DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
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GEOLOGIC ATLAS
OF THE
UNITED STATES

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BY

CHARLES BUTTS

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The Geological Survey is making a geologic atlas of the United States, which is being issued in parts, called folios. Each folio includes topographic and geologic maps of a certain area, together with descriptive text.

**THE TOPOGRAPHIC MAP.**

The features represented on the topographic maps are of two kinds: (1) those belonging to the surface of the earth, such as plains, plateaus, valleys, hills, and mountains; (2) distribution of water, including rivers, streams, lakes, and swamps.

The map may be divided into four classes: (1) the land above sea level, (2) the land below sea level, (3) the land below sea level but above water, and (4) the land under water.

Contour and elevation lines are shown in black. The manner in which contour lines express relief, and the heights of their points are accurately determined, and those of the most important ones 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 outlines or forms of all slopes, and to indicate their grade or steepness. This is done by lines of which in drawn through points of equal elevation above mean sea level, the vertical interval represented by each space between adjacent lines is the same. These lines are called contour lines, or more briefly, contours, and the uniform vertical distance between two contours is called the contour interval. Contour lines and elevations are printed in brown. The manner in which contour lines express altitude, form, and grade is shown in figure 1.

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The sedimentary formations deposited during a period are grouped together into a system. The principal divisions of a system are called series. Any aggregate of formations that has a series is called a group.

Inseam or sedimentary deposits accumulate successively the younger one on those that are older, and their relative ages may be determined by observing their relation to observable features of the earth's surface. Many regions of intense disturbance, however, the beds have been deformed by folding or by faulting, so it may be difficult to determine their relative ages from their present positions; under such conditions fossils, if present, may indicate which of two or more formations is the oldest.

Many stratified rocks contain fossils, the remains or impressions of plants and animals which, at the time the strata were deposited, lived in bodies of water or were washed into them, or were buried in surface deposits on the land. Such rocks are called strata. By studying fossils it has been found that the life of each period of the earth's history was to a great extent different from that of other periods. Only the simpler kinds of marine and limnic formations were deposited. From time to time more complex kinds developed, and as the simpler ones lived on and were modified forms life became more varied. But during each period there lived peculiar forms, which did not exist in earlier times and have not existed since; these are characteristic types, and they define the age of any bed of rock in which they are found. Older types passed on from period to period, and thus linked the systems together, forming a chain of life from the time of the oldest strata to the present. Where two sedimentary formations are remote from each other and it is impossible to observe their relative position, characteristic fossil types found in them may determine which was deposited first from the strata of different areas.

Symbols, colors, and patterns. Each formation is shown on the map by a distinctive combination of color and pattern and is called a symbol. The names of the systems and of series that have been given may be arranged in wavy lines parallel to the structure planes. The age of a rock is expressed by the name of the time interval in which it was formed. The names of formations are given in figures that state the least and greatest times during which they were formed. The order of listing is that of the formation of the sediments in the strata and the introduction of the igneous mass or is deposited upon it. Similarly, the time at which a series is called, the age of the formation, but the relative age of such a formation, its name should be sought in the legend and its color and pattern noted; and the same on the map corresponding in color and pattern may be traced out.

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The geologist is not limited, however, to natural and artificial cuttings the relations of different beds to one another may be seen. Any cutting that exhibits those relations is called a section. The kind of rock is shown by appropriate patterns of lines, dots, and dashes. These patterns admit of much variation, but those shown in figure 3 are used to represent the common kinds of rocks.

The figure represents a landscape which is cut off sharply in the foreground on a vertical plane, so as to show the underground relations of the rocks. The kind of rock is indicated by appropriate patterns of lines, dots, and dashes. These patterns admit of much variation, but those shown in figure 3 are used to represent the common kinds of rocks.

The section shown at the left of figure 2 presents toward the top. The plateau shown at the left of figure 2 presents toward the top. The plateau shown at the left of figure 2 presents toward the top. The plateau shown at the left of figure 2 presents toward the top. The plateau shown at the left of figure 2 presents toward the top. The plateau shown at the left of figure 2 presents toward the top.
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