RALEIGH FOLIO
WEST VIRGINIA

INDEX MAP

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GEORGE W. WILCE, EDITOR OF GEOLOGIC MAPS
S. J. KIBBEL, CHIEF ENGRAVER

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The Geological Survey is making a geologic map of the United States, which necessitates the preparation of a topographic base map. The two are being issued together in the form of an atlas, the parts of which are called folios. Each folio consists of a topographic base map and geologic maps of a small area of country, together with explanatory and descriptive texts.

THE TOPOGRAPHIC MAP.

The features represented on the topographic maps are of three distinct kinds: (1) Qualitative: the shape of the surface, called relief, as plateaus, plains, valleys, hills, and mountains; (2) distribution of water, called drainage, as streams, lakes, and swamps; (3) the works of man, called cultures, as roads, railroads, boundaries, villages, and cities.

Relief—All elevations are measured from mean sea-level. The heights of many points are accurately determined, and those which are most important are given on the map in figures. It is desirable, however, to give the elevation of all parts of the area mapped, to delineate the horizontal outline, or boundary, of all slopes, and to indicate their grade or degree of steepness. This is done by lines connecting points of equal elevation above mean sea-level, the lines being drawn at regular vertical intervals. These lines are called contours and the uniform vertical spacing between two contours is called the contour interval. Contours and elevations are printed in brown.

In the manner in which contours express elevation, form, and grade is shown in the following sketch and corresponding contour map:

1. A contour indicates approximately a certain height above sea-level. In this illustration the contour interval is 50 feet; therefore the contours are drawn at 50, 100, 150, 200 feet, and so on, above sea-level. Along the contour at 200 feet lie all points of the surface 200 feet above sea; and similarly with any other contour. In the space between any two contours are found all elevations above the lower and below the higher contour.

2. Contours define the forms of slopes. Since contours are continuous horizontal lines conforming to the surface of the earth, they may pass smoothly over smooth surfaces, recede into all reentrant angles of ravines, and project in pleasing relief of valleys, ridges, and other features of the country. The curves and angles to forms of the landscape can be traced in the map and sketch.

3. Contours show the approximate grade of any slope. The vertical space between two contours is the same whether they lie along a cliff, a gentle slope, or a gentle rise on the left; the ground ascends steeply on the left, and comparatively slowly on the right. Where a stream sinks and reappears at the surface of the earth, and the structure-section below is not exposed, as at the mouth of a stream, the water may flow at a lesser speed than it used to in the valley of the stream. The height above sea-level of the points on the lower contour is not the same as that on the left the ground ascends steeply on the left, and comparatively slowly on the right.

4. Contours and elevations are printed in blue. If the stream flows the year round the line is drawn broken. When a stream is dry the line is solid. Where a stream sinks and reappears at the surface of the earth, the exposed underground course is shown by a broken line. If the lower part of a slope is cut by a stream, and other bodies of water are also shown in blue, by appropriate conventional signs.

5. The works of man, such as roads, railroads, and towns, together with boundaries of townships, counties, and States, and artificial features such as roads, railroads, and towns, are shown by brown lines. The relation of contours to them is shown by examples.

Scale.—The area of the United States (excluding Alaska) is about 3,025,000 square miles. On a map of the size of this page the area would cover 3,050,000 square inches, and to accommodate it the paper dimensions would need to be about 240 by 180 feet. Each square inch of ground surface would be represented by a square inch of map surface, and one mile line on the ground would be represented by a linear inch on the map. This relation between distance in nature and corresponding distance on the map is called the scale of the map. In this case it is 1 mile to an inch. The scale may be expressed also by a fraction, of which the denominator is 1200, or 1 mile to the map, and the denominator the corresponding length in nature expressed in the same unit. Thus 1 inch on the map may be equal to 1 mile on the ground, or 1 linear inch contains 1 mile. Where a stream 1 mile wide is represented by 1 inch on the map, the scale is 1 to 120, or 1 mile to 120 inches. In this case 1 inch on the map contains 1 mile, and 120 inches contain 1 mile.

6. The scale of a map is important both as a measure of the relation of certain areas on the map to those in nature, and as a measure of the character of the relief. The smallest interval used on the atlas sheets of the Geological Survey is 5 feet. This is the smallest shown on the map of the Mississippi delta, the smallest is 1 foot, and the largest, the sum of two of the above, is 10 feet. An interval of 1 mile on the map represents a distance in the metric system, and a third giving the size of the country is the map is the scale of the map. In this case it is 1 mile to an inch. The scale may be expressed also by a fraction, of which the denominator is 1200, or 1 mile to the map, and the denominator the corresponding length in nature expressed in the same unit. Thus 1 inch on the map may be equal to 1 mile on the ground, or 1 linear inch contains 1 mile. Where a stream 1 mile wide is represented by 1 inch on the map, the scale is 1 to 120, or 1 mile to 120 inches. In this case 1 inch on the map contains 1 mile, and 120 inches contain 1 mile.

7. Contours on the topographic sheets of the Geological Survey are printed in blue; the smallest is 1 foot, the intermediate and the largest, the sum of two of the above, is 10 feet. If the stream flows the year round the line is drawn broken. When a stream is dry the line is solid. Where a stream sinks and reappears at the surface of the earth, and the structure-section below is not exposed, as at the mouth of a stream, the water may flow at a lesser speed than it used to in the valley of the stream. The height above sea-level of the points on the lower contour is not the same as that on the left the ground ascends steeply on the left, and comparatively slowly on the right.

8. Contours and elevations are printed in blue. If the stream flows the year round the line is drawn broken. When a stream is dry the line is solid. Where a stream sinks and reappears at the surface of the earth, the exposed underground course is shown by a broken line. If the lower part of a slope is cut by a stream, and other bodies of water are also shown in blue, by appropriate conventional signs.

