A NEW THEORY OF THE FORMATION OF THE SOLAR SYSTEM.

MESSRS. EDITORS:—As the result of some years of study, I propose a new theory of the original formation of the solar system, in opposition to that of Laplace.

My idea is that the sun and planets were primitively a single, vaporous mass, of a lens-shape, rotating in a resisting medium of etherial air, which had the same effect upon the lighter portions of the nebulous planetary matter that our atmospheric air has upon feathery or downy substances that move through it; that is to say, it deflected them toward the center. The consequence is that, of the 739 parts of the solar system, 738 are in the sun, and only one constitutes all the planets and satellites. The matter which was most deflected by revolving in the resisting air was that which was the least dense, and that which moved with the greatest velocity. As the matter nearest the sun moved with the greatest velocity, it was nearly all swept into the sun. At the point where Jupiter was formed, which is about one sixth of the distance from the sun to Neptune, the velocity was sufficiently moderated to allow cohesion and centrifugal force to prevail over the influence of the resisting medium. This is the reason of the great magnitude of Jupiter and of Saturn, and of the smallness and density of the planets between Jupiter and the sun. The mass of Jupiter is equal to 338 earths; the mass of the next planet (Saturn) is equal to 101 earths, and all the other planets together are not more than equal to 40. The four planets, with the asteroids added, between the sun and Jupiter are, altogether, not equal to 2½ earths; but their density is about five times greater than that of the other planets. It was the great density of the matter of these planets which prevented it from being carried spirally to the sun, as the lighter matter was, with which it was primarily associated during the early stages of planetary creation. Some of the spiral nebulae seen by the telescope are evidently undergoing the same process—the lighter portions, especially near the centers, are gradually moving spirally to the centers to form suns, while the denser is left to form planets. At a definite distance from the center, a giant planet must be formed in each system, analagous to Jupiter.

The tendency of cohesion was to unite the nebulous matter that revolved around the sun into one ring; but the tendency to greater velocity at the inner than at the outer part of the ring antagonized cohesion, and tended to separate the large ring into a number of smaller rings, from each of which a planet was afterward formed. As the cohesive power was the same in all parts of the nebulae, though the velocity regularly decreased from the inner to the outer parts, the consequence was that there was a tendency to make the differences of the velocities of the planets the same, while the intervals or distanees apart—in other words, the width of the rings—increased from within outward.

There appears to have been a tendency of the differences of the velocities to assume an arithmetical ratio, while the differences of distance (the width of the rings) assumed a geometrical ratio, as a necessary consequence. Thus, what is called "Bode's law" is accounted for. The discrepancies and irregularities in the series are to be attributed to the disproportions between the masses of the planets and their intervals, producing perturbations sufficient, in some cases, to prevent the concentration of planetary matter; and thus to give birth to groups of asteroids, some of which will yet be discovered in places where planets would otherwise have been formed. It would seem that the less dense the nebulous matter was when it became separated into rings, the narrower and more numerous the rings were, and the wider the space occupied by the whole system. This is exemplified by the differences between the satellites of Jupiter and Saturn.

The system of Jupiter's and Saturn's satellites are formed on the same plan as the solar system, having one giant satellite, analogous to Jupiter, in each system, larger than all the others, with several small ones between the giant and the primary.

In following out this train of reasoning, I was led to the discovery of an important relation between the velocity of the planets, which is represented in the following tables:—

Relative Velocities of the Planets and the Differences of their Velocities.

	Miles per hour.	Actual vel'cs.
Velocity of Neptune	12,460	12,460
Add 65½x5, equal to	3,275	
Velocity of Uranus	15,735	15,730
Add 65½x10	6,550	
Velocity of Saturn	22,280	22,300
Add 65½x11	7,200	
Velocity of Jupiter	29,480	30,200
Add 65½x20	13,100	
Velocity of the Asteroids	42,580	42,580
Add 65½x20	13,100	
Velocity of Mars	55,680	55,810
Add 65½x20	13,100	
Velocity of the Earth	68,780	68,890
Add 65½x20	13,100	
Velocity of Venus	81,880	81,000
Add 65½x21	13,750	
Velocity of undiscovered planet	95,630	
Add 65½x21	13,750	
Velocity of Mercury	109,380	109.720

It will be noticed that the difference between Uranus and Jupiter is 65½×21=1,375.

