

**PROFESSOR
MONTGOMERY'S
DISCOVERIES IN
CELESTIAL MECHANICS**

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Professor Montgomery's discoveries in celestial mechanics by L. A. Redman

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UNIV. OF
CALIFORNIA

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TO THE
UNIVERSITY
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*"Thus the Seer,
With vision clear,
Sees forms appear and disappear,
In the perpetual round of strange,
Mysterious change
From birth to death, from death to birth,
From earth to heaven, from heaven to earth;
Till glimpses more sublime
Of things, unseen before,
Unto his wondering eyes reveal
The Universe as an immeasurable wheel
Turning forevermore
In the rapid and rushing river of Time."*

Longfellow.

Introductory

The views herein set forth were made known to me in the year 1886 by the late John J. Montgomery, afterwards a professor in Santa Clara College, and at that time the model referred to in the text was exhibited to me and it is now in my possession. On several occasions thereafter I urged him to publish his discovery, the last time in the year 1909, about two years before his death. He did not do so however, and on my pressing him for an explanation on the last occasion, he said that his failure to publish was not because of any doubt as to the soundness of his views, but that the discovery made by him was connected with or incidental to certain underlying principles, and that in due time he would reveal it in its relation to such principles. I do not know what he had in mind. Possibly principles of molecular action, or it may be that he saw and intended presently to explain how the progressive changes which he proved were mechanically necessitated were incidents of the dissipation of energy in the solar system. This (to a limited extent) was perceived by Professor Percival Lowell, and was expounded in his "The Evolution of Worlds", which was published at about the time I last saw Montgomery. Professor Lowell says that Sir Robert Ball was the first to suggest the "argument" which he employed (p. 145). I do not recall that Montgomery ever mentioned to me this phase of the subject. I first became acquainted with this principle on reading Lowell last year when I began my investigation. Montgomery met with a sudden death by the fall of an airplane with which he was experimenting. During his lifetime (in 1905) there appeared in the newspapers an article, telegraphed from Cambridge, Massachusetts, setting forth that Professor William H. Pickering had discovered that the planets were "keeling over", and thereupon, without Montgomery's knowledge, I sent to the San Francisco "Bulletin" the following communication which it published:

"CALIFORNIA ENTERTAINING A GENIUS UNAWARES.

San Francisco, March 27, 1905.

Editor Bulletin:

Referring to the dispatches in The Bulletin of the 15th inst. from Cambridge, Massachusetts, and the Lick Observatory, relating to Professor Pickering's theory that 'all the planets have keeled over or are keeling over', I feel impelled to make public the fact that this discovery was made by Mr. John J.

TO MR
MONTGOMERY

Montgomery, now a professor in Santa Clara College, more than twenty years ago. It was disclosed by him to me in 1886 or 1887. With him it was more than a theory. By means of a mechanical device—a sort of orrery—he physically demonstrated that spheres having a retrograde rotation being in unstable equilibrium, will necessarily 'keel over'. The parts nearest the sun of a planet having a retrograde rotation move with relation to the sun more rapidly than those parts on its remote side; hence the former tend to move away from the sun while the latter have a tendency to move toward it. The result is that the planet turns over and establishes a condition of stable equilibrium—one in which the inner parts tend to move towards the sun and the outer parts away from it. I have not sufficient knowledge of the subject to set forth accurately all the remarkable implications of this great discovery—some of which I believe are still occupying Mr. Montgomery's attention. I may say, however, that it accounts for the precession of the equinoxes, the tides, the transfixed position of the moons of Jupiter and the earth and of Venus (†), the half-tilted over condition of Uranus, the retrograde rotation of Neptune and the retrograde translatory motion of Saturn's ninth moon.

In my judgment this brilliant revelation eclipses any discovery made in astronomical science since the days of Kepler and Newton. In unassuming John Montgomery, whose recent experiments in wireless telegraphy and aerial navigation have been attracting public attention, California has these many years been 'entertaining an angel unawares.' His self-abnegation is so extreme that unless some one else drew attention to his claims the merit of the discovery referred to would naturally be bestowed wholly upon Professor Pickering. I do not question the latter's claim to originality, nor do I know when the discovery was made by him, but I do know that it was made many years ago by Mr. Montgomery.

Respectfully yours,

L. A. REDMAN."

I learned upon investigating the subject last year that Professor Pickering had first advanced his theory in 1893. But the reading of his articles disclosed that, while he contended that polar inversion, where the rotation is retrograde, must ensue, his explanation of the cause thereof is totally different from that of Montgomery and is, as I think I have clearly shown, erroneous.

Montgomery was a firm believer in the nebular hypothesis. He also believed, as Kirkwood did, ("The American Journal of Science", Vol. 36, p. 1), and as Professor Pickering and others do, that the planets formed from detached parts of the nebula as it

contracted would have retrograde rotations. I have not however dealt with this feature of the problem. Postulating this, I have set forth the argument showing how the planets are inverted, and then how forward rotation (which inversion involves) is retarded until the rotation and revolution periods coincide; and finally how the planets and their satellites will be drawn into the sun. I have also shown the harmony between Montgomery's discovery and the proposition that energy will be dissipated until it is reduced to the least quantity consistent with the original and unchanging moment of momentum of the system. And I have pointed out (what Ball and Lowell did not see) that their "argument" involves the proposition that by dissipation of energy the matter composing the nebula will ultimately be concentrated in a cold rotating body.

There is one feature of the process which I have merely indicated without going into it in detail, namely, the inversion of the orbits of the satellites. The planets do not "carry over" their moons, but the orbits of the moons are "carried over" by the sun. And where the differential attraction of a satellite is greater than that of the sun it controls the inversion of its primary. In the case of the few very remote satellites which still have a retrograde revolution, the inversion force has been so feeble that little progress has been made. And in this connection it is to be noted that while Mercury and Venus (which have no moons) turn always the same face to the sun, the earth will not do so until after it has absorbed the moon. It is the moon and not the sun which controls the earth's inversion, and it will also control the earth's rotation as its differential attraction is greater than that of the sun. Hence, the earth's rotation will only be retarded until the day and month are the same. The earth and moon will finally rotate and revolve as if united by a bar. Thereupon the moon will spiral inward upon the earth; and finally the earth-moon will spiral into the sun.

In December, 1917, I asked Professor Campbell, Director of the Lick Observatory, if the views of Montgomery were known to and accepted by astronomers as correct, and was informed by him that the theory of Professor Pickering was well known, but that it was not generally accepted. I thereupon made an investigation and was amazed to find that not only was there a want of agreement amongst those who had given the matter consideration, but that the arguments made in support of the propositions advanced by the various writers on the subject were of the loosest character,