9. The following explanation may make clearer the character of the original sediments which are shown in the geologic maps. The character of the original sediments may be changed by chemical and dynamic action so as to produce metamorphic rocks. Such changes transform sands and shales into quartzites, limestone into marble, and modify other rocks according to their composition. A system of parallel division planes is often produced, which may cross the original beds or strata at any angle. Such rocks divided by such planes are called stratified or stratified. Rocks of any period of the earth's history may be more or less altered, the younger formations being more altered and metamorphosed than the older. These processes, through the agencies of pressure, movement, and chemical action, are often greatly altered, and in this manner they are produced as sediments.

Rocks of the kind originally formed from sand and gravel are called sandstone, and the most common are those deposited in the sea, and the structure-section map shows their underground relations, as far as known, and in such detail as the scale permits.

The Wellington shelf is divided up into counties, and the land of each county is divided into townships. The township is the smallest unit in the United States, and is about 25 square miles in area. Each township is divided into sections of one square mile each, and each section is divided into lots of one acre each. The lots are numbered, and the heights of hills are ascertained by counting up or down from a numbered contour.
forming another gradation into sedimentary deposits. Some of this glacial mass were deposited underground. Relations. The Pleistocene and the Archean, are distinc-

tions which appear on the historical-geology sheet and its letter-symbol as used in the
deposits of the second set at the left of the section. The over-

ground in mining, or by inference, it is frequent.

fig. 2. Sketch showing a vertical section in the front of the

and folded is regarded as proof that forces exist

the outcrops of limestone and calcareous shales.

inferred. Hence that portion of the section

and their arrangement underground can not be

strata may be of the same age.

But this pressure and intrusion of igneous rocks have not affected the overlying strata of the second set.

Since at one time the strata of the schists were continuous, but the crests of the arches

by strong colors. A symbol for mines is intro-
duced at the top.

The sections in the structure-section sheet are

the outcrop of deposits. Thus their positions underground can

any colors.

character, and its letter-symbol as used in the

tions which appear on the historical-geology sheet are shown on this sheet by fainter

Silurian (including Ordovician) ....

of the sections corresponding to the actual slopes

and the total thickness of each system.

slopes are shown in the section and landscape in fig. 2, are ideal,

angles at which they dip below the surface can be

slopes are shown in the section and landscape in fig. 2, are ideal,

and its letter-symbol on the map the

often observed that they form troughs or arches,

in the section may be

are arranged, in columnar form, according to the origin

left of the section. The over-

which correspond to beds of sandstone that rise to the

shaped and its letter-symbol as printed in any brilli-

the geologist is not limited, however, to the

The horizontal strata of the plateau rest upon the

on the map corresponding in color and pattern may be traced out.

surfaces to wrinkle along certain zones.

the sediments in the columnar arrangement-

the area that is represented under any given formation, its name should be

angular and the intermediate valleys follow the

Shale, argillaceous, and igneous rocks. At some period

the area that is represented under any given formation, its name should be

strata, the characteristic fossil types found in them may determine which was deposited first.

formed in sandstone, forming the cliffs, and shales, con-

color and pattern noted, when the areas on the map corresponding in color and pattern may be traced out.

The interval of time which corresponds to

slopes are shown in the section and landscape in fig. 2, are ideal,

Any colors.

iv. *+,. «(, 

The origin of the Archean rocks is not fully

The second set of formations consists of strata

the geologist is not limited, however, to the

inferred. Hence that portion of the section

As sedimentary deposits or strata accumulate the

silurian, and the Archean periods. These sedimentary strata are

distinguishable in the table in the next column. The names of certain subdivisions of the periods, frequently

as sandstones, forming the cliffs, and shales, con-

interference of deposition of sediments may be

The intervals of time which correspond to

in the section and landscape in fig. 2, are ideal,

The second set of formations consists of strata

The horizontal strata of the plateau rest upon the

the Archean is not fully settled. Many of them are certainly igneous.

sedimentary deposits or strata accumulate the

by appropriate symbols of lines, dots, and dashes. These symbols admit of much variation, but the following are commonly used in sections to rep-

the surface to wrinkle along certain zones.

The section and landscape in fig. 2 are ideal,

the overlying strata of the second set.

the arches have been removed by degradation. The beds, like those of the first set, are conformable.

When the geologist is not limited, however, to the

the overlying strata of the second set.

the sequence of two or more formations is the oldest.

The second set of formations consists of strata

sedimentary deposits or strata accumulate the

slopes are shown in the section and landscape in fig. 2, are ideal,

inferred. Hence that portion of the section

by appropriate symbols of lines, dots, and dashes. These symbols admit of much variation, but the following are commonly used in sections to rep-

the surface to wrinkle along certain zones.

the sections in the structure-section sheet are

The horizons of the schists are not parallel, a relation which is called

the different kinds of rock which correspond to beds of sandstone that rise to the

periods of rock formation, is another uncon-

sedimentary deposits or strata accumulate the

are arranged, in columnar form, according to the origin

The kinds of rock are indicated in the section

The section and landscape in fig. 2 are ideal,

The section and landscape in fig. 2 are ideal,

their relative positions after they pass beneath the surface, draw sections which represent the structure of the earth to a considerable depth, and construct a diagram exhibiting what would be seen in the side of a cutting many miles long and several thousand feet deep. This is illustrated in the following figure.
Information Concerning
Topographic and Geologic Maps and Folds
and Other Publications of the Geological Survey
can be had on application to
The Director, U. S. Geological Survey,
Washington, D. C.