THE GEOLOGICAL HISTORY OF NORTH AMERICA.

BY DR. STEVENS.

Third Lecture.

This map represents the form of the North American continent at the commencement of the geologic record, as nearly as we can make it out after all the devastation that has taken place. Then Labrador formed the only portion of the continent above the sea, with the exception of the Adirondack Mountains, the peaks of the Alleghanies, and these others that I have already described as forming a number of iron and granite islands in the midst of the lifeless seas.

This evening I purpose to describe the first rocks that were formed upon granite and the azoic slates—the oldest rocks that contain any remains of animal or vegetable life. These were coral reefs, formed in the shallow waters off the southeast, the south and the southwest shores of what was then the continent. This reef extended from the British possessions in the northeast, sweeping round entirely across the State of New York, away here through Wisconsin, and since this map was made it has been traced beyond Lake Winnipeg at the northwest. It now exists as limestone rock, which on being examined is found to be one mass of coral. Other coral reefs surrounded the islands.

The coral reefs, you are aware, are formed by one of the very lowest orders of animals. Cuvier discovered that all of the animals on the earth are naturally divided into four great orders. The highest are those having vertebra or backbones, and are called vertebrated animals. The next order in the descending scale is composed of those animals which grow to an outside crust, like the lobster, called crustacea. Clams and other similar soft animals form the order of molusca. The last and lowest are the starfishes, mere masses of jelly or muscle without any true bones, generally radiating from a common center, and therefore called the radiata. The coral animals belong to the order of the radiata.

But we find in the rocks of this period remains of animals belonging to the next two orders, the molusca and the crustacea. I will draw upon the blackboard a figure of one of the fossils that are found in great numbers in the rocks of this period, and you will see that it belongs to the order of the crustacea. It resembles somewhat the horsefoot, or king crab, of our waters. Its name is paradoxides, a trilobite. This is another fossil found in these old rocks, which you see is a molusc, being but a slight variation from a soft clam. It is a singula. The other queer form, radiating from a center, is a bryozoo, belonging to the radiata.

These low forms of life were all the inhabitants that the world then had. As we proceed in our history, you will discover that it was a very long time before the lowest class of vertebrated animals, the fishes, even the lowest forms of fishes, made their appearance in the ocean. Seaweeds were the highest forms of vegetation.

In this moluscan age were deposited many thousand feet of sandstones, limestones and shales, filling up the bottom of the seas in those regions now known as Western New York, West Canada, Middle Ohio, Northern Illinois, Wisconsin, Minnesota, Northern Iowa, the Red river country of the north, Central Missouri, Kentucky and Tennessee.

The soils from these rocks form the richest wheat and clover lands of our country. They are inexhaustible in their fertility. Many of the rocks contain as high as 14 per cent of organic matter still preserved in these cemeteries of an ancient world.

The minerals properly belonging to this age are, the native copper of Lake Superior; the copper ores of Acton, Canada East; the lead of Iowa, Wisconsin, Illinois and Missouri; the gold of Du Loupe and Chaudiere, in Canada, of Franklin, in Nova Scotia—recently discovered—and some of the gold mines of North Carolina.

The iron ore pecular to this age is dyestone ore of Tennessee, the lenticular ore of Pennsylvania, the oolitic of New York and the red ore of Dodge county, Wisconsin; all being one and the same ore, known by different names in widely separated localities.

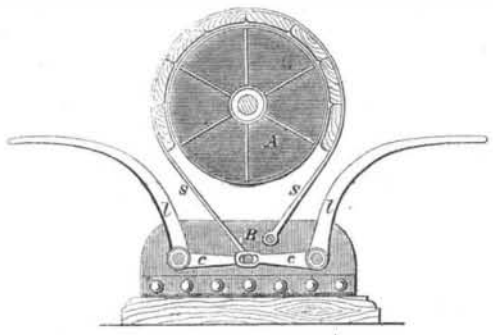
You perceive that the minerals are quite different from the last age. Each age or era of geological history has its appropriate minerals, as it has its fossils, peculiar to, and diagnostic of it.

In my next lecture I shall exhibit another map of the United States, exhibiting its outlines in the fish era and great plant-bearing age.

MERITON'S SAFETY BRAKE FOR STEERING GEAR.

We take the following from the *Mechanics' Magazine*:—The alarming accidents which so frequently occur from heavy seas striking the rudders of ships, when, from the sudden impulse given, the helmsman is ofttimes carried over the wheel, the result being serious if not fatal injury, have led Mr. Meriton to devise a simple and economical means of preventing such accidents, the value of which is enhanced from the fact that it is applicable, at small cost, to new steering apparatus, as well as to all that are already in use, and without in any way interfering with or affecting their proper action.

Mr. Meriton's invention consists in the application of a brake to the various descriptions of steering apparatus, and in the construction of the brake itself, which is so constructed as to admit of its being worked from both sides of the barrel or steering apparatus by means of levers, so that when a heavy sea strikes the rudder, the helmsman can apply the brake—or if two be steering, both can do so—and thereby secure firm footing and perfect security from accident.



