove their usefulness. The sheer size of the country and corresponding number of potential origins and destinations made the automobile an ideal method of transportation. The impact of the automobile on society, migration patterns, and the visible landscape in this country has been the subject of considerable attention in both scholarly and popular literature. Peirce Lewis (1984), for example, has identified six "successful" man-made environments that he considers part of the "ordinary American landscape". Three of these are directly linked to the advent of automobile travel: the freeway, the shopping centre, and the commercial strip. The success of each is directly tied to what Lewis describes as the force behind the automobile: "the overpowering American urge for personal mobility".

This desire for personal mobility was responsible for the production of auto tour books of various kinds during the first years of the twentieth century, while the auto age was still in its infancy. These tour books were commonly in the form of itineraries for travel between specific origins and destinations. In the U.S., tour books with photographs of intersections were initially employed due to a lack of a highway numbering system. As had happened with the evolution of Middle Ages pilgrimage itineraries into strip maps of routes from London to Jerusalem, and the evolution of portolani (coastal itineraries) into coastal charts, auto itineraries soon led to auto strip maps that referenced the photographs by number. Written process descriptions, while useful, simply can not obviate the desirability of a cartographic process description as a navigation aid.

One of the first strip map series designed specifically to aid automobile travel was produced by G. S. Chapin in 1907 for the route from New York to Chicago (Schwartz and Ehrenberg, 1980). These maps were included in a guidebook containing written descriptions of the route and photographs of intersections as well as the accompanying maps. Like the Ogilby maps, more than two centuries earlier, Chapin's maps depicted only the highway and adjacent features of potential interest to the traveller (distances, bridges and viaducts, railroad crossings, service centers, landmarks, etc.). They were also oriented to whatever direction was convenient, and

