and action, and now believed in all probability to be one in their common birth and origin—are direct emanations from the sun.

But how grand and beautiful is the theory that *all* material blessings here below come to us entirely and alone from the sun? Its simplicity and unity are completely consistent with the attributes of the Maker. Given motion, and given matter, all the rest follows as an inevitable consequence. All nature, from the simplest fact to the most complex phenomenon, is nothing but a work of destruction or reconstruction, a displacement of force from one point to another, according to laws which are absolutely general.

With this much said about might, let us now look at the question of magnitude. From the foregoing statements, it may be easily conceived that the more an organized being is capable, in consequence of its physiological structure, of assimilating a given amount of aliment, the more effective force it will set at liberty, or, in other words, the more strength it will have at its own disposal.

Now, the solar forces, thus rendered active within the frame of a living creature, have, by determining its growth, to construct the animal itself. They have to generate its own proper vitality, as well as the result of vitality, its muscular power. It may therefore be asserted that the effective force at the disposal of every living creature will increase in proportion to its alimentation, and will diminish in proportion to its weight. Otherwise expressing the same idea; The more food an animal consumes and the less it weighs, the more muscular strength it will possess.

These deductions have lately been confirmed by curious experiments instituted by M. Felix Plateau, who has determined the value of the relative muscular power of insects—power of pushing, power of drawing, and the weight which the creature is able to fly away with.

It had already been remarked that animals of small stature are by no means proportionally the weakest. Pliny, in his "Natural History," asserts that, in strength, the ant is superior to all other creatures. The length and height of the flea's leap also appear quite out of proportion to its weight. No very definite conclusion, however, had hitherto been arrived at. M. Plateau has settled the question by employing exact science as the test. Insects belonging to different species, placed on a plane surface, have been made to draw gradually increasing weights.

A man of thirty, weighing on an average a hundred and thirty pounds, can drag, according to Regnier, only a hundred and twenty pounds. The proportion of the weight drawn to the weight of his body is no more than as twelve to thirteen. A draught horse can exert, only for a few instants, an effort equal to about two-thirds of his own proper weight, The man, therefore, is stronger than the horse.

But, according to M. Plateau, the smallest insect drags without difficulty five, six, ten, twenty times its own weight, and more. The cockchafer draws fourteen times its own weight. Other coleoptera are able to put themselves into equilibrium with a force of traction reaching as high as forty-two times their own weight. Insects, therefore, when compared with the vertebrata which we employ as beasts of draught, have enormous muscular power. If a horse had the same relative as a donacia, the traction it could exercise would be equivalent to some sixty thousand pounds.

M. Plateau has also adduced evidence of the fact that, in the same group of insects, if you compare two insects notably differing in weight, the smaller and lighter will manifest the greater strength.

To ascertain its pushing power, M. Plateau introduced the insect into a card paper tube whose inner surface had been slightly roughened. The creature perceiving the light at the end through a transparent plate which barred its passage, advanced by pushing the latter forward with all its might and main, especially if excited a little. The plate, pushed forward, acted on a lever connected with an apparatus for measuring the effort made. In this case also it turned out that the comparative power of pushing, like that of traction, is greater in proportion as the size and weight of the insect are small. Experiments to determine the weight which a flying insect can carry were performed by means of a thread with a ball of putty at the end, whose mass could be augmented or reduced at will. The result is that, during flight, an insect cannot carry a weight sensibly greater than its own body.

Consequently, man, less heavy than the horse, has a greater relative muscular power. The dog, less heavy than man, drags a comparatively heavier burden. Insects, as their weight grows less and less, are able to drag more and more. It would appear, therefore, that the muscular force of living creatures is in inverse proportion to their mass.

But we must not forget that it ought to be in direct proportion to the quantity of carbon burnt in their system. To put the law completely out of doubt, it would be necessary to determine the exact weight of the food consumed, and the quantity of carbonic acid disengaged in the act of breathing. Some chemist will settle it for us one of these days.—*All the Year Round.*

ANTIQUITY OF NOMINALLY "NEW" DISCOVERIES AND INVENTIONS.

Bold and reckless philosophers of these modern times often with oracular gravity declare that "this is the age of progress." Progress in what? The explosive power of steam, the composition of gunpowder, the peculiar properties of the magnetic needle, were known ages ago. Plutarch could have written a work on chemistry which would have been prized by the schools of to-day. Livingstone, the traveller, found in the wilds of Africa germs of science and crude ideas of chemical combinations as applied to the arts, among rude tribes who did not possess even an alphabet. The gold of California was known long ago, and forgotten; Cortez knew of its riches through tradition.

Ships were no original invention; man copied the idea from the nautilus. Suspension bridges were borrowed from the spider's web; and in the tropics may be found the curious cockle-shell which—half insect, half fish—on the approach of danger draws in a quantity of air, dives to the bed of the ocean, and uses the air as long as oxygen remains and then