Jupiter's Satellites.

Velocity of the fourth	17,743	17,743
Add	7,000	
Velocity of the third	24,743	24,513
Add	7,000	
Velocity of the second	31,743	30,716
Add	7,000	
Velocity of the first	38,743	88,717

The following arrangement is more complicated, but perhaps more accurate:—

Velocity of the fourth	17,743	17,743
Add 618x11, equal to	6,798	
Velocity of the third	24,541	24,513
Add 618x10	6,180	
Velocity of the second	30,721	30,716
Add 618x13	8,034	
Velocity of the first	38,755	38,717

Satellites of Saturn.

Japetus' velocity (eighth)	7,968	7,968
Add 350x4, equal to	1,400	
Undiscovered Satellite	9,368	
Add 350x4	1,400	
Undiscovered Satellite	10,768	
Add 350x4	1,400	
Hyperion (seventh)	12,168	12,215
Add 350x4	1,400	
Titan (sixth)	13,568	13,635
Add 350x10	3,500	
Undiscovered Satellite	17,068	
Add 350x10	3,500	
Rhea (fifth)	20,568	20,763
Add 350x10	3,500	
Dione (fourth)	24,068	24,510
Add 350x10	3,500	
Tethys (third)	27,568	27,760
Add 350x10	3,500	
Enceladus (second)	31,068	31,000
Add 350x10	3,500	
Mimas (first)	34,568	34,986
Add	350	
	34,918	

Satellites of Uranus.

Velocity of the sixth	7,636	7,636
Add	600	
Velocity of the fifth	8,236	8,178
Add	600	
Velocity of the fourth	8,836	8,828
Add	600	
Undiscovered Satellite	9,436	
Add	600	
Velocity of the third	10,036	1,056
Add	600	
Undiscovered Satellite	10,036	
Add	600	
Velocity of the second	11,236	11,209
Add	600	
Undiscovered Satellite	11,836	
Add	600	
Velocity of the first	12,436	12,560

NOTE.—The actual velocities in the right hand column of figures are mostly as estimated by Dr. Lardner. It will be observed that the existence and localities of several undiscovered satellites and of one planet (or group of asteroids) is indicated. The number 65½ in the table of the planets seems to indicate that the nebulae first tended to separate into smaller rings, with a difference of velocity of only 65½; but the irregularities of the masses, together with increased condensation, produced the present arrangement by combining several small rings into one.

J. STANLEY GRIMES.

Lansingburg, N. Y., Sept. 15, 1860.

EXPANSION OF METALS BY HEAT.

Most all bodies expand when heated, but there are scarcely two solid or fluid bodies which expand alike. The metals expand most, and their rate of expansion is best known, because the greatest number of experiments have been conducted with them. Rods of the undermentioned substances, on being heated from the freezing to the boiling point of water, elongate as follows:—

Zinc (cast)	1 on 323	Gold (pure)	1 on 682
" (sheet)	1 on 340	Iron (wire)	1 on 882
Lead	1 on 351	Palladium	1 on 1000
Tin	1 on 516	Glass	1 on 1142
Silver	1 on 524	Platinum	1 on 1157
Copper	1 on 531	Black marble	1 on 2833
Brass	1 on 584		

This is the increase which these bodies sustain in length when heated. A rod of silver 524 inches long will be extended to 525 inches at a temperature of 212°. Zinc is the most expansive of metals; it expands nearly four times more than platinum with the same heat. Glass without lead expands nearly in the same degree as platinum, hence it has been supposed possible to weld these two substances together, but we have not yet seen this done. All expanded bodies return to their original dimensions on cooling. It has been observed that the same solid is more expansible at high than at low temperatures, but the increase is not considerable. All solids have been observed to expand at an accelerated rate when heated up to near their fusing points. Platinum is the most uniform, in its expansion, of all the metals.