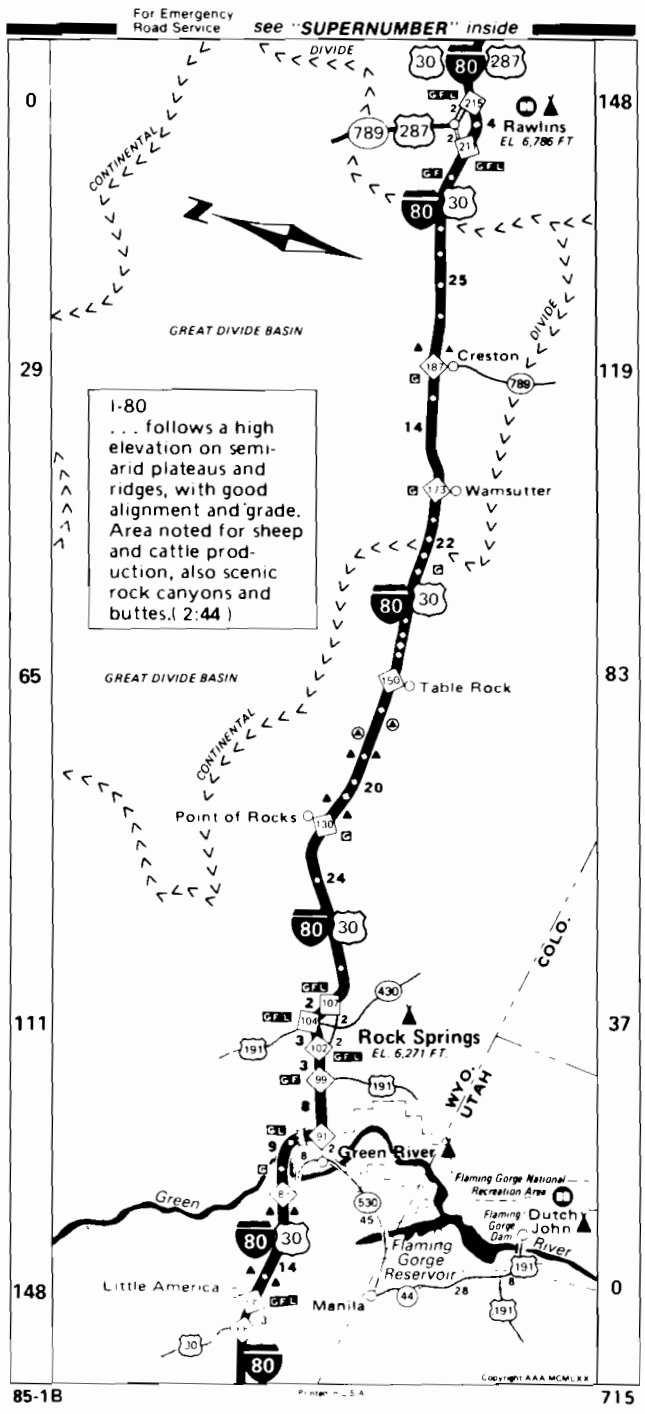

Figure 10. An example of one panel from a modern AAA *Triptik*. Each panel is constructed to be opened like a book with a somewhat smaller scale regional map in circular format filling the open page. *Triptiks* are now produced in two colours instead of the original black and white. The reproduction here is at 60% of the original size. (© AAA – Reproduced by Permission).

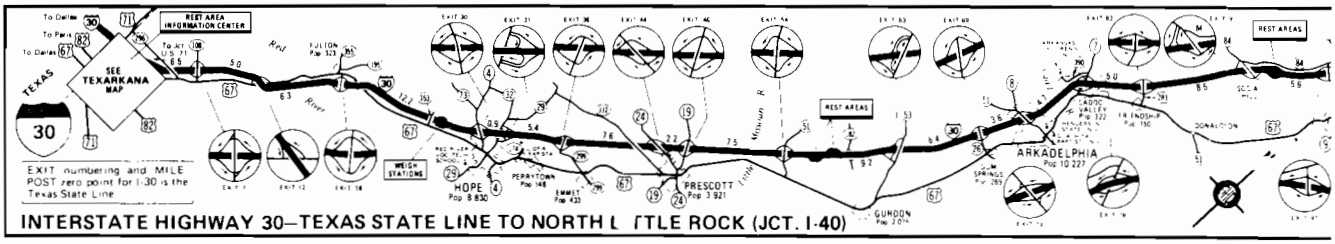

Figure 11. A section of the strip map depicting Interstate 30 from the 1977 Highway Map of Arkansas (Arkansas State Highway and Transportation Department, 1977. Reproduced by permission, from the original colour map at 46% of the original size).

contained a directional indicator on each map to alert the user to this fact.

Even in the U.S., strip format maps met with mixed success in the first three decades of the twentieth century. The American Automobile Association's first attempt at a strip map series in 1917 was discontinued (Ristow, 1946). When the AAA and regional automobile associations began to succeed in lobbying for state and national highway numbering systems, the need for photographs of intersections declined and the popularity of maps increased. A second effort in the latter half of the 1920s proved more successful and gradually evolved into their now popular *Triptik* series of custom prepared strip map sets (Figure 10). Automobile clubs at the regional level also made use of strip format maps during this time.

As automobile travel became a principal means of transportation, the highway system was expanded and improved. In the 1950s and 1960s the ubiquitous nature of highways in the U.S. resulted in a decline in the usefulness of strip maps with their narrow focus on process descriptions for individual routes. Only the AAA's more flexible system of combining strip and regional maps seems to have survived this period. In addition to the greater applicability of regional (state description) maps to the increasing variety of automobile travel purposes and possible routes, the introduction of free oil company highway maps by Gulf Oil Company in 1913, and other oil companies shortly after, was in part responsible for the decline in strip map use (Ristow, 1946).

THE PRESENT ROLE OF STRIP FORMAT TRAVEL MAPS

It is clear from historical examples that the "map using public" recognizes the relative applicability of process versus state descriptions of the environment. When potential origins and destinations are numerous and limitations on possible routes are few, maps that provide a state description have been preferred. In contrast, when routes are limited in number or accessibility to the desired mode of travel, trips are for narrowly defined purposes, or there is a high level of uncertainty about following the route, maps providing a process description (i.e., strip maps) have been preferred.

