The Heights of Mountains

Chart of the English Channel by Lucas Waghenaer. In this "Waggoner" of the late 16th century, landmarks and coastal profiles are indicated to help the navigator determine his position.
The study of the cartographic record, because of the great variety in format and style over the centuries, inevitably leads to speculation regarding the origin and diffusion of a given printing technique or means of cartographic expression. Often this speculation is a natural outgrowth of research which has as its central theme the search for the first cartographic depiction of a place or physical feature. Since earliest recorded history cartographers have used description of relative location, or the direction and distance of a place from other places. Eratosthenes devised a crude earth grid-system as early as 200 B.C., but only in the past few centuries has location been accomplished with increasing accuracy by use of the geographical coordinates of latitude and longitude; John Harrison’s invention of the chronometer in the first half of the 18th century has subsequently made the determination of longitude relatively easy. The historical development of these two means of describing spatial location is well documented.

The vertical dimension, that of height or depth, has also been studied, but to a lesser extent. Arthur H. Robinson, François de Dainville, and Norman J. W. Thrower have described in some detail the history and development of different ways of expressing the third dimension in cartographic format, concentrating in particular on the isoline in all its variations. Isolines, according to Robinson, “are the sets of lines (usually on a map) that show by their absolute and relative positions the locations and gradients within a set of numbers, which set may range from temperatures and elevations to population densities or even the blooming dates for flowers.”

Little has been written, however, regarding the historical development of the profiling convention—the use of profiles to depict the earth’s surface or underwater features, particularly for the purpose of showing relative heights and depths. I have explored both bathymetric and hypsometric measurement as depicted in profile and feel that the latter may very well have given birth to the former (as opposed to current thinking regarding the isoline), but this essay is by no means a definitive statement. It is a history and as such is subject to the continual process of reinterpretation. I hope that my comments will, however, stimulate further research, for the history of 19th-century cartography, particularly American cartography, is relatively unexplored and in that way, perhaps, is analogous to the state of cartographic art at the beginning of that century, when cartographers turned to the use of the profile until something better came along.

The origin of the profiling convention is obscure. Because the concept of end-on viewing is relatively simple, it is certain to have been used in remotest antiquity. The use of profiles in early mining operations and for planning and constructing canals and irrigation works is documented in records dating back to dynastic Egypt.
The technique seems to have been revived in the late Renaissance and has passed with modification, particularly in accuracy of measurement, into our own time.

As early as the second half of the 15th century, rutters of the sea, or pilot books, were illustrated by rough coastal profiles or views of prominent landmarks as seen from seaward and oriented by compass direction. Coastal profiles were included either with or on sea charts, particularly those published in the sea atlases or “Wagoners” of the early 17th century. An interesting description of the use and worth of coastal profiling is contained in *A Regiment for the Sea and Other Writings on Navigation*, by William Bourne, a 16th-century English gunner and sailor:

This also is very necessary to be done to furnish up all the vacant places of the plat or card, to draw the shape or fashion of every headland or high lande almost every coast that is needful to be knowne, and at what pointe of the compass the lande is of that fashion: at howe farre off the lande yseth in that fashion: and so to make the fashion of the lande as often as the lande altereth the forme and fashion: and last of all, at what pointe of the compass the lande hath that shape or fashion: for being upon one side, the lande yseth of one fashion, and on the other side of another forme or fashion: Also being neare the lande it will be in one fashion, and being far off in an other fashion . . . for there is nothing more needful and necessary for a Seaman, than this: to knowe the lande when he seeth it, and there is no way better to make him remember it, than to have notes howe the lande dothe rise upon every side: and what greater inconvenience may there growe by any means, than there may by mistaking of a place: for it were twentie times better to be throughly persuaded that he knoweth it not, than to thinke he doth knowe it not being that place. For whereas he doth thinke to prevent the dangers, he may willingly runne upon the dangers not known of him. Therefore in my opinion they can do no better than to furnish their vacant places in their plats and cards with this matter: for there can be nothing better.\(^5\)

Similar profiles are used in conjunction with modern charts and good examples appear in the sailing directions and admiralty pilots published by most of the national hydrographic bureaus.\(^6\) The landscape surrounding fortifications constructed during the late 17th and early 18th centuries is also illustrated in profile in military treatises and atlases of the period.

