

of Livingstone's services. The strictly biographical part of the work is equally well done. All the world agrees that Livingstone was one of the noblest men who have ever devoted themselves to travel. This is felt strongly by Mr. Johnston, and he has been able to express his feeling effectively without extravagance and without any attempt at fine writing. The book will especially interest young readers, but may be studied with pleasure and profit by readers of any age. There are many good illustrations from photographs or drawings by the author, and seven maps by Mr. E. G. Ravenstein.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The National Home-Reading Union.

WHEN one remembers the difficulties with which one's own first efforts to study Nature were beset, it seems a pity that any youthful student should be ignorant of the existence of an organization which can do much towards making his path smooth.

The National Home-Reading Union endeavours to guide those who cannot obtain aural instruction into the safest and most attractive roads. Lists of books are drawn up; difficulties and discrepancies in systematic reading are, as far as possible, foreseen and removed in the pages of the magazine; questions are answered by those who conduct the courses. Last year and the year before, the courses on organic and inorganic Nature were in the charge of Mr. Francis Darwin, Dr. Hickson, and Dr. Kimmins. This year, geology is undertaken by Mr. Marr, and cryptogamic botany by Mr. Murray; and any persons who wish to work at these subjects may save themselves much labour and misplaced reading by writing to the Secretary of the Union, Surrey House, Victoria Embankment, for a prospectus. Mr. Murray tells me that it is often pitiful to see how much effort has been wasted by people who come to the British Museum to educate themselves, owing to the need of guidance to the right books with which to commence their studies.

I trust that this good work will commend itself to you as worthy of notice.

ALEX. HILL.

Downing Lodge, September 17.

Notoryctes typhlops.

ALLOW me to protest against the misnomer "Marsupial Mole" applied to Dr. Stirling's marvellous mammal by Mr. Slater, both in the *Times* and in *NATURE*. "Mole-like Marsupial" it may be, but the other phrase has quite a different meaning, and either shows a want of appreciation of important characters, or implies a theory which, however plausible, has not been proved.

ALFRED NEWTON.

September 12.

"W = Mg."

I WISH that Prof. Greenhill would kindly explain to a bewildered reader of your paper the nature of his quarrel with "W = Mg," and with the writers of "theoretical" treatises who use this equation.

To those trained to regard quantity of matter as measured by its inertia, and who regard the "mass" of a body as the quantity of matter, so measured, which it contains, the equation  $W = Mg$  has a pretty clear meaning.

A certain body "has a mass M," this being the measure of its inertia in terms of that of the mass-unit. This body is observed to have an acceleration  $g$ . We argue, from Newton's experimental laws, that there is a force acting on it; and we measure this force by a number which is the product of the two numbers, M (the measure of the mass of the body), and  $g$  (the measure of the acceleration observed).

NO. 1143, VOL. 44]

If we observe a tight string attached to the body in question, and have every reason to believe that there is no other cause for the observed acceleration, we say that  $Mg$  measures the tension T of the string; or write " $T = Mg$ ." If the acceleration be due to the presence of the earth only, we say that the earth exerts a force [the "half" of the mutual stress] on the body, measured by  $Mg$ . This force we call the "weight of the body"; and the equation  $W = Mg$  gives us the measure of the "weight" as deduced from the observation of rate of change of momentum produced by it.

If I felt sure that Prof. Greenhill considers M to be *still* merely a convenient abbreviation for  $\frac{W}{g}$ , I would say more on this matter; but I am in doubt as to what are the views of which he is so strong an opponent.

I see that he wishes to abolish " $g$ " from works on hydrostatics. Why? I do not see how we can conveniently indicate the dependence [*ceteris paribus*] of hydrostatic pressure on the strength of the earth's gravitational field of force at any given place otherwise than by the introduction of  $g$ . But, as I have already implied, I am as yet in the dark as to the precise nature of the quarrel between Prof. Greenhill and the theorists.

Devonport, August 17.

W. LARDEN.

[WE look to America for clear, unprejudiced ideas on the definitions of elementary dynamics, and Mr. Frederick Slate's letter from California is a valuable contribution, to which I hope Mr. Larden has directed his attention.

The quotations from certain elementary treatises which form Mr. Larden's letter are the statements it was my chief object to dispute; according to this school of writers, the Standard Pound Weight is not the lump of platinum preserved at the Exchequer, but rather it is the pressure on the bottom of the box in which it is kept.

When goods are sold in commerce by weight, they are weighed in scales, and the weight is the same wherever the weighing is carried out, whether at the equator, or the poles, or in the Moon, Sun, or Jupiter; so that the weight cannot be said to depend on the local value of  $g$ , the only effect of which is to slightly alter the infinitesimal strain of the balance.

Let Mr. Larden consult the recent Report of the Committee on Electrical Standards, to see how carefully the units must be defined to satisfy practical commercial requirements.—A. G. G.]

WHEN I was young, I never had the presumption to understand the use of " $g$ " in questions connecting mass and weight, and I fear my boy takes after me.

He told me the other day that he understood how a falling body could have its velocity increased per second with a velocity of  $g$ , or 32 feet per second; and that he knew that  $m =$  stuff in a body, and  $w =$  its weight, but he could not see what the "blooming  $g$ " (I think that is what he called it) had to do with the matter.

I replied that no doubt, if we could only understand it, it had a beneficent use in the economy of nature.

TOMMY ATKINS, Senior.

Sleep Movements in Plants.

I READ the other day in a local paper that "Mr. Seemann, the naturalist of Kellett's Arctic Expedition," states that plants undergo sleep movements at regular intervals (presumably once in 24 hours) during the long period when the sun never sets. Has this been authenticated? I thought it was well known that a plant does not undergo periodic variations of the kind if it has never been subjected to the regular succession of light and darkness. Other instances are the daily periodicity of the strength of so-called "root-pressure" and of the rate of growth. But if the above observations are correct, not only have the sleep-movements become independent of the ordinary determining conditions in the individual, but they have become hereditary in the species. If the movements really possess the significance usually assigned to them (of checking excessive radiation) this would seem to negative the prevalent view that the state of panmixia alone suffices for the disappearance or degeneration of a structure or mechanism.

A. G. TANSLEY.

September 19.