From Chambers's Educational Course.

INTRODUCTION TO THE SCIENCES.

MASSES OF MATTER—THEIR ATTRACTION AND MOTIONS.—All things, of the existence of which we are informed by our senses, bear the general appellation of *Matter*, and, in contradistinction to those things of which we become conscious by thought, are denominated the *Material World*. The earth which we inhabit, the air which we breathe, the distant planets and suns, and probably the whole of that space in which the heavenly bodies move, constitute matter, though some are much more solid or substantial than others. A stone, for instance, is more solid than water or air; yet all are alike matter. The earth is more solid than the planet Jupiter, which has been ascertained to be as light as cork; but still both are alike material. Even that vast realm of space, thro' which the planets are constantly moving, has been surmised on good grounds to have material properties, and to be a fluid of inconceivable thinness.

Matter, in all its forms, is subject to various fixed rules or laws, which must have been established by the Creator for very important ends. By one of the most important of these, it is ordered, that every particle of matter possesses a power of *attracting* other particles, this attractive power of each being in proportion to their respective sizes, their densities and distances being the same. Thus one of those globules of ink which sometimes start from our pen and settle lightly upon a hair of the paper, will be found to make a slight movement towards a larger drop which we carefully bring near to it. Thus, also, we often observe that a little stalk of tea, floating in our cup, no sooner approaches the side, than it makes a kind of dart towards it, and settles as nearly as it can alongside. *All pieces of matter would be observed to exercise the same influence over each other, if in circumstances equally favorable to allow of a movement.*

The attraction of a body is greatest in its own immediate neighborhood. The attraction has also reference, not to the surface of the body, but to its whole mass, the centre being the point where the influence is strongest. At a point twice as far from the centre as the surface is, the attraction is diminished to a fourth of what it is at the surface. At three times the distance, it is only a ninth; at four times, a sixteenth; at five times, a twenty fifth; the diminution being always as the *squares* of the distances—that is, the distances multiplied by themselves. The distance from the centre of any mass of matter to its surface is called its *semi-diameter*—that is, the half of its diameter or thickness. When we wish, therefore, to ascertain the relative amount of the attraction which any mass of matter exercises over another, we have to enquire how many semi diameters of the larger the smaller is distant from it, and to multiply that number by itself. The result shows how many times the attraction at this distance is less than at the surface. The moon, for instance, is distant 240,000 miles from the earth, or as much as sixty semi diameters of the earth: 60 multiplied by 60 gives 3600; consequently, the attraction exercised by the earth upon the moon is a 3600th part of what it would exercise upon the same mass at its own surface.

When the particles of a body can be suspended in the air in a fluid state, they will, if not under the attractive influence of some other body, arrange themselves, by virtue of the same law, around a centre, and take a spherical form. Thus, a small quantity of dew suspended on the point of a thorn or leaf, becomes a globule, because in that case, the attraction of the particles towards their own centre is greater than the attraction of any neighboring body. In consequence of this law of nature, it is considered probable that the globes of space, including our own earth, were originally in a fluid state—that, in that state, they unavoidably assumed a spherical shape, and were then hardened into their present inconsistency.

Another of the important laws of matter relates to its movements. Rest and motion are equally natural to matter, and both alike result from certain circumstances. Thus, for instance, if a cricket-ball be allowed to lie upon the ground, it naturally remains at rest. If it be put into motion, it is natural for it to continue in that motion, until stopped by some countervailing force. In the case of a cricket-ball impelled by a bat, the air, which is another, though rarer kind of matter, presents a certain amount of countervailing force. Another countervailing force arises from the attraction which the mass of the earth exercises over the ball, so as to draw it to the ground. When on the ground, it encounters a third obstruction in the friction or rubbing of its body on the surface; this countervailing force being the greater in proportion to the roughness or unevenness of the ground. When at length *as much force has been exerted in stopping it, as was exerted in setting it in motion*, it comes to a pause. Being ourselves placed in certain circumstances where the forces just described are constantly operating, we cannot well conceive that it is equally natural for a piece of matter to remain in motion as to remain at rest; for, on account of those forces, we invariably see motion sooner or later brought to a stop. But, when we conceive a mass of solid matter set in motion through a space entirely free of all countervailing forces, we readily perceive how natural it is for it to continue in motion, seeing that, in such circumstances, an amount of obstruction equal to the impulse is not to be found.

We have now seen that, by natural laws, a fluid mass takes the spherical form: that different masses attract each other with forces respectively proportioned to them, their distances being the same; and that, if a body be set in motion in a place where there is no opposing force, it will continue in motion.