The beginning of scientific, or measured, precision in graphic presentation and the first extensive use of the bathymetric profile appears in Luigi Ferdinando Marsigli's *Histoire physique de la mer*, published in Amsterdam in 1725. The several transects shown on the profiles in *Carte du Golfe de Lion*, drawn seaward from the coasts of Roussillon, Languedoc, and Provence, are lines of soundings taken in the Gulf. In *Profils ou coupes du bassin de la mer*, individual

Profile of the ocean bottom as measured along different transects. From Marsigli's *Histoire physique de la mer*, 1725.
In 1757, Philippe Buache, a French geographer, included two charts of interest in his *Cartes et tables de la géographie physique ou naturelle*. The first chart, entitled *Carte de l'Ocean vers l'équateur*, originally published in 1737, contains two profiles, one of which, a plan of the area surrounding the island of Fernando de Noronha (1731), includes both vertical and horizontal measurements, in brasses and toises (6 pieds or 2.1315 yards) respectively. It could be considered an early forerunner of the block-diagram, a measured perspective drawing which gives a three-dimensional impression of landform.

The second profile, entitled *Coupe de fonds de la mer entre d’Afrique et l’Amérique* (1754) and also measured in brasses, is of a transect from West Africa to Brazil. Buache’s second chart, first
published in 1752, is the very interesting and important *Cartes et courbes du Canal de la Manche.* This plate contains a much more sophisticated profile of the middle of the English Channel, with Dover as mid- or zero-point from which distances are measured north and south, and northeast and southwest, in marine leagues. The latter chart is also generally recognized as one of the first printed charts to show the depth contour line, or isobath. It is interesting to note that Thomas Jefferys evidently copied Bauche's English Channel chart, naming it the *3d Chart of the Coast of France, Including the British Channel,* which he published in *A Description of the Maritime Parts of France* (London, 1774). The relative positions of the profile and contour are reversed on the plate, and the northern transect inset is omitted, but in all other respects it is essentially the same chart.

The earliest measured representation of a topographic relief profile that I have so far unearthed appears in La Condamine's *Journal du voyage fait... a l'équateur* and portrays the result of his measurement of the arc of the meridian of Quito, accomplished under extreme hardships during the period 1735-45. La Condamine and his companions Bouguer and Godin used barometric pressure to determine the absolute height of several South American mountains above the mean sea level of Porto Bello, Guayaquil, and Callao. Geometric measurements were used for heights and locations between the mountains. Measurement of this equatorial arc and similar arcs in the high latitudes of Lapland and the middle latitudes of France helped to determine the length of the degree at various latitudes, providing the first tentative steps toward accurate measurement of the general oblate spheroidal shape of the earth. Although quite primitive in graphic form when compared to later representations, La Condamine's resulting profile does indicate that some thought was being given to the importance of comparative heights in any physical description of the earth's surface.

William Faden, the 18th-century English cartographer and successor to Thomas Jefferys, was among the first to use the profile frequently, particularly on his canal plans during the latter part of the century. The examples in his *Nouvelle Carte de la Suisse* published in London in 1778 and reprinted and republished until 1799, are the most important to our discussion. Inside the lower right hand margin there is an outline profile—a transect through Mt. Blanc—measured with the level of Lake Geneva as base line and drawn to scale, in English feet, with notes on prominent landmarks. This is certainly one of the earliest scientifically determined hypsometric profiles to appear on a separately published map, antedating by several years some other maps be-

*Detail from Faden's Nouvelle Carte de la Suisse, a hypsometric profile of Mt. Blanc and other mountains around Lake Geneva.*
lieved to represent the introduction of this technique. After Faden the use of this graphic means of representing comparative heights seems to have been gradually accepted.

