An instance of the kind was found by Dr. Huntington in part of a Brenham pallasite in the Harvard University Museum, and was illustrated in Plate III. of his above-cited paper. The scientific and exhibitional value of the Brenham pallasites is shown by the fact that, while the total "fall" was scattered over an area of about a half mile by two miles, and aggregated well toward a ton in weight, the largest specimen offered in the 1907 price-list of one of the largest firms in America dealing in meteorites, weighs less than five and a half pounds, and is listed at $150.

UNIVERSITY AND EDUCATIONAL NEWS

Harvard University has received the sum of $15,000 from Mrs. James Augustus Rumrill, of Springfield, in memory of her husband, who received his degree of A.B. from the university in 1859. It is to be used to establish three scholarships for southern students.

While the British are reorganizing the College of Medicine and the Technical Institute at Hong Kong into a university, the Germans have established a school of university grade at Kiao-chau. It is said that the German government has appropriated $160,000 for its establishment and will contribute $50,000 annually for the support of the institution.

It is proposed to reorganize the schools of higher education of Algiers into a university.

The Tulane University of Louisiana during the past year has come into possession of the following amounts: Two million eight hundred dollars from the Newcomb estate. This goes to the Newcomb College—the woman's department of the University—founded by Mrs. Josephine Louise Newcomb as a memorial to her daughter, and to which Mrs. Newcomb before her death gave about one million dollars. Mrs. Ida A. Richardson has made a donation of $50,000 to the university towards the establishment of a chair of botany. By the will of Miss Linda Miles, who died recently in Washington, D. C., the university library is the recipient of $5,000 to purchase books. The following persons have been added to the scientific departments of the university for the session of 1909–10: Charles K. Burdick, New York City, professor of law; Irving Hardesty, Ph.D., University of California, professor of anatomy; Henry W. Stiles, University of Michigan, assistant professor of anatomy; H. Hays Bullard, University of Missouri, instructor in anatomy; D. F. MacDonald, University of Chicago and U. S. Geological Survey, assistant demonstrator in chemistry and geology; J. G. Gage, assistant in clinical medicine.

DISCUSSION AND CORRESPONDENCE

"MARS AS THE ABODE OF LIFE"

The recent letters in Science on the geologic facts in "Mars as the Abode of Life" have an origin which readers of Science should have the opportunity to know. The geologic facts in "Mars as the Abode of Life" are taken from recognized sources, chiefly Dana, Geikie, Dr. Lapparent and recent research; only the weaving together is new. They are not *res gratae* to certain geologists because they clash with a new cosmogeny devised by the Chicago geologist, Professor Chamberlin, who associated with himself for the mechanical and mathematical proof of it, on which all such hypotheses must rest, the assistant professor of astronomy of his university, Professor Moulton. It becomes pertinent, therefore, to consider the basis of their belief which is necessarily astronomic. From the latter writer's exposition of the hypothesis given in most detail in his "Introduction to Astronomy," we shall now quote.

We shall begin with a statement on page 380, which in itself is sufficient to render the reader cautious when he finds himself adventured later upon the exposition. It is with regard to the speed of meteors when they strike the earth. It runs as follows:

> Let us assume provisionally that the meteors are moving around the sun in sensibly parabolic orbits, like the orbits of the comets, and let us find the greatest and least velocities with which they can encounter the earth's atmosphere. If it were not for the earth's attraction they would pass the earth's orbit at the rate of twenty-five miles per second, the velocity being independent of the angle at which they crossed. The earth's

attraction would generate a velocity of nearly seven miles per second in a body falling from an infinite distance into its atmosphere, whether the sun were attracting it or not. The greatest relative velocity will be when the earth and meteor meet, which is $25 + 7 + 18 = 50$ miles per second. The least will be when the meteor overtakes the earth, which is $25 + 7 - 18 = 14$ miles per second.

Now the velocities due to the sun's attraction and to the earth's upon a particle falling to the latter under the action of both can not be added in this simple manner.

The geometric explanation why the velocities can not be directly added is that when each body is supposed to act alone the times involved in their actions are different, while when they act together these are naturally the same. In the latter case the velocity due the sun hurries the particle through the space faster than the earth's pull alone could and so gives the earth less time to act.

For the analytical solution of the problem the reader is referred to a paper in the *Astronomical Journal*, No. 601, in which he will find that the speed the earth can impart depends on the mode of approach, that it can never exceed 2.66 miles a second and may fall as low as 0.53 mile.

We shall now go on to what concerns the hypothesis more directly. The first point we shall mention is found on page 460. In the criticism of the suggestion that "when Saturn extended out to the orbit of the ninth satellite, it rotated in the retrograde direction with the period of this body," the book says:

> When the rotation period of the nebulous mass equaled that of its revolution, it filled some space as that indicated by the dotted curve in Fig. 168. Up to this time the tides generated by the sun had increased its moment of momentum by changing it from a negative quantity to a certain positive quantity. After this time the tides generated by the sun decreased its moment of momentum, for they always retarded the rotation. Therefore, if the theory is true, the greatest moment of momentum in the whole history of the Saturnian system should be found when the day and year of its nebula were equal.