We thus see how the great globes of space, including our own, took their shapes. In what manner they were first put into motion—whether by the operation of some law still existing, or by a direct and immediate interference of the Almighty Creator—is a question which scientific men are as yet unable to answer. But laws have just been stated, by which we can perceive how, after being set in motion they should have continued it. We can also tell how this motion should be in circles: it is owing to the attraction exercised by the larger central body over those moving around it, at the distance which actually exists between them, and at the rate of speed which the earth exemplifies. the whole of these circumstances are calculated to suit each other, and if any one had been different, all must have been different, in order to preserve the economy of the planet. So also, if the attractive power of the sun were to cease, the earth would fly off in a direct line into space, as a stone which has been whirled for some time in a sling flies off when the string is slipped. To fly off in this manner, be it observed, was the original tendency produced by the motion of the earth. and is only suspended by the operation of the principle which draws it towards the sun. Our earth may thus be described as a thing kept steady between two forces which pull it different ways, one pulling it towards a centre, and the other driving it away from a centre. The first of these forces has received the appellation of *centripetal* [that is, centre-seeking], and the other the epithet of *centrifugal* [that is, centre-flying].

Attraction also bears the name of *gravitation*, from a word signifying weight; for weight is entirely a result of the law of attraction. To make this practically intelligible, a ball of iron, weighing a thousand pounds at the level of the sea, if weighed in a spring balance on the top of a mountain four miles high, will be found to have lost two pounds of its weight, in consequence of the attractive power of the earth's bulk being diminished to that extent at that remoteness from the centre. In consequence of its fluidity when in a state of fluidity, the earth at its equator has a diameter exceeding that of its poles by twenty six miles; consequently, the surface of the poles is thirteen miles nearer the centre than the surface at the equator—a proportion being observed in all the intermediate places. Objects are therefore found to weigh more heavily in a spring balance as we advance from the equator to the poles. From the same principle, a pendulum moves more slowly in the neighborhood of the equator than at the poles. For these reasons, weights and pendulums have to be adjusted according to the distance of the place they are to be used from the equator.

The branch of science which bears reference to the laws for the movements of matter, is called *Dynamics*.

MISCELLANY.

WHO OUGHT TO DRINK SPIRIT?—Not the rich, for in it there is no refreshment. Not the poor, for it injures their purse, their credit, their health, their morals, and their families. Not the idle man, for he is lazy enough without it. Not the industrous man, for it will render him idle and improvident. Not the merchant, for it will probably render him a bankrupt. Not the mechanic, for it will cause him to make promises which he cannot keep, and so he will lose his customers. Not the farmer, for it will make his cattle lean, his sheep hide-bound, his barn empty, and fill the windows of his house with old hats and old rags. Parents do not need it; children do not need it; masters do not need it; servants do not need it. Who does? Nobody. Why then does any one drink it? Because his reason is asleep, and appetite governs him.

INTEMPERANCE IN LONDON.—We regret to state says Bell's Life in London, of the 12th Nov. that several suicides have been announced in the daily papers during the week, all having their origin in habits of intoxication.

A LOVER'S DEVOTION.—An English paper says—"The fair sex at Antwerp are all in a state of excitement at an occurrence which, it is said, has lately taken place there. It appears that a Parisian lady, celebrated for her beauty, and well known to the frequenters of Frascati's, received a letter a few days since by the *petite poste*, which appeared to contain something voluminous. The lady hesitated to open the paper, thinking some absurd trick was intended, but her curiosity having at last got the better of her resolve, she unsealed the letter, and, to her extreme surprize, found in it the finger of a man, with these words traced in blood:—" Beautiful, but inhuman creature, I send you the little finger you required of me.

Signed, L."

LAWYERS.—It seems there is quite a mania among young Englishmen to become lawyers. Bell's Life in London says, "No less than 147 gentlemen have given notice of their intention to apply to be admitted attornies of the Court of King's Bench during the present term."

LAW.—An action was recently decided in New Hampshire, in which the amount in dispute was a small *Calf*, and the legal costs on both sides are estimated over *two thousand dollars!*

AGENTS
FOR THE BEE.
Charlottetown, P. E. I.—Mr. DENNIS REDDIN.
Miramichi—Revd JOHN MCCURDY.
St. John, N. B.—Mr. A. R. TRURO.
Halifax—Messrs. A. & W. MCKINLAY.
Truro—Mr. CHARLES BLANCHARD.
Antigonish—Mr. ROBERT PURVIS.
Guysboro'—ROBERT HARTSHORNE, Esq.
Tatmagouche—Mr. JAMES CAMPBELL.
Wallace—DANIEL MCFARLANE, Esq.
Arichat—JOHN S. BALLAINE, Esq.