In 1783 the French scientist Pasumot pictured the Andean, Pyrenean, and Alpine peaks in Rözier’s *Observations sur la physique*. The peaks are drawn in profile and resemble the teeth of a saw. Dupain-Triel’s profile of elevations across France, on his map *La France considérée dans les différentes hauteurs de ses plaines*, published in Paris in 1791, is believed to be the first of an entire country. Because there were only some 200 recorded heights, it is grossly generalized. Nevertheless, this profile probably represents the general acceptance of the technique as one way to show the vertical dimension, particularly at a small scale and in a manner which allows for close comparison, whether of height or of some other feature, such as vegetation.

Alexander von Humboldt is of primary importance in this discussion, for in his work one can see the beginning of a more formal and scientific means of expressing the vertical dimension. Although all Humboldt’s contributions to the study of geography cannot be enumerated here, his emphasis on the use of illustrative techniques is evident in the scores of maps, charts, and diagrams he published over a period of many years. His training in biology and geology and his travels in Europe with Georg Forster, the botanist who had accompanied Cook on his second world voyage, had a great effect on Humboldt’s subsequent interests. His use of the profile to show a wide range of geographical distributions may also have had its origins during the geographer’s early experience as an inspector of mines in the Prussian civil service: subsurface mineral exploitation can be effectively depicted through the cross-section.

Humboldt’s Andean profile, *Geographie der Pflanzen in den Tropenländern, ein Naturgemälde der Anden*, published in Tübingen in 1805, is his earliest and perhaps his most interesting. As Robert Dickinson notes of Humboldt’s travel in Brazil and Peru:

> In a matter of days he traversed from the equatorial forest to the tundra, the equivalent [in environmental change] of some 5,000 miles from the equator to the Arctic Circle. He noted, measured, and mapped changes in relief, plant life, crops, tree and snow lines, in a way that had never been done before. To generalize these features (particularly important since no maps were available) he used the cross section or profile. . . . In Paris, in 1804, he had a Viennese landscape painter draw the cross section . . . to give pictorial representation to the generalized altitudinal zones between latitudes 10° north and south [of the equator].

The object of this was “to bring out the ways in which the great variety of observable phenomena of the landscape are associated and interconnected with each other at different places.”

His famous *Profil du chemin d’Acapulco à Mexico, et de Mexico à Veracruz*, which appears in the *Atlas géographique et physique du royaume de la Nouvelle-Espagne*, first published in 1811, was designed according to barometric and trigonometric measurements obtained in 1804. In addition to the data for the Mexican transect, it contains comparative heights from other continents. Mont Blanc in the Swiss Alps and Mt. Canigou in the Pyrenees, for example, are recorded on the vertical scale and appear on the plates in profile. This particular profile was often copied and apparently served as an example of the technique for a large number of cartographers and map and atlas publishers during the first half of the 19th century. Max Eckert notes:

> With the depiction of heights, maps became more useful. At first [map] construction aids were still necessary. One of the most important is the profile or vertical section which is imagined to be drawn through the plane. . . . Just as one did not [immediately] recognize the true value of the contour maps to geography so it was with profiles. First A. v. Humboldt had to draw his profiles, which he used to illustrate his discussions on hypsometry, before we could recognize the significance of the profile for the estimation of the geography of a country or continent.”

Oskar Peschel has written that “looking at the gigantic gives us a certain satisfaction: that is why we have the desire to know the tallest peaks of the earth. . . . But the name and location of these highest peaks is only an object of curiosity because, much more important, since A. v. Humboldt founded the comparative science of heights, are the differences in pass heights, and the ridge lines of a mountain chain. The pictorial representation alone gives us the possibility of comparing these relationships.”