The construction and application of the brake will be readily understood by a glance at the above engraving, by which it will be seen that the brake consists of a drum, A, round which passes a strap or band, S S, having upon its under surface, where it comes into contact with the drum, stops of wood, or other suitable substance, for the purpose of causing great friction, and thereby effect the braking of the barrel which contains the chain working the rudder.

The necessary motion is imparted to the strap and drum, by a mechanical arrangement of cranks and levers, *c l*, one end of the strap being fixed to a pin or stud, and the other attached to the cranks or levers, so that upon lifting the levers the requisite amount of friction is produced. The levers act simultaneously.

Lessons from the Leaves.

We men sometimes, in what we presume to be humility, compare ourselves with leaves; but we have as yet no right to do so. The leaves may well scorn the comparison. We who live for ourselves, and neither know how to use nor keep the work of past time, may humbly learn as from the ant foresight, from the leaf reverence. The power of every great people, as of every living tree, depends on its not effacing, but confirming and concluding the labors of its ancestors. Looking back to the history of nations, we may date the beginning of their decline from the moment when they cease to be reverent in heart and accumulative in hand and brain; from the moment when the redundant fruit of age hid in them the hollowness of heart whence the simplicities of custom and sinews of tradition had withered away. Had men guarded the righteous laws and protected the precious works of their fathers with half the industry we have given to change and ravage, they would not now have been seeking vainly in millennial visions and mechanical servitudes the accomplishment of the promise made to them so long ago: "As the days of a tree are the days of my people, and mine elect so long enjoy the works of their hands; we shall not labor in vain nor bring forth for trouble, for they are the seed of the blessed of the Lord, and their offspring with them."

This lesson we have to take from the leaf's life; one more we may receive from its death. If ever in autumn a pensiveness falls upon us as the leaves drift by in their fading, may we not wisely look up to their mighty monuments? Behold how fair, how far prolonged in arch and aisle, the avenues of the valleys, the fringes of the hills! So stately, so eternal! the joy of man, the comfort of all living creatures, the glory of the earth, they are but monuments of those poor leaves that flit faintly past us to die. Let them not pass without our understanding their last counsel and example; that we also, careless of monument by the grave may build it in the world-monument by which men may be taught to remember, not where we died, but where we lived.—*Ruskin's Modern Painters.*

The Lemon Trade.

The most delicate varieties of lemons known in the export trade are the Poncine, incomparable, the Naples, the sweet lemon, the imperial, the Gaeta, the large fruit and the wax lemon. The most delicious, however, are the hothouse production, which are known only in the conservatories of the wealthy. The peculiar nature of the lemon tree, on which may be seen at the same time the blossom and the fruit in all stages of growth, continues the supply through every month of the year, but in greatest abundance in the spring. The importations, which continue during the year, are largest from January to June, in which month they seem to culminate. The scarcity of the supply at present is variously accounted for, but may be safely attributed to the general interruption to commence occasioned by the rebellion of the Southern States. The supply in the market is not always governed by the demand, as there are but four houses in New York who import on their own account, all other shipments being made on account and at the risk of the producers. It will thus be seen that the trade is of a precarious character, and not likely to tempt investment. The number of boxes brought to this country from Sept., 1860, to Aug., 1861, according to the most reliable figures, is, to New York, one hundred and twenty-five thousand; to Boston, thirty-five thousand; to Philadelphia, thirty-one thousand; and to Baltimore, where the season closed earlier than usual, only eight thousand. This is less by fifty thousand boxes than the importations of the previous year. No natural production varies in price so much as do lemons, oranges and Mediterranean fruits. Ten days ago lemons were worth twelve dollars a box, and this week they are six. Last year the price ranged from fifty cents to seven dollars a box. The price is governed by the immediate supply, as they are purchased for immediate consumption.

The Oldest Record.

The oldest of all records of which we have any knowledge was written upon a swift-flying ray of light. Sir William Herschel estimated that some of the nebulæ which were faintly visible by means of his forty-foot reflector were so remote that light occupied two millions of years in coming from them to us. Consequently we see the nebulæ, not as they are now, but as they were two millions of years ago. Looking in the telescope, we are reading the very oldest of histories. Since the nebula had the form which it presents to us—since the ray of light started forth to convey the intelligence of this form, races of men have advanced from barbarism to civilization and have written voluminous histories, which have moldered into dust; and yet the light bears its shining record across the ages, as bright as when it was first so curiously written upon the flying ray.

PHOTOGRAPHS OF GHOSTS.—The *London Review*, in an article on the tendency in modern literature to the revival of ghost stories, suggests to the writers as a verification, that they obtain photographs of their spectral visitors. It says:—"Now, if the specter can ask the favor, let science do it a good turn. Let optics and chemisty catch this modern ghost and photograph it! It can fix the tails of comets and the atmosphere of the sun; the other day a photographer at Berlin caught a stream of electric light flowing out of the bronze spear of Kiss's "Amazon." A ghost can hardly be less material, if it wear crinoline, is helped twice to beef, drinks claret and wants a portrait taken. The photographer's plate is liable to no delusions, has no brains to be diseased, and is exact in its testimony.

A PATENT has been secured by J. Walker and J. Barnes, England, for enameling common card cloth to render it impervious to grease and oil.