It is somewhat surprising that for intra-urban public transit by bus or subway, strip format maps have not been a dominant map form. Although strip maps are used in this context, the dominant characteristic of public transit maps is a schematic form. Although scale and direction are often varied across the map, orientation is usually to the north and a strip format is used only

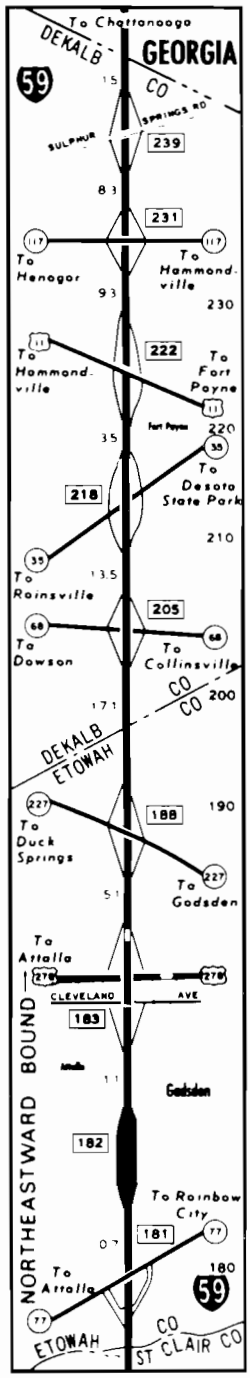

Figure 12. A panel from a schematic strip map depicting Interstate 59, on the 1979–80 official highway map of Alabama. The route runs roughly northeast to southwest, is depicted vertically, and has no indication of orientation on any map sections (State of Alabama Department of Highways, 1979. Reproduced by permission from the original colour map at 77% of the original size).

where the route runs in a single direction. No sets of vertical strips similar to Ogilby's highway map design appear to have been used in depicting sections of transit routes that change direction.

The development of the interstate highway system in the U.S., in contrast to transit systems, has led to the cartographic solution that would be predicted from the guidelines cited above. The U.S. Interstate system provides limited access, high speed, routes suitable only to motorized travel. Routes are between major points of origin and destination and those travelling these routes tend to be more interested in reaching their destination than exploring the countryside.

There has, in fact, been a dramatic resurgence in popularity of strip format travel maps to depict the Interstate system. In addition to the AAA *Triptik* series that quickly began incorporating these routes, state and commercial highway map producers have adopted the strip technique as well. On U.S. state highway maps beginning in the 1970s, strip maps of sections of the Interstate passing through the state became a common occurrence. This is a testament to the applicability and desireability of strip maps for modern automobile travel. Even though strip format maps by their nature would encourage travellers to avoid deviation from their route and pass quickly through the state, many states that use their maps as an advertisement to attract tourists have responded to a demand for this kind of travel aid.

With this latest in a long history of strip map applications, we can find strip maps representing the entire range of abstractness identified. In some states, maps are strip maps only in the sense of a focus on a narrow corridor around the highway. Most common is probably the planimetrically accurate strip representation using a non-cardinal orientation for convenience in positioning several strips on a page (e.g., Arkansas) (Figure 11). There are, however, examples of severe shape and distance distortion to emphasize the itinerary or process description function of the map (e.g., Alabama) (Figure 12). This later extreme abstraction has also been used in creation of modern Ogilby-like road atlases of the British Isles (Figure 13).