The fallacies here are two: (1) It is supposed that the sun-tides would act solely in the Saturnian plane; whereas they would undoubtedly turn the system over in the act. (2) The moment of momentum here considered is that of the solar system; whereas in the generation of satellites it is that of the Saturnian system itself, a totally different matter; so that the supposed destructive proof falls to the ground.

The next point is on page 480, where we are told with regard to the acceleration of a satellite nucleus by a particle m that

> It is found by a mathematical discussion that this always results if the eccentricity of the orbit of m is greater than

$$\frac{r}{R} + \sqrt{\frac{MR}{r}},$$

where R is the radius of the orbit of the planetary nucleus around the sun, r the radius of the satellite nucleus around M, and M the mass of the planetary nucleus expressed in terms of the sun's mass. In the case of the earth and moon the limit comes out 0.035, but in the case of the larger planets and closer satellites it is very much larger.

Now the determining equation is

$$\sqrt{\frac{1}{R}} - \sqrt{\frac{M}{r}} = \sqrt{\frac{2}{Rr} - \frac{1}{a}}$$

where

$$a(1 + e) = R - r$$

whence

$$e = \pm\sqrt{\frac{MR}{r} - 2M + \frac{rM}{R} - \frac{MR}{r} + M + \frac{r}{R}}$$

or taking terms of the first order only

$$e = 2\sqrt{\frac{MR}{r}} - \frac{MR}{r} \text{ approx.}$$

Comparing this with the printed value we see that a term of the first order has been omitted and one of the second kept. The result is that with Jupiter and his fourth satellite we have

$$\text{true value } e = 0.86$$
$$\text{planetesimal value } e = 1.26$$

or actually a hyperbolic orbit.

The next point is from pages 478 to 481. The book says, speaking of the effect of particles inside the planet's orbit:

> The satellite nucleus is carried forward by the motion of M, while it moves backward in its revolution around M. The latter is a much slower motion than the former. . . . It follows from the

direction of motion of the satellite nucleus that in this case its motion around M will be accelerated by its collision with m. . . . The effect of the accelerations by the scattered material is to enlarge the orbit of the satellite nucleus, and to prevent its being drawn down upon the growing planetary nucleus.

Now the speeds of the larger planets and of their satellites are as follows:

	Speed in Miles per Second	
	Of Primary in Orbit	Of Satellite about Primary
Jupiter	8.1	
Sat. 1		10.7
2		8.5
3		6.7
4		5.1
Saturn	6.0	
Sat. 1		9.0
2		8.2
3		7.9
4		6.3
5		5.3
6		3.5
8		2.0
Uranus	4.2	
Sat. 1		3.5
2		2.9
3		2.3
4		2.0
Neptune	3.4	
Sat. 1		2.7

On the very face of the table it will be seen that six satellites contradict the book. When we get into it deeper we find they all do. Thus if we suppose the colliding particles to be equally distributed in space we have for those within the planet's orbit:

$$\int_{\frac{1}{2}}^{1} \frac{(2a-1)\,\frac{1}{2}a\,\frac{1}{2}da}{\int_{\frac{1}{2}}^{1} ada}$$

for their mean velocity at the point of collision; a being the semi-major axis of any particle.

This equals 0.79 of the planet's orbital speed. A result substantially similar is got for any other possible distribution.

From this it appears that all the large satellites of all the large planets have spatial speeds which would cause them to be retarded by such impacts or exactly the opposite of what the book states. So that the supposed proof by this of the planetesimal hypothesis turns out to be a disproof of it.

From what we have said it will be seen that the hypothesis expounded will not work.

Percival Lowell

THE NOMENCLATURE QUESTION

To the Editor of Science: May I add a few words to the excellent letters by Mr. F. N. Balch[1] and Dr. W. H. Dall?[2]

It is necessary first to assume that zoologists in general accept or wish to accept the rules drawn up by the Nomenclature Committee of the International Zoological Congress. The assumption may be a ridiculous one, but it will at any rate be admitted that until those rules are generally accepted further discussion is premature.

I agree with Dr. Dall that most cases can be settled by a rigid application of the code. There are a few in which the interpretation or application of the code may be obscure. These must be remedied either by greater precision in the rules or by the decisions of a court in the manner described by Mr. Balch. There are other cases in which the consequences of the rules are perfectly clear, but at the same time exceedingly unfortunate—so unfortunate indeed are some of them that a great many zoologists are beginning to say "So much the worse for the rules."[3] A phrase has often been used that we should accept the principle of priority "tempered with common sense." This would be all very well if there were such a thing as common sense, but it is notorious that in these matters *quot homines, tot sententiæ*. In a recent paper[4] I have therefore ventured to repeat an old proposal, for which the time now seems to be more ripe, and as that paper may not be very widely seen, I ask you to print the following extracts:

[1] Science, June 25, pp. 998–1000.

[2] Science, July 30, pp. 147–149.

[3] See, for instance, a letter to *Nature* for August 27, 1908, pp. 394–395, signed by many leading British zoologists.

[4] "Some Common Crinoid Names, and the Fixation of Nomenclature," *Ann. Mag. Nat. Hist.* (8), IV., pp. 37–42, July, 1909.