After Humboldt and during the 19th century, atlas and map publishers gradually began to
adopt the profile as a most useful pictorial technique. In the early years of the century, numerical lists or tables of comparative heights and lengths had predominated, but with the 1817 and 1821 publications of *A New General Atlas of the World*, by John Thomson, we begin to see a change. His introductory “Summary of Physical Geography” in the 1817 edition contains a tabular description of the principal rivers’ lengths and a “Table of the Snow Line or Lower Limit of Congelation of Different Latitudes.” In the 1821 edition the snow line table remains the same, but the river length table has evolved into a pictorial representation of the comparative lengths of major rivers throughout the world. The 1817 edition, however, also contains a double-page Comparative View of the Heights of the Principal Mountains and Other Elevations in the World. This plate, by W. and D. Lizar of Edinburgh, includes an ingenious locational device and, with minor variations, is found in many different atlases published from about 1817 to 1840.

Although I have, of necessity, confined the major part of my research to comparative plates in atlases, comparative views were also published separately and many fine examples are extant. The *American Journal of Science, and Arts* in 1821, for example, contained this advertisement:

Map of Mountains.

Cummins and Hilliard of Boston, have just published an engraving presenting at one view, the comparative heights of the principal mountains in the world, with corrections, and upwards of one hundred additions of the principal American mountains. We have a copy of this map and think it well worthy of being possessed, both for geographical and geological purposes, as it produces, at a coup d’oeil, an impression, for which no description can be an adequate substitute. The annexed heights, latitudes and names, give the most important particular information, and the map neatly mounted, coloured and varnished, forms a handsome parlour picture.

European publishers were also producing scores of comparative views on both large and small scales. German cartographers coined the terms

![Höhen Charte](image)

*Franz Pluth's Höhen Charte represents one of the many styles of comparative plates.*
"Comparative Height of the Principal Mountains and Other Elevations in the World," published in 1823 by Fielding Lucas, Jr., in A General Atlas.

"Höhentableau" and "Höhenbilder" to describe them. "Höhentafeln" was also used to describe those views which covered smaller areas.

Henry S. Tanner's New American Atlas, published in Philadelphia in 1823, has a small comparative inset on his Map of North America. In the 1825 edition of the Atlas, a much more elaborate representation of heights and lengths appears on the Map of South America. Mountains are shaded to give the appearance of depth, and river lengths are depicted in a highly stylized form which is not often found in other atlases of the period.

There are several ways of portraying mountain heights pictorially, all of which seem to have been introduced during the first part of the 19th century. Franz Pluth's Hohen Chart published in Prague in 1823, is an example of a style current in Germany and Central Europe and a direct descendent of Passium's 1783 saw-tooth profile. Max Eckert refers to it as "generally resembling long and pointed icicles" and complains that such "pictures are . . . monsters" with too much vertical exaggeration. They do lack the visual appeal of the more pictorial profiles.

Much more pleasing to the eye are the comparative mountain height plates from A General Atlas by Fielding Lucas, Jr., published in Baltimore in 1823 and perhaps the first Ameri-
Pictorial representations of different river lengths were also popular in the 19th century. This example is from Lucas' 1823 General Atlas.

can atlas to contain a comparative plate derived from the Lizar view mentioned earlier. Vandermaelen's *Atlas universel de géographie,* published in 1827 in Brussels, contains a colorful *Tableau comparatif des principales hauteurs du globe.* Shown on the plate are a balloon symbol for Gay-Lussac's 1804 balloon ascent, the limit of vegetation (in this case 6,977 meters), the heights reached by Humboldt and Bonpland in the South American Andes, and the maximum altitude which the Andean condor attains in flight.

Illustrative depiction of comparative river lengths kept pace with those of mountain heights. As new geographical knowledge became available, this was reflected in increasingly sophisticated pictorial representations of the major rivers of the world. Particularly noteworthy is the expedient curving of the American rivers on the comparative plate from Lucas' previously mentioned 1823 General Atlas. A map of the principal rivers throughout the world, in Tanner's 1836 *Universal Atlas,* adds textual material to the same pictorial representation. It should be noted that all the river lengths in these maps are selective, with only the major rivers for each continent shown.

