

branches of every family who take our paper will thereby be put in possession of the means of becoming acquainted with the laws of matter—with principles, facts and illustrations that concern their daily occupations, which will help them to understand many things that must otherwise remain a puzzle and a mystery, or the subject of ignorant, and perhaps superstitious wonder. When we take into account the scanty supply of useful books, especially on such subjects, that is generally to be met with in the houses of our farmers, and the consequent ignorance of the plainest and most important principles of natural science in which too many of the youth of Canada are growing up to manhood, we think we cannot render a more useful or acceptable service to our youthful readers, than to lay before them a series of articles containing a plain, concise, and easily understood explanation of the subjects mentioned, accompanied with wood-cut illustrations of the most important laws and principles involved. We shall make the articles published in the "Library of Useful Knowledge," some of which are republished in the fifth book of Lessons, of the National Series, the foundation of our selections and remarks, with such extracts from other works as we may think needful.

The following introductory remarks and definitions occupy all the space we can spare in this number:

Natural Philosophy, in its most extensive sense, has for its province the investigation of the laws of matter, that is, the properties of matter; and it may be divided into two great branches. The first and most important (which is sometimes called *Natural Philosophy*, by way of distinction, but more properly *Mechanical Philosophy*) investigates the sensible motions of bodies. The second investigates the constitution and qualities of all bodies, and has various names, according to its different objects. It is called *Chemistry*, if it teaches the properties of bodies with respect to heat, combination with one another, weight, taste, appearance, and so forth; *Anatomy* and *Animal Physiology*, if it teaches the structure and functions of living bodies, especially the human;—for, when it treats of the functions of other animals, we term it *Comparative Anatomy*. It is called *Medicine*, if it teaches the nature of diseases, and the means of preventing them, and of restoring health: *Zoology*, if it teaches the arrangement or classification, and the habits of the different lower animals: *Botany*, including *Vegetable Physiology*, if it teaches the arrangement or classification, the structure and habits of plants: *Mineralogy*, including *Geology*, if it teaches the arrangement of minerals, the structure of masses in which they are found, and of the earth composed of these masses. The term *natural history* is given to the three last branches taken together; but chiefly, as far, as they teach the classification of different things, or the observation of the resemblances and differences of the various animals, plants, and un-growing substances in nature.

Here we may make two observations. The first is, that every such distribution of the sciences is necessarily imperfect; for one runs unavoidably into another. Thus, Chemistry shows the qualities of plants with relation to other substances, and to each other: and Botany does not overlook those same qualities, though its chief object be arrangement. So Mineralogy, though principally conversant with classifying metals and earth, yet regards also their qualities in respect of heat and moisture. So Zoology too, beside arranging animals, de-

scribes their structures like comparative anatomy. In truth, all arrangement and classification depend upon noting the things in which