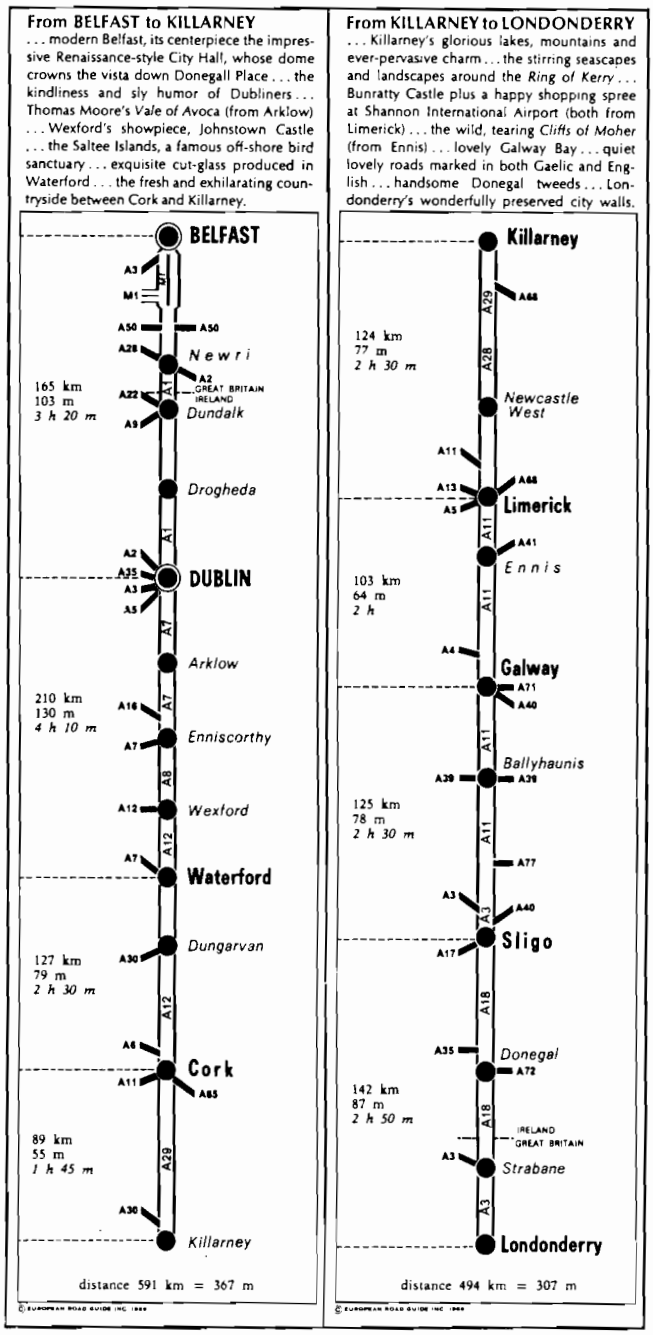

Figure 13. Layout of a modern Ogilby-style road atlas page (*European Road Guide, Inc.* Reproduced by permission).

SUMMARY AND DISCUSSION

The purpose of this paper has been to examine, from a historical perspective, the role of strip format maps as a navigational tool, as a cartographic solution to a problem of spatial behaviour, and as a reflection of attitudes toward and ability to travel. Analysis has been based primarily on examples from western culture. Oriental applications of travel maps, however, are shown to exhibit similar cartographic solutions to the problem of devising a map to simplify route following.

An important distinction in examining strip format maps is that between process and state descriptions of the geographic environment. For situations in which the map user's main goal is to travel from an origin to a destination, a process description (i.e., one that outlines the process to follow) is more useful than a state description (i.e., one that provides a variety of geographic information about the entire region). Strip maps, with their sequential organization provide a graphic process description that is comparable to verbal itineraries from which they have sometimes evolved.

A second concept or factor related to application of strip format maps considered here is restricted travel. For any situation in which the potential origins and destinations, or routes between them are limited in number (as in many historical cases) or limited in access (as with fixed rail travel or interstate highways), strip maps of the routes have been common.

In those applications where need for a process description is the factor responsible for use of a strip format, the maps produced tend to depict geographic locations in a very abstract manner. In contrast, for those applications in which restrictions on travel are responsible for the choice, the strip maps produced are often much less abstract. These maps tend to be strip-like only

in terms of a restriction to details along the route, while the process description oriented strip maps usually disregard cardinal directions in their orientation and often exhibit significant scale change and straightening of routes. Those applications for which travel is restricted and process descriptions are needed (e.g., U.S. Interstate highway travel) exhibit a complete range from little to extreme abstraction.

The rise and fall in popularity of strip maps over time and the successes and failures of commercial efforts to publish and sell them, provide an indication of the presence of certain driving forces and attitudes toward travel in a geographic region or country at a particular time. The factors that stand out historically, and to some extent cross-culturally, are:

1. an adequate road or roads for frequent travel (or other surface relevant to the mode of travel such as rails for train travel.
2. the desire and ability to travel by a large group of people.
3. restrictions on travel either in terms of a limited set of routes acceptable for the prefered mode of transportation, and/or a limited set of origins and destinations with emphasis on single purpose trips.

Strip maps also tend to follow new travel developments of various kinds only to eventually give way to more general reference maps. When a new category of road has been developed such as the British post road system or the Interstate highway system in the U.S., strip maps are often the first map representation. In addition, when a new mode of travel is introduced that is limited to specific suitable routes (e.g., mail stage travel in Britain and the rest of Europe, rail travel in the U.S., or early air travel that was limited by landing sites), strip maps provide the necessary process description until people become familiar with the routes and the route network is expanded.

The potential function, as a precursor to more complete geographic representations, indicates that map users and producers have seen strip maps as particularly useful for new geographic environments. One role of strip maps, therefore, may be to help people learn new routes or environments. This environmental learning application for strip maps has been considered from a theoretical perspective (MacEachren, 1986), however, no empirical work has yet been done. It is a question that deserves further consideration.

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