Atlas plates which combine worldwide comparisons of both selected mountain heights and river lengths began to appear about 1826. We
Bulla's Tableau comparatif, one of the most comprehensive and detailed comparative plates, encompassing cities, balloons, snow lines, waterfalls, and the Egyptian pyramids as well as rivers and mountains.

have already noted Tanner's *Map of South America*, which contains an early example of this trend. With these new atlas plates, what could be called the "illustrative," or pictorial, way of expressing comparative relationships reaches its finest representation. They show a marked advance in the imaginative use of color and symbols and in the manner of depicting heights and lengths.

Sometime after 1826 Bulla produced the *Tableau comparatif*, another one of the first to show both heights and lengths. The plate also includes, for comparison, illustrations of waterfall heights and the heights of the Egyptian pyramids and selected European buildings. The latitude and longitude of river sources and the general direction of their major trends by compass direction is also indicated. The heights which the balloonists Gay-Lussac (21,474 feet in 1804) and M. Brioschi (25,443 feet) attained is also shown. Also included is the altitudinal limit of perpetual snow and the tree line for both deciduous and coniferous trees, and color is used to differentiate the continents. It is one of the finest and most comprehensive representations that I have considered. A detail of the waterfalls section of the plate illustrates the use of symbols for vegetation types. Smith's *New General Atlas*, published in London in 1836, contains a plate that is similar in appearance, but not
quite as detailed as Bulla's. These two comparative plates and one from Joseph H. Colton's 1852 *General Atlas* represent what could be called the "diagonal style": the mountains are arranged by height in ascending order from left to right, and the river lengths are likewise arrayed across the top of the plate, from right to left. This kind of plate was still used in G. W. and C. W. Colton's 1888 *General Atlas*, but appears in few atlases after that date.

A different technique for depicting comparative heights and lengths is found in *A New Universal Atlas*, published in 1846 by S. A. Mitchell. This plate is an example of what I will call the "center peak style," with the mountains clustered in the middle and the rivers shown on either side. Not nearly as comprehensive as the "diagonal style" but still as pictorially appealing, it is included with minor variations in many different atlases for a period of some 20 years or more. As late as 1866, Johnson's *New Illustrated Family Atlas* includes a similar plate, but the style has clearly deteriorated.

There are many other variations in style which were introduced about midcentury. The highly stylized "double hemisphere style," in which the two hemispheres of the globe are shown with the comparative mountain heights arranged below and the river lengths above, is exhibited in Lange's *Geographischer Handatlas über alle Theile der Erde* of 1866. Another plate, in Taintor and Merrill's *American Household and Commercial Atlas*, published in 1874, is also stylized but to a point of diminishing effectiveness. The "single hemisphere style" can be seen in a plate in Traugott Bronnec's *Atlas zu A. v. Humboldt's Kosmos*, 1851-54. These styles have continued to find expression in one way or another in various forms through the years.

The same chart as it appeared in the 1823 and the 1861 editions of Adolf Stieler's Hand-Atlas. The later edition (below) reflects the knowledge gained through explorations in Africa, Asia, and America.
another up to the present time.

I would like to examine briefly another somewhat different way of expressing vertical dimension. We have seen the general manner in which the illustrative technique of height and length depiction developed. The "scientific" technique of representation, as I will call it for lack of a more appropriate term, is less pictorial than the illustrative method and tends to resemble graphs, although the comparative profile idea is retained. This style also had its origin in Humboldt's early work, beginning with the *Geographie der Pflanzen*.