The foregoing table will be found very useful to mechanics, as a guide to them not to unite two metals having a great difference in expansibility together in a machine, especially when it has to be exposed to a high heat.

THE BAROMETER A USEFUL INSTRUMENT.

MESSRS. EDITORS:—Knowing that many of your readers, like myself, own a farm, I wish to bring to their notice the barometer, as an instrument of great value at the time of securing their crops.

I purchased one a short time since, and have already proved it to be a certain indicator of changes in the weather. At the time I bought it I was building a house for a farmer who owned a large farm, and hanging it up at his house, we saw the mercury was falling. The next day was a rainy day, as indicated; but before night, the mercury began to rise. The next morning the mercury stood at a high point, but the weather looked so threatening, with a north-east wind, that we all thought it was a "prophet not to be accepted in our country." But by noon the aspect had entirely changed, and the barometer had told us the truth. In two or three days after that, the mercury commenced to go down again and continued to do so all day. It was a lovely afternoon, with a north-west wind blowing gently, and certainly did not look like a storm. Mr. J., however secured his grain, as the barometer had told us the truth before, and though it was perfectly clear at bedtime, it rained before daylight next morning.

R. C. N.

Guilford, N. Y., Sept. 10, 1860.

THE PHENOMENON OF REGELATION.—From a long paper on this subject by Professor Faraday, which we find in the London *Mechanics' Magazine*, we take the following extract. It contains the pith of the whole matter:—"The philosophy of the phenomenon now understood by the word 'regelation' is exceedingly interesting, not only because of its relation to glacial action under natural circumstances, as shown by Tyndall and others, but also, as I think, especially in its bearings upon molecular action; and this is shown, not merely by the desire of different philosophers to assign the true physical principle of action, but also by the great differences between the views which they have taken. Two pieces of thawing ice, if put together, adhere and become one; at a place where liquefaction was proceeding congelation suddenly occurs. The effect will take place in air, or in water, or in vacuo. It will occur at every point where the two pieces of ice touch; but not with ice below the freezing point, *i. e.*, with dry ice, or ice so old as to be everywhere in the solid state."

STEAM TUNNAGE OF THE SEVERAL PRINCIPAL PORTS OF THE UNITED STATES.—The following statement of the enrolment of steam vessels belonging to the several ports of the United States, in 1859, is taken from the "Report on Commerce and Navigation," recently issued by our government:—

Ports.	Tuns.	Ports.	Tuns.
New York	120,598.09	Mobile	28,898.52
New Orleans	75,789.91	Philadelphia	22,238.50
St. Louis	54,515.64	Cleveland	21,720.73
Pittsburg	40,550.08	Baltimore	19,260.83
Buffalo	42,464.04	San Francisco	10,214.94
Detroit	33,005.12	Boston	9,998.52
Louisville	29,626.73	Chicago	7,651.45
Cincinnati	25,668.31		

The total steam tunnage of the whole United States, for the year ending 30th of June, 1859, was 676,004, 83-95 tuns.

THE SEPARATION OF THE RAYS OF HEAT FROM THOSE OF LIGHT IN THE EYE.—Our readers are aware that the sunbeam consists of three elemennts—light, heat and the chemical rays. A paper has recently been communicated to the French *Academie des Sciences* by M. J. Janssen, giving an account of a series of experiments undertaken by him, to ascertain how large a portion of the *heat* rays pass through the central portions of the eye and reach the retina at the back. His experiments show that *all* the rays of heat are absorbed before they reach the retina—two-thirds by the cornea and the other third by the aqueous humor.