DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

GEOLOGIC ATLAS
OF THE
UNITED STATES

LOUDON FOLIO
TENNESSEE

INDEX MAP

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TOPOGRAPHY
AREAL GEOLOGY
ECONOMIC GEOLOGY
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STRUCTURE SECTIONS

WASHINGTON, D. C.
ENGRAVED AND PRINTED BY THE U.S. GEOLOGICAL SURVEY
BAILEY WYLLIE, EDITOR OF GEOLOGIC MAPS
S.J. KUBEL, CHIEF ENGRAVER
1896
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 a geologic map of a small area of country, together with explanatory and descriptive texts.

The Topographic Map.

The features represented on the topographic map are of three distinct kinds: (1) inequalities of 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 culture, 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 stated on the map by numbers. In design to show the elevation of any part of a hill, ridge, or valley; to delineate the horizontal outline, or contour, of all slopes; and to indicate their grade, or degree of steepness. This is done by lines connecting points of equal elevation, all the lines being drawn at regular vertical intervals. These lines are called contours, and the constant vertical space between each two contours is called the contour interval. Contours and elevations are printed in brown.

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

2. Contours define the forms of slopes. Since contours are continuous horizontal lines conforming to the surface of the ground, they wind around hills, around irregularities of surface, as plateaus, plains, valleys, hills, and mountains; (2) distribution of water, called drainage, as streams, lakes, and swamps; (3) the works of man, called culture, as roads, railroads, boundaries, villages, and cities.

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in tunnels and channels in the ice, and forms characteristic ridges and mounds of sand and gravel, known as eskers, or couches, and kames. The material deposited by the ice is generally ground up and modified by drift; that washed from the ice onto the adjacent land is called modified drift. It is usual also to place a classification of these, and of lakes and rivers that were made at the same time as the ice deposit.

**AGENS OF ROCKS.**

Rocks are further distinguished according to their relative ages, for rocks are not formed all at one time, but from one age to age in the earth's history. Classification by age is independent of origin; igneous, sedimentary, and surficial rocks may be of the same age.

When the predominant material of a rock mass is essentially the same, and it is bounded by rocks of different materials, it is convenient to call the mass throughout its extent a formation, and such a mass is then classified as a system. The rocks comprising a system and the time taken for its deposition are designated a system.

System and time taken for its deposition are given the same name, as, for instance, Cambrian system. Other types may be combined and form a chain of life history. The formations are arranged according to their age, and within each class are placed in the order of age, so far as known, the youngest at the top.

**The various Geological sheets.**

**Areal sheet.**—This sheet shows the area occupied by the various formations. On the margin is printed a legend, which is the key by which the reader can obtain the names of all the formations shown on the map. The areal sheet is accompanied by its name, a description of its formation, and also the total thickness of each system.

**Columnar-section sheet.**—This sheet contains a continuous description of the rock formations which constitute the local record of geologic history. The diagrams and verbal statements form a summary of the facts relating to the character of the rocks, to the thicknesses of the formations, and to their order of accumulation of igneous and sedimentary rocks. The columnar-section sheet is accompanied by its name, the names of all the formations shown in the order of age, so far as known, the youngest at the top.

**Fossil remains.**—To show the relative ages of strata, the history of the earth is divided into periods. The names of the periods in proper order (from new to old), with the color or the characteristic mineral, and the symbol used, are printed on the map. The origins of these symbols are explained in the legend, which is the key by which the reader can obtain the names of all the formations shown on the map. The areal sheet is accompanied by its name, a description of its formation, and also the total thickness of each system.

**Colors and patterns.**—The horizontal strata of the plateau rest upon the upturned, eroded edges of the beds of the second set at the left of the section. The overlying deposits are, from their position, evidently younger than the underlying formations, and the bending and degradation of the older strata must have occurred between the deposition of the older strata and their surface contact in an unconformity.

**The third set of formations consists of crystal- ligneous shales, which have not affected the overlying strata of the second set. Thus it is evident that an interval of consider- able duration elapsed between the formation of the schists and the beginning of deposition of the strata of the second set. During this interval the schists suffered metamorphism, and the surface was changed from a scene of eruptive activity; and they were deeply eroded.**

The contact between the second and third sets is marked by a horizontal line, which connects points of equal age, and is described as the horizon of the epoch. The vertical line at the right represents the age of the rocks of the various periods.

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The contact between the second and third sets is marked by a horizontal line, which connects points of equal age, and is described as the horizon of the epoch. The vertical line at the right represents the age of the rocks of the various periods. The average thickness of each formation is shown in the column, which is drawn to a scale—usually 1,000 feet to 1 inch. The order of occurrence of the strata is indicated by the muscle, and that the total thickness of each system.

**The intervals of time which correspond to events of uplift and degradation and constitute the unconformities of the various periods of the earth's history are indicated graphically by way of the word "unconformity," printed in the columnar section.**

Each formation shown in the columnar section is accompanied by its name, a description of its formation, and its age. The formation of the first column is designated as the category, and its letter-symbol as used in the map and their bearing is determined by the various periods of the earth's history. The formations are arranged according to their age, and within each class are placed in the order of age, so far as known, the youngest at the top.

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