One of the earliest scientific profiles is found in Adolf Stieler's *Hand-Atlas* of 1823. The *Höhen über der Meeresfläche in transparenten Profilen* appears in increasingly updated form in almost every edition of this magnificent atlas from 1823 to 1861; for example, there is an increase in the number of recorded mountain heights in Asia and Africa during this period. Bromme's *Atlas zu A. v. Humboldt's Kosmos*, mentioned above, also contains a similar plate. Both atlases, however, are selective in the new additions they show from year to year.

Heinrich Berghaus' *Atlas von Asia*, 1828–56, contains an interesting early profile on the *Karte von Assam*, published in 1834. Like illustrative profiles in coloration and style of presentation, shaded to present a conical or rounded appearance with snow line shown, it is also similar to many of the scientific genre. This style is found in several of the midcentury and later thematic atlases which depicted in detail different features of the landscape. Tanner's 1825 South American map profile, although classified with the illustrative school, may very well be an antecedent of this profile.

Berghaus' *Physikalischer Atlas* of 1845 and 1852, and A. K. Johnston's *Physical Atlas of Natural Phenomena*, published in Edinburgh in 1848 and in Philadelphia in 1850, both exhibit the same sophisticated scientific pictorial technique which has so many variations; for example, each atlas contains a plate representing the distribution of world vegetation types in both vertical and spatial dimensions. Almost every plate in the early thematic atlases carries some form of vertical expression. Max von Sydow's *Methodischer Hand-Atlas* of 1853 contains many colorful diagrams which illustrate the relief of various smaller regions. There are several other variations of this profile type which could be described; however, either illustrative or scientific comparisons were made in virtually all atlases published during this period, and some atlases used variations of both.

The comparative plates depicting mountain heights and river lengths, from the 19th-century "heyday" of the technique, could be considered the visual expression of a methodological era in
Max von Sydow used both pictorial and scientific profiles in this plate from his Methodischer Hand-Atlas, published in 1853.

the development of geographic thought. Systematic description, comparison, and classification in geography had their origins during the lifetimes of Humboldt and his contemporary Carl Ritter. Both men made major contributions to the development of geography and it is from this period that we date modern scientific geography.

At the beginning of the century there were few accurate maps of any scale available for most areas. There was no better way of comparing relations or connections between sets of phenomena in the same area and from one place to another than the comparative profile. The decline in its use is directly due to the increase in large-scale topographic mapping for most areas of the world.

Environmental perception also seems certain to have played an important part in the creation and development of these very elaborate and exaggerated styles of graphic presentation. Objects seemed larger, distances greater, heights higher, and lengths longer in the early part of the century. Geographical and physical dimensions became more manageable—and less exaggerated—as the century drew to a close. Discoveries of mountain heights and river sources and lengths proliferated and the blank places on maps were gradually filled in.

As a measure of geographical exploration and discovery, both the profile and river comparisons are certainly of some value, even though most representations are highly selective regarding
The technique of profiling, as an illustrative method for comparisons of heights between and among continents and mountain systems, is seldom seen today. River lengths have, for the most part, been consigned once again to tabular form. A few school atlases—usually the last holdout of any cartographic format—still contain a few comparative examples. Perhaps, as Carl Troll, an eminent European geographer, has said:

One could say that modern relief presentation on physical maps gives sufficient indication of elevations. But the distribution of certain features, e.g. vegetation, settlements, the snow line, etc., cannot be determined from these maps, not even on those with larger scales. . . . It is worth noting that those graphic means of portrayal of a third dimension created under Humboldt greatly excel over our modern products. . . . It would be greatly appreciated if the lost tradition is taken up again in the preparation of a national atlas.*

If Troll's recommendations are followed we may see the reintroduction of this excellent

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Table 1. Comparative mountain heights, as recorded in various atlases from 1817 to 1971. Measurement is in feet, except where noted.

