

**ALPHABET OF GEOLOGY AND ELEMENTS
OF MINERALOGY. A TREATISE,
ACCOMPANIED BY
MINERAL SPECIMENS OF MOST OF THE
GREAT MASSES OF ROCK THAT
COMPOSE THE GLOBE**

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Alphabet of Geology and Elements of Mineralogy. A treatise, accompanied by Mineral Specimens of most of the Great Masses of Rock that Compose the Globe by H. T. W. Adams

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H. T. W. ADAMS

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ALPHABET OF GEOLOGY

AND

Elements of Mineralogy.

A TREATISE

DESIGNED FOR STUDENTS AT SCHOOL OR AT HOME, AND
ESPECIALLY ADAPTED TO THE ADVANCED CLASSES
OF THE COMMON SCHOOLS.

ACCOMPANIED BY

MINERAL SPECIMENS

OF MOST OF THE

Great Masses of Rock that Compose the Globe.

By H. T. W. ADAMS.

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P R E F A C E.

THAT *Geology* and *Minerology* are neglected sciences, and that the people ought to have a better knowledge of them, cannot be questioned. In our high schools and academics, studies of less value are taught. This little Manual will contain, in a condensed form much that is elaborately spread out in other works. The author has labored to arrange the material so as to confine the attention step by step, that the whole may be understood; and it is hoped that the present plan of instruction will be so attractive, that the teachers and pupils will be often led to the fields and to nature's wild haunts, where they will need no calisthenic exercises but such as are required for the use of hammers and chisels; *and if it be summer time, baskets for flowers.*

Believing if a taste is formed for the *natural sciences*, life will be made happier and more useful, leading to life's great end, we submit this outline of a science which ranks next to astronomy, to an enlightened public, hoping and trusting that the great Author of worlds will add His blessing so to the young minds that they may see God in His works, and loving Him through the works of His beautiful creations, will be led to draw near unto Him, who speaks in the grandeur of the upheaved mountains, as well as in the sweet voices of nature's whisperings, saying, "Come unto me."

INTRODUCTION.

THE climate, soil and productions of the different countries are so varied, that we naturally expect the rocks to differ, but we find wonderful uniformity everywhere. We find the upheaved granite and all other primary rocks the same in Europe, Asia and Africa, as in America; and the deposits of the precious metals are about equally accessible to all the inhabitants of the globe; iron, coal and the other useful minerals are very abundant.

Geology aids the skill and industry of all classes. A knowledge of the rocks enhances the enjoyment and lightens the toil of the artisan as he chisels his stony material; and the time will undoubtedly come when the farmer will be considered degraded who knows not the composition of the rocks and soil of his farm. Besides, if he has a knowledge of Geology and there be mineral treasure under the soil, he will be more sure to find it.

Geology had its origin as a science in the eighteenth century. It was attacked by misguided philosophers, but it now stands upon a firm basis. Its noblest efforts are to deduce from existing appearances what produced them. On seeing a formation composed of fossil shells and fishes, it will be suggested to the thinking mind that they must have been deposited beneath salt water, and that rounded pebbles and boulders were rolled by waves of ocean or by

running streamlets or rivers; and by examining the cliffs, wells and excavations we learn the thickness of the formation. We also learn that the stratified rocks have a regular order and may be classed, by attention to their mechanical and chemical constitution, and the organic remains they contain. The non-stratified rocks, having no order or place, may be found with aqueous deposits of all ages. A bed or stratum occupying a particular place in the series may be in one place a clay, and in another a limestone; but the fossils being the same, there will be no difficulty in identifying one with the other, and if the deposits of the ancient seas were like those of the present time, in some places the formation may be entirely wanting. When we see the strata *conformable* like the leaves of a book, and other formations lying *unconformably* upon the upturned edges, we conclude that the upheaving took place before the other rocks were deposited. And when we observe that the layers of a formation are the same on the opposite sides of a mountain, forming a foliated axis, we believe a force from beneath bent the strata upward.

Geologists have divided stratified rocks into ten groups, nine of which are fossiliferous, the lowest in the series being *graywacke* and argillaceous slates. This group includes slates and transition limestone. The *carboniferous* group lie next above, and contain old red sandstone, mountain limestones and the coal measures; next, red sandstone, and so on up to alluvial. The mind possesses a classifying principle—a law of order and arrangement. Nature presents this necessity in her varied outward forms and inner structure. Plants, animals and minerals, and the starry heavens present differences which the mind seizes and remembers. These memories lay a foundation upon which to build up a structure of knowledge

which shall be in the mind a temple of great beauty, and a mine of wealth to its possessor.

In the lowest fossiliferous rocks we do not find vegetable, but animal life secreting the limestone, and preparing, by their animal remains, a soil upon which the future vegetation shall live. In the beautiful chambered shells we trace, as it were, the finger-marks of Omnipotence, and in the organic masses we see truth, beauty and purity impressed, and rainbow tints in the crystal gems.

To the Divine Will we refer all first causes in geology.

To the Christian student its claims are of the highest order. It elevates the mind and brings the heart in sympathy with every created being. The more we study His works, the more we see the wisdom and benevolence of the Creator. The Christian loves his Bible; it is God's *new* and revealed *book*. The rocks are His *old book*, and not less truly revealed. In its strata are its pages lettered as with a diamond, and he who has learned to love the Creator, and will read His revealed Will prayerfully, will see that the *two books* are in conformity; he will find no discrepancies.

'Tis God in the volcanic throes,
And in the zephyr's sigh;
'Tis God where sleep the living things,
Impressed long ages by.

GUIDE TO TEACHERS.

A good microscope is essential as it will interest the pupils in their rambles, and aid the teacher in judging of the specimens.

The little boxes of specimens being present, let each pupil be required to show which three specimens of simple mineral form *granite*. The pupil will then take from the box, quartz, mica and felspar. Then let the pupils be required to show which specimens form *gneiss*. They will then show from their boxes *hornblende*, and placing it with the *quartz* and *felspar* they have the simple minerals that compose *gneiss*. Then let them show which two simple minerals form *mica slate*, (mica and quartz). Then let them tell the difference between limestone and gypsum,—the one being a carbonate, the other a sulphate of lime: limestone having carbonic acid; gypsum, sulphuric acid. Then the difference between pudding-stone and breccia, etc., etc.

pudding-stone has rounded fragments or pebbles, united by iron or other cement. Breccia has angular fragments united or cemented, and is called by geologists metamorphosed rock, and conglomerate when the materials are very coarse. The ingredients of pudding-stone often become angular when broken.

The description of the minerals in the boxes and others that represent the great masses of rock on the globe will be found on