

**KEY TO A CHART OF THE  
SUCCESSIVE GEOLOGICAL  
FORMATIONS, WITH AN ACTUAL  
SECTION FROM THE ATLANTIC TO  
THE PACIFIC OCEAN**

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Key to a chart of the successive geological formations, with an actual section from the Atlantic to the Pacific Ocean by James Hall

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**JAMES HALL**

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TO  
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**GEOLOGICAL FORMATIONS,**

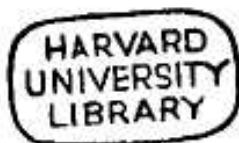
WITH AN ACTUAL SECTION FROM  
THE ATLANTIC TO THE PACIFIC OCEAN.

ILLUSTRATED BY THE  
CHARACTERISTIC FOSSILS OF EACH FORMATION.

BY  
**JAMES HALL,**  
PALŒONTOLOGIST TO THE GEOLOGICAL SURVEY OF THE  
STATE OF NEW YORK.

**BOSTON:**  
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## P R E F A C E .

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THE preparation of the Chart of the Geological Formations was undertaken at the request of S. S. Randall, deputy superintendent of the Common Schools of New York and editor of the Common School Journal, and of A. G. Johnson, deputy secretary of the State of New York.

The object had in view was the introduction of the study of Geology into the schools with better means of instruction and illustration than then existed within the reach of the pupils.

The work was commenced in September,

1849, and completed in December following. Circumstances, which it is not now necessary to enumerate, have delayed its appearance much longer than could have been desired.

It is now issued, with the following pages of explanatory matter, in the hope that it may render a study so delightful in itself and so practically useful, more extensively introduced and more easily understood.

ALBANY, N. Y., *December, 1851.*



## INTRODUCTION.

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THE crust of the earth is found to consist of materials which are either in a loose condition, as soil, clay, sand, gravel, etc.; or consolidated in the form of what are commonly called rocks, as limestone, slate, granite, etc. All these, however, are termed rocks by the geologist.

These rocks are arranged in successive beds or layers, one above another, and are more or less distinctly marked by their mineral character, or by the fossils they contain. Most of these layers or strata were originally formed in a horizontal position, but have been subsequently deranged and displaced, so as to be tilted up, and stand in more or less inclined positions, or even sometimes to be entirely overturned. It is owing to this circumstance, that we are able to explore the strata to a very great depth, and without the necessity of excavating;

since those beds which are really the lowest, are often broken up, and have their edges raised to the surface, or even to great heights beyond other layers which are above them in the geological succession.

It is within the province of geology to determine the true position of each layer, and its relations to those above and below it, however confused or obscured may be their present condition; and to present the evidence on which this determination is sustained.

The chart, to which this book is an accompaniment, is designed to exhibit to the eye the order in which the successive layers or strata of rocks are arranged, as it has thus far been determined by geologists; and, also, the characteristic fossils which have mainly afforded the key to this arrangement. It is intended to exhibit the appearance that would be presented if a section, or cut, were made from the surface towards the centre of the earth, thus exposing the different layers to view by their edges. It is, in fact, such a representation as may be seen in the banks of many rivers, as the Niagara, or in the high, rocky cliffs of the lake or ocean shores, only it is much more extended than any such natural exposures.

## GENERAL DESCRIPTION OF THE CHART.

Towards the left hand side of the chart there is represented a large mass of rock colored red, which is regarded as the basis upon which, or against which, all the other rocks rest. To the right of this are represented the several successive strata or layers composing the entire series of stratified rocks. By observing the direction of the stripes which represent these strata, and which are in truth as we find them in nature, it will be seen, that by passing along the upper margin, from *right* to *left*, we pass over the strata in the same order as they occur in passing downwards along the right hand margin of the section. In other words, we may obtain the same information by travelling along the surface of the earth as we should do by penetrating downwards towards the centre.

In no limited region of country will all the strata here represented be seen; nevertheless, all these strata, and all the phenomena exhibited, from the granite peak on the left, as far to the right as the limits of the Carboniferous formation, may be seen in travelling over the country from the northern part of New York to the centre of Pennsylvania. In this way, we pass in succession over the out-cropping edges of the different layers which lie one