

For the Scientific American.

The Nebular Hypothesis.

The manner in which, and the materials of which solar systems were created, have engaged the attention of the most expanded minds in all ages; and we might perhaps as well acknowledge that the subject is beyond our comprehension, were it not for the fact that many things which remained mysteries since man's creation, have lately been, and are being elucidated in the clearest manner. One fact of great importance is now conceded by every ingenious philosophic investigator, namely, that the Creator, like every other judicious mechanic, adapts means to ends, and employs agents to accomplish his glorious and beneficent purposes; and if "he is without variableness or shadow of turning," it is but reasonable to suppose that he always operated in the same manner.

J. B. Dodds argues that electricity contains all the elements of matter and thinks all things were created of its substance; and that it is a substance, is proved by its making holes through solid bodies when launched from the clouds. All astronomers who have explored space with powerful telescopes, state that there are in the illimitable expanse, vast bodies of ethereal matter, called nebulous, and supposed to be partially condensed electricity on account of its rarity. La Place, who took up astronomy where his predecessors had left it, supposes all solar systems to have been formed from this nebulous matter; and that, governed by those laws which the Creator has established to regulate all things, creation is still progressing, and new worlds are still bursting into progressive being in the following manner.—It is well known that celestial bodies have a rotary motion on their axes; and when these partially condensed electrical masses have attained sufficient auxiliary rotary motion to create a centrifugal force that overbalances the power of cohesive attraction of the particles composing those masses, they throw off a part of their equatorial surface matter which has the greatest velocity, being farthest from their axes. This part, as well as that remaining, being yet in a fluid state, contract again into globular bodies by virtue of the attraction of aggregation inherent in every particle of matter, just as water falling from the clouds forms spherical drops. When the central mass becomes still further condensed, it throws off other planets in succession, until the central mass, which retains nearly all the uncondensed electricity, and remains as a central sun to the whole system, becomes sufficiently reduced to proportion the centrifugal force on its surface to the central force of attraction. But the parts thrown off still retaining their state of fluidity, and receiving also a rotary motion on their axes by the projectile force that casts them off, throw off parts from their equatorial regions also, and these are called moons, and rings in Saturn.

Whatever may be thought of this theory, called the nebular hypothesis, it cannot be denied that it is the only one that will account for existing facts, a few of which may be named:—

1st. The greatly varying and progressive distances at which the planets are placed from their respective suns, and the secondaries, or moons, from their primary planets, show that they were cast off at different times and with different projectile forces.

2nd. Kirkwood's Analogy—which gives a rule to calculate the lengths of their respective days, when the time of their revolution round the sun, or of the secondaries around their primaries, is given, and vice versa—confirms the nebular hypothesis, by showing that the projectile force with which they were cast off, gave them a rotation on their axes proportional to their orbital velocities, and to the larger planets the greater rotary motion proportional to their sizes.

3rd. Every person knows that the larger a heated body is, the longer it requires to cool (to radiate its heat); and we are accordingly informed that the larger planets, which were of course cast off before the earth was, have not yet lost sufficient of their primeval heat to condense them down to the consistency of water on our globe; and they may therefore require many ages yet to become habitable for such beings as we are: the density of Jupiter

and Uranus being about one-fifth, and of Saturn one-tenth that of the earth.

4th. The secondary planets are located much nearer to their primaries than the primaries to the sun; and the rotations of the former on their axes are much slower than those of the latter; the length of a lunar day being the same as of a lunar month.

5th. The orbits of the planets lie nearly in the plane of the equator (equinoctial, rather) of the sun, and those of the secondaries do not vary very much from the planes of the equinoctials of their respective primaries, except Uranus; and all revolve in planes which cut the bodies around which they move into two equal parts, through their centres; but it is easily understood that, if the mass cast off by a central body were to separate more from one side of its equator than from the other side, the axis of that central body might be somewhat changed.

6th. The heat and consequent fluidity of the sun must have been much greater when the primary planets were thrown off, than that of the primaries when they cast off their moons; and these latter being so much smaller than the former, would therefore cool much sooner. We find, accordingly, that the mountains on our moon are much higher in proportion to her size than the mountains on the earth,—showing that the moon cooled so fast as not to allow sufficient time for a more regular arrangement of her surface matter.

7th. On the supposition that the earth was once in a fluid state, Newton calculated that, in consequence of the centrifugal force generated by her rotation, her equatorial diameter must be longer than the polar, while the French mathematicians contended for the contrary; but, when the question was afterwards decided by measurement, it was found that Newton's ratio of the two diameters was as nearly right as the data on which his calculation was founded, would allow.