<table>
<thead>
<tr>
<th>Mountains</th>
<th>1817</th>
<th>1830</th>
<th>1850</th>
<th>1851 (Humboldt)</th>
<th>1874</th>
<th>1899 (Unrivalled Atlas)</th>
<th>1971 World Almanac*</th>
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<td></td>
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†The Unrivalled Atlas, published by the Philadelphia Public Ledger.
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Table 2. Comparative river lengths, as recorded in various atlases from 1817 to 1971. Measurement is in miles.

and easily understood scientific means of comparing heights and lengths. We will, however, probably never again see the elaborate, exuberant, and colorful illustrative plates that were so popular a hundred or more years ago. We can lament their passing, for they are certainly fascinating to peruse and a pleasure to view—perhaps the next best thing to viewing the mountains and rivers themselves.
For an excellent summary of the accomplishments of the classical Greek geographers see F. Lukermann's "The Concept of Location in Classical Geography," *Annals of the Association of American Geographers*, 51:194-210 (June 1961). He points out that location was the central concern of the Greek geographers, as it is of modern geographers, and that the Greeks developed the science of geographical description.


Robinson, p. 49.


Luigi Ferdinando Marsigli, *Histoire physique de la mer* (Amsterdam, 1725). The first section of this book, which deals with the profile, was published in Venice in 1711, thus predating La Condamine by some 90 years or more.

De Dainville, p. 392. According to Cornelius Koeman, a leading Dutch historian of cartography, Peter Bruins compiled a manuscript map of the Het Spaarne River in 1584 which showed a contour line in mid-channel. In 1696, Pierre Ancelin produced a chart of the Meuse River in which depths are shown by a system of equidistant curves.


Philippe Buache, *Cartes et tables de la géographie physique ou naturelle* (Paris, 1757). This interesting atlas of 14 plates illustrates Buache's theory that the earth was divided into several "natural" regions or basins by mountain ranges, both on land and under the sea.

*Cartes et coupes du Canal de la Manche et d'une partie de la Mer d'Allemagne qui présentent par une nouvelle méthode la pente du fonds de ces deux mers. The plate contains two insets, a *Profil ou coupe des differens fonds du Canal* and a small enlarged scale chart (Sec. de Carte (B)) which shows the transect extending northward to the latitude of Yarmouth, England.


*Nouvelle Carte de la Suisse, dans laquelle sont exactement distingués les treize cantons, leurs allies et leurs sujets, dressée sur les mémoires les plus corrects asujettie aux observations astronomiques* (Londres, chez W. Faden, 1778). In *A Catalogue of Maps, Charts, and Plans Printed for William Faden, Successor to the late T. Jefferys, Geographer to the King* (negative photostat copy in G&M Division pamphlet file), the map is listed as one sheet, Grand Eagle, 1778. I have not located an English-language version, but a German edition was published in 1789 and included in *Allgemeiner Grosser Schätzmblisher Atlas* (Wien, 1800).

In J. J. Dupain-Triel's *Recherches géographiques
Chronology of the Profile to 1900

BATHYMETRIC

Ancient & Classical

Medieval

Renaissance

Bruins 1584

Ancelin 1697

Marsigli 1725

Cruques 1729

Buache 1734

Buache 1752

Jeffreys 1781

ILLUSTRATIVE*

Thomson 1817

Tanner 1818

Lucas 1826

Stucchi 1826

Vandermaelen 1827

Smith 1830

Lizar 1831

Arrowsmith 1833

Black 1844

Colton 1852

Colton 1870

Stieler 1871/75

Bartholomew 1895

HYPSOMETRIC

Ancient & Classical Engineering (Mining, irrigation)

Portolans

Medieval

Renaissance

Rutgers of the Sea Engineering (Mining, fortification)

