

(For the Scientific American.)

Lateral Motion of the Earth.

Owing probably to the great snow storms in February, I received but one number of the SCIENTIFIC AMERICAN for that month up to the 27th of March, when I received the 22nd number, containing the remarks of your correspondent, A. Z., on my article under the above caption, and finding that he has misunderstood me, and thinking it probable that others may have done so, I will attempt another explanation. I never came "to the most singular conclusion, that the axis of the earth is moving east," but to the conclusion that what is now the north pole of the earth, is moving in an eastern direction from its axis from that point, and the south pole in a western direction, each towards the other pole—on another axis perpendicular to this and passing through its center, with its ends or poles at the equator, probably near the eastern coast of South America, and its antipode. Leaving the axis of diurnal rotation just where it was, in the same direction with regard to the heavens, but the earth changing in regard to it. M. Arago says, "Geometry demonstrates that every body may turn in a constant and invariable manner round three axes perpendicular to each other, and passing through its center of gravity." But from the supposed cause of this motion as given in the first article—this may be what astronomers call an instantaneous axis, liable to change and cause the earth to revolve in an undulating plane. The variation of the needle, and the revolution of the equinoxes, by which the axis of the earth, if produced to the heavens, describes a circle equal to twice the inclination of the earth's axis, 46° 56' in diameter, around the celestial pole, may have led astronomers to account for apparent changes, in terrestrial directions, by ascribing them to these, or to geological changes, and so overlook such a motion, even if there is such.

The variation of the needle here is now about 10° to the east, the line on the government surveys, 7½, and the needle has not raised perceptibly from these lines for nineteen years, perhaps not since they were run. However singular this polar motion theory may be, it appears to me that it cannot be more erroneous than the central heat theory, for its advocates say "the fossil inter-tropical plants found in Europe just where they grew, and which are larger than any of the same kind now found between the tropics, lived when the central heat being much nearer the surface than it now is, and by evaporation caused a dense fog, which enveloped the earth, and diminished the rigors of winter by preventing the radiation of heat from the earth, and plants and animals now found only between the tropics could then live anywhere, even under the poles." It is now well known that light is as essential to a healthy and vigorous vegetable growth as heat, and a fog dense enough to prevent the radiation of heat from the earth, would prevent the radiation of light from the sun, and so make it necessary to resort to internal fires for light, which to make one-half as brilliant as that of the sun, would scorch everything to death. I think it no less rational to suppose they grew when that part of the earth was between the tropics, and its soil then recently emerged from the ocean, and being newly fertilized by the myriads of inhabitants of that element, and the washings from other lands, was every way adapted to the growth of plants superior to those now found there. It is not necessary that the earth should originally have been in a state of fusion to have caused an accumulation of matter at the equator. Newton suggested it, I believe, in advance of this theory; and any person who observes the vast amount of solid matter carried down by our western rivers, and knows that all matter held in suspension by the waters tend, by the centrifugal force of the earth's rotary motion, towards the equator—that the largest river in the world, the Amazon, empties upon it—that the mouth of the next in size, the Mississippi, is constantly approaching nearer to it, that the greater the accumulation of matter at the equator, the greater is its tendency to accumu-

late, like compounding interest—may, without any extraordinary stretch of the imagination, conclude that if the earth has attained anything like the great age assigned to it by geologists, and there has been no change of place in the equator, it would ere this have loomed up, so as to cause the earth to lose its spherical form, and assume one approaching to that of a coin.

The great length of some of the mountain chains indicates that they were thrown up under the equator, for we know of no other adequate cause for such prodigious and extensive effects, and even if the internal mass of the earth is not in a molten and liquid state, the mud washed from the land would in many centuries accumulate in some parts of the bed of the ocean in sufficient quantities for this, which being thrown up and sustained by the equatorial motion would become indurated by petrification, and by drying before it passed from over this sustaining force.

If there is a motion in the earth in the direction of its poles, it follows that the land, with its rivers, etc., must pass under poles as well as under the equator, where the centrifugal force of the earth's rotary motion would be so much diminished, that the increased attraction of gravitation would be likely to detain the waters of rivers, where they would spread out into the seas, until their channels had passed far enough from the pole for the centrifugal force to act on them again, when they would again commence flowing towards the equator, and leave the lands which they had submerged at the pole; and as the western coast of Greenland which is next to the north pole, has been sinking for four centuries, and the coasts of Sweden and Newfoundland, which are further from the pole, are rising, this motion may account for it. Be that as it may, it accounts for many things which, without it, require a dozen other theories, and so has the advantage of simplicity. It also has analogy in its favor, for all the great operations of the universe, so far as known, are carried on by revolving movements. And this (if there is one) is one of those sublime slow movements which requires thousands of years to complete a revolution. H. P.

Lafayette, Mo., April 11, 1855.

(For the Scientific American.)
The Mexican Snake Bird.

Having read a brief description of the snake bird, in a number of the SCIENTIFIC AMERICAN (1854) sent me by my brother, I thought that a more extended description of its nature and habits would be interesting to your readers, especially as I have been a resident in this country for more than ten years.

This bird inhabits not only all the southern coasts of Lower California, but all the hot climates of the Republic, and both Central and South America. It goes by the name of Hicaco—pronounced *soaco*. Its color is almost black, and mottled. Its tail is composed of four or five dark mottled feathers, about ten inches long. Its beak is two and a half inches long, slim, hard, and very sharp. Its length is about twenty-two inches from the tip of the tail to the point of the beak. Its weight is about one pound. It has four toes on each foot; its claws are sharp and slender. Its food is grain of all kinds, seeds, and fruit, and particularly the fruit of the cactus, which is abundant in all the hot climates. This fruit is about the size of a small lemon, and is covered with prickles like a chesnut bur. When fully ripe, however, these are easily removed, and it is very fine. This bird has plenty of these, consequently he has an abundance of spare time on hand to make war against all the snake species. With such zeal does he prosecute the warfare, that he seems to have been ordained to keep within certain limits this species of reptile, so dangerous to the human family. No sooner does he see a rattle snake, than he proceeds to gather in his beak and claws the leaves and vines of a certain plant (the hicaco,) and drops them cautiously upon his sleeping foe, at the same time diving down upon him, and screeching in a most threatening manner. This puts the snake upon his guard, not seeing his

most mortal enemy (the plant). If he should get away, the bird again catches it in his beak, and drops it upon him as before. In about three minutes, the snake becomes so stupefied as to fall an easy prey to the enraged bird, which is so strong, although not large, that he will take a snake four feet long by the tail, and fly up with him into the air to the height of 600 feet, and let him drop down to be dashed in pieces. An infusion of this plant (the hicaco—from which the bird gets its name) in brandy, taken into the stomach immediately after a person has been bitten by a snake, stung by a scorpion, or any poisonous reptile, &c., has been stated to be a most powerful antidote to the poison. It is in general use in all the hot climates, where poisonous reptiles abound.

The common way of treating snake bites is, to cut out the wounded piece at once, suck out as much of the poison as possible, and take a dose of the hicaco, sufficient to produce partial intoxication. It is said to prevent, in nine cases out of ten, the setting of the jaw of persons bitten by snakes, and produce relief in from twelve to twenty hours. JOHN S. BLAKE.

Japalpa, Mexico.

(For the Scientific American.)
Chemistry of Steam and Iron.

Experimenters have found that it takes as much heat to convert one pound of water, after it is boiling hot, into steam, as it does to raise the temperature of 5½ lbs. from 32° to 212°, or 990°. The capacity of iron for heat is about one-ninth of that of water, hence it follows that the heat required to evaporate one pound of water would raise the temperature of one pound of iron 990 × 9 = 8910°, or 15 lbs. of iron from 212° to (8910 ÷ 15 + 212 = 806°) a red heat in day light. Or in other words it would require 15 lbs. of red-hot iron to evaporate one pound of water after ebullition has commenced. And, 62.5 × 15 = 937.5 lbs. of red-hot iron to evaporate one cubic foot of water into steam, which, at the ordinary pressure of the atmosphere, will occupy a space equal to 1,700 cubic feet. Under a pressure of 100 lbs. to the square inch, however, it will only occupy a space equal to about 260 cubic feet. Therefore it will require near a thousand pounds of red-hot iron to generate 260 cubic feet of steam under a pressure of 100 lbs. And should the space occupied by the steam be equal to 260 cubic feet, the steam generated by the 1,000 lbs. of red-hot iron would increase the pressure to something over 200 lbs. to the square inch.

Water is composed, by weight, of eight of oxygen and one of hydrogen; and as a cubic foot of oxygen weighs 48 grains, and one of hydrogen 3 grains, it is composed of one volume of the former to two of the latter—three cubic feet of the gases, thus weighing 48 + 3 + 3 = 54 grains, or 54 ÷ 3 = 18 grains per cubic foot, and as water weighs 62.5 × 7000 = 437,500 grain per cubic foot, the gases that form water occupy 437,500 ÷ 18 = 24,305 times its space, or 24305 ÷ 1700 = 14.2 times the space of steam. If steam pass over a surface of red-hot iron, the oxygen unites with the iron, forming an oxyd, whilst the hydrogen is set free. The hydrogen thus liberated will occupy a space equal to 14.2 ÷ 14.2 + 3 = 9.5 times that of the steam, considered as at ordinary temperature, but as it will be heated to at least 212° it will occupy a space equal to about 12 times that of the steam. The oxyd formed by steam is the black oxyd, which is considered to be a mixture of the two oxyds of iron, and is usually composed of about one part of oxygen to three of iron—hence one pound of oxygen is required to convert three pounds of iron into oxyd. Now, as there is about one pound of oxygen in 34 cubic feet of steam, three pounds of iron converted into oxyd will set free 34 × 12 = 408 cubic feet of hydrogen, or will increase the bulk of steam 408 ÷ 34 = 37.4 cubic feet, or each pound of iron oxydized will increase it 37.4 ÷ 3 = 12.47 cubic feet. Thus it appears that the conversion of one pound of iron into oxyd, will enlarge the bulk of steam as much as 70 lbs. of red-hot iron will, by being cooled. And if a scale on the inside of a boiler 1-280 inch in thickness

should be oxydized it will cause the steam in the boiler to expand to as great an extent as it would if the whole of the boiler was cooled from a red heat.

Water is likewise decomposed by electricity. And it is known that electricity is evolved during evaporation. May not the mysterious principle of which we know so little, in some way unknown, decompose the aqueous vapor in a steam boiler, and cause it to expand to near twenty times its volume? J. B. CONGER.

Jackson, Tenn.

Letter from Mr. Worthington.

MESSRS. EDITORS—The undersigned must be the "well known pump maker" whom you favored with a notice last week. He is somewhat surprised, if not gratified, to find that the results of his visit to Washington were so great and unprecedented as to suggest the use of "unexplained means."

From your point of view, it may appear that said pump maker is over-strenuous in maintaining what he considers to be his rights. But you have not heard all of his story yet, for the reason that all of his claims are not yet on public record; when they are, he will trust to your understanding to reach, and to your sense of justice to give him the advantage of more favorable conclusions. With other patentees this is, at present, no place to contend. As "pump maker," the undersigned occupies very circumscribed ground. By and by it shall appear, that if any one has planted his foot on this little patch, it may be well respectfully to request him to step off.

The somewhat equivocal introduction you have given him to the public will suit his purpose very well if you publish this communication. It would be folly to lose the benefit of your piquant notice by omitting to give it a little direction.

H. R. WORTHINGTON.

28 Broadway.

[A gentleman has appeared, it will be seen by the above article, who claims to be the party to whom the note referred, which was appended to the end of the claim of Mr. Gorsuch in our edition of the 14th inst. We do not see the point of this gentleman's letter, for he neither admits nor contradicts the truthfulness of those remarks, but as he seems anxious to assume the title of "well known pump maker," we publish his letter, and in order to benefit him still further, we would refer our readers to his advertisement in another column.—[Ed.]

Discoveries in Old Sidon.

In the winter of 1853-4, some Musselmen who were digging for treasures in the old grave yards of the city, uncovered three copper pots, each containing eight hundred pieces of gold. The whole value of the treasure was about \$12,000. After this discovery, excavations were commenced upon a larger scale, and as it has turned out, with more important results.

On the 19th of January last, some men were digging for more hid treasure in an ancient cemetery on the plain of Sidon, called *Mughorat Tubloon*, when at the depth of about twelve feet below the surface, and near the walls of an ancient edifice, they uncovered a sarcophagus, upon the lid of which is a long Phœnician inscription. The lid is of a blue black marble, intensely hard, and takes a very fine polish. The lid is about eight feet long by four feet wide.—The upper end is wrought into the figure of a female head and shoulders, of almost a giant size. The features are Egyptian, with large, full, almond-shaped eyes, the nose flattened, and lips remarkably thick, and somewhat after the negro mold. The head dress resembles that which appears in Egyptian figures, while on each shoulder there is the head of some bird—a dove or pigeon—and the bosom is covered by what appears to be a sort of cape with a deep fringe, as of lace.

The engines of the new steam frigate *Niagara* are being built by Pease and Murphy, of this city, and are to be splendid pieces of workmanship.