I have given the merest sketch of a subject on which a volume might be written, and at which many still sneer, without attempting a scientific argument against this hypothesis; but the more the proofs above stated are contemplated and compared with the laws of inertia and motion, the clearer and stronger will the evidence in favor of the nebular hypothesis appear. H. R. SCHETTERLY.

Howell, Mich.

[For the Scientific American.]

Gas and Leakage of Pipes.

In the case mentioned on page 179, this volume of the Scientific American, whereby a number of persons lost their lives by inhaling a great quantity of gas which had escaped from pipes, the question may be asked, "how did so much gas escape on that particular night—did the pipes burst?" A gas pipe never bursts from the simple pressure of the gas, for the pressure is very limited, while the pipes, being so small, are very strong. A large leak could be detected during the day, by the offensive odor and suffocating nature of the gas. I admire the goodness and wisdom of the Creator in giving us this useful agent for illuminating our streets and dwellings, and endowing it with qualities which make it a good servant, and from becoming our master by the warning it gives of its presence in any dangerous quantity. As a practical man of twenty years' experience, I give it as my opinion that the accident referred to, was caused by one or more of the stop-cocks being left open. This is not an uncommon occurrence; I have known ignorant persons blow out the flame of a gas burner, as they would a lamp, and have also known of their turning the key so as to extinguish the light, and then throw the pipe open again, or partially so. In the article referred to, it is hinted that many diseases are caused by inhaling gas that escapes through leaky pipes. This is not so; the inhalation of carburetted hydrogen in minute quantities, never produced any disease whatever. It is unable to support combustion or respiration; this is the reason why life is lost by it, still that does not prove it to be poisonous. I speak of its inhalation in very minute quantities, for in no other condition will it be inhaled by any consumer of gas for one day. Men engaged in the manufacture of gas are very healthy, in general, and as a gas fitter, and while engaged in the works, I have inhaled

it, in great quantities, without any injurious effect.

Carbonic acid gas is mentioned in the said article, as if its deadly qualities were known to everybody; but the truth is, everybody does not know of the destructive qualities of carbonic acid gas, nor of its still more deadly fellow, "carbonic oxide." People in general do not know that both gases are given off by the combustion of charcoal; all persons ought to know this; parents should teach this fact to their children among their household words. These facts would be more generally understood, if people, instead of reading works of fiction, which have a pernicious tendency, would read such works as the Scientific American.

The gas used for general illumination is named "carburetted hydrogen," from its being composed of carbon (charcoal) in a gaseous state, and hydrogen gas. While undergoing combustion, the carbon unites with the oxygen of the atmosphere, and forms carbonic acid gas; the hydrogen unites with the oxygen of the atmosphere and forms vapor of water. The atmosphere is composed of oxygen and nitrogen, which last named gas is as unfit to support life as carburetted hydrogen. Supposing one volume of gas to have been consumed in lighting a room, it requires the oxygen of fifteen volumes of air for its combustion, and it thus leaves in the atmosphere two volumes of carbonic acid gas, twelve volumes of nitrogen, and two volumes of vapor of water—in all sixteen volumes of gases unfit for respiration. This does not apply to gas alone, but to the combustion of all hydro-carbons—oil, tallow, and wax lights. We should be taught by this how important a subject that of "ventilation" is; it is not generally understood, and therefore not generally appreciated. Yours, W. COLINSON.

New York.

Testimony to the Value of the Meat Biscuit.

MESSRS. EDITORS—In a recent number of your paper I noticed an article upon "Meat Biscuit," invented by a Texian gentleman by the name of Borden. Having had an opportunity to test the qualities of the Extract Meat, as it is sometimes called, I am induced, through your columns (if you please), to add my testimony to its merits. I have used it not only at my table, but have prescribed it frequently for several months past, as an article of diet, for a variety of diseases. Being, by a peculiar process, dispossessed of the tendinous portions of the meat (of which it is mainly composed), renders it very easy of digestion, and when taken into the stomachs of dyspeptic individuals, instead of experiencing the usual train of distressing symptoms, to which they are subject after their meals, they feel a general sense of refreshment and restitution of vigor. As an article of diet, for a person under any circumstances afflicted with indigestion, observation has forced upon me the conviction that it is invaluable. I have prescribed it as diet for the convalescent with results equally happy to the patient and satisfactory to myself. The inventor is to me a stranger; but I trust he will pardon the liberty which I take in calling the attention of the medical faculty to the Meat Biscuit. Try it, gentlemen. E. W. SPAFFORD, M. D.

Portlandville, N. Y., April 3, 1852.

New Theory of Coal Basins.

A Mr. McGinnes, of Pottsville, Pa., a year or two ago, advanced a theory that there were more than one coal basin in the Schuylkill region—that the coal strata were thrown into saddles at a number of places, where the seams would be found very deep, and near the surface. Recent experiments have demonstrated the correctness of his theory. "A perpendicular proof shaft," says the Philadelphia Ledger, "has just been sunk in the red-ash range, below St. Clair, on Mr. Carey's land, which, after passing through the two middle grey-ash veins, has, at the depth of 400 feet from the surface, revealed the first big white-ash vein, 28 feet thick, and of splendid quality; which was the thing to be demonstrated."

News From Europe in Five Days.

The authorities of Newfoundland have granted to Mr. H. B. Tibbitts and associates, of New York, the exclusive right to construct and use the magnetic telegraph across that

island, for the period of thirty years. The grant is designed to facilitate Mr Tibbitts in his scheme for the establishment of steam and telegraphic communication between New York and Liverpool, or London, in five days. The telegraph is to extend from New York to St. Johns, from whence a line of steamers is to run to Galway, where another line of telegraph is to commence, extending to London. This latter line will, it is said, be completed during the current year. The distance from St. Johns to Galway, is 1,647 miles, or about five days' sail.

The Telegraph in Mexico.

MESSRS. EDITORS—I came out here last summer, from Philadelphia, for the purpose of constructing and carrying on the Electro-Magnetic Telegraph. We had 130 miles completed by the first of November, extending the line from the city of Mexico to Nopalucan, and taking in its course the city of Puebla. We have men at work completing it to Vera Cruz; our materials are on the ground, and even considering that the country is one of difficulties, we hope to be able to extend the electric spark to the eastern coast by the middle of April next—after which it is contemplated to extend other lines throughout the Republic. This is the first and only successful new improvement that has as yet been introduced into this country, and it bids fair to be both profitable and useful, and may doubtless be regarded as a stepping-stone to other national improvements. Wm. McREA.

City of Mexico, Feb. 25, 1852.

Freezing of Vegetables.

Contrary to the general opinion, freezing is not necessarily destructive of life in vegetables. At Charles Island, in Hudson's Bay, according to Captain James, the trees had to be thawed by fire before they could be cut down, and there is no doubt that the roots are as well frozen as the stem since the vegetation prospers in Siberia, where the following observations have been made:—A well was dug 400 feet deep, and the temperature at 50 feet was 18° Fah., at 77 feet 19°, at 119 feet 22°, at 300 feet 28°, at 382 feet 31°. At this place the ground is frozen to the depth of 400 feet; the cold reaches 58° below zero, and the mean temperature of the two winter months is 40° below zero. During the 128 days during which there is no frost, the strata of eternal ice are never thawed to a greater depth than 3 feet.—[Ex.]

[It is not a general opinion in the United States, that freezing is destructive to vegetable life. Every man who has lived in the northern States knows better. His axe, if he has ever made the forest bow beneath his sturdy stroke, has told him oftentimes of the complete penetration of frost into the interior of the tree.

Curious Phenomenon.

A phenomenon at sea is thus described by Capt. Leslie, of the bark Guilford:—Arrived at Rio. Feb. 10th, in lat. 27.00 N., long 61.00 W. in the northern board near the constellation of Ursa Major, the sky from N. to N. E. by E., assumed the most beautiful appearance I have ever witnessed. It appeared as if a vast volcano, bursting suddenly out beyond the visible horizon, threw its resplendent shadows on the sky to the altitude of 25° to 30°, producing the most vivid colors, some of the brightest scarlet, others of the most beautiful yellow, intermixed with streaks and columns of fire. The whole producing one of the most grand and beautiful phenomena imaginable. Its duration was ten minutes, at the end of that time it gradually vanished and finally was lost to view. The weather had been very pleasant, the evening mild and serene, and so continued for many days.

Monument to the Founder of the Smithsonian Institute.

Dr. Stone, the sculptor, has prepared a design for the monument to Smithson, to be placed in the Institute grounds. It is to be nineteen feet in height—the pedestal ten, and the statue nine. The space between the plinth and frieze is six feet. From this cylindrical plane, projects four allegorical groups in basso-relievo, representing young Freedom, emblematic of America in the progression of development to maturity. The frieze itself carries out and completes the minorities of the allegory, and alone is worth close study.