Montaigne 1725

La Condamine 1725

Milet de Mureau 1749

Raspe 1776

Faden 1778

Du Carta 1782

Dupain-Triel 1791

Humboldt 1804

ILLUSTRATIVE*

Stieler 1858

Phillippi 1860

Stieler 1871/75

Griesbach 1872

Berghaus 1886

Drude 1890

BIOGRAPHY

Humboldt 1817

Berghaus/Stieler 1822

Berghaus 1838

Johnston 1843

Tschudi 1844/46

Petermann 1846

Berghaus 1849

Petermann 1850

Stieler 1858

Phillippi 1860

Stieler 1871/75

Griesbach 1872

Berghaus 1886

Drude 1890

*Shading implies increasingly heavy use in "illustrative" column to mid-century with decline thereafter, general increase to end of century in "scientific" column.
Comparative Atlas Plates: Evolution of Style*

*Based on examination of approximately 250 atlases. Conclusions are tentative

**Lakes and seas were also included on some plates.
europa, asia, africa, america, and the indian islands. the profile very effectively complements the map, the first contour map of an entire country.

14 the plate is in alexander von humboldt's ideen zu einer geographie der pflanzen nebst einem naturgemälde der tropenländer (tübingen, 1807).

15 robert e. dickinson, the makers of modern geography (new york, washington, 1969), p. 27-28.

16 humboldt, atlas géographique et physique du royaume de la nouvelle-espagne (paris, 1811). four plates are of particular interest: 12. tableau physique; 13. tableau occidentale; 14. tableau central; and 15. profil du canal de huehuetoca.

17 max eckert, die kartographische wissenschaft; forschungen und grundlagen zu einer kartographie als wissenschaft (berlin, 1921), vol. i, p. 450-451. in this landmark cartographic text, eckert cautions the reader against being misled by vertical exaggeration on the plates, sometimes as much as 200:1.

18 oskar peschel, geschichte der erdkunde: bis auf alexander von humboldt und carl rütter (munich, 1877), p. 697, 699. it should also be noted that the first profile which humboldt designed was of colombia's magdalena river valley. this was engraved and published according to his drawing, but without his permission, in madrid in 1801.

19 john thomson, a new general atlas, consisting of a series of geographical designs, on various projections, exhibiting the form and component parts of the globe; and a collection of maps and charts, delineating the natural and political divisions of the empires, kingdoms, and states in the world. . . . with a memoir of the progress of geography, a summary of physical geography, and a consulting index to facilitate the finding out of places (edinburgh, london, 1817).

20 thomson, a new general atlas . . . . , 1821 ed. see also thomson's excellent atlas of scotland (1832) for examples of plates using smaller geographical areas for comparison. this atlas contains an imaginatively styled waterfall plate and a river plate which indicates bridges by illustration.

21 american journal of science, and arts, 3:364 (1821).

22 the plate carries the date 1818. in other Tanner atlases—Atlas of the united states (1835), profile of Erie canal on a new map of New york (plate 9), and Tanner's new universal atlas (1833 and 1836)—profiles of lengths of rivers and heights of mountains show the gradual increase in elaborate pictorial expression.


24 eckert, p. 449.
Map of Each of the United States, Plans of Cities, etc. . . . (Philadelphia, 1846).


* Henry Lange, Geographischer Handatlas über alle Theile der Erde (Leipzig, 1866).


* Atlas zu Alex. v. Humboldt’s Kosmos in zweundvierzig Tafeln mit erläuterndem Texte. Herausgegeben von Traugott Bromme (Stuttgart [1851-54]).

* Adolf Stieler, Hand-Atlas über alle Theile der Erde, nach dem neuesten Zustande, und über das Weltgebäude; hrsg. von Adolf Stieler . . . (Gotha [1834]). Plates are dated from 1816 to 1834.

* Heinrich Berghaus, Atlas von Asien (Gotha, 1828-56). See also the profiles on plates 5, 9, 11, and 12.


* The two atlases are similar, Johnston’s atlas being “based on the Physikalischer Atlas of Professor H. Berghaus.” For an excellent history of these physical atlases, their publication history, plates, etc., see Gerhard Engelmann’s “Der Physikalische Atlas des Heinrich Berghaus und Alexander Keith Johnston’s Physical Atlas,” Petermanns Geographische Mitteilungen, 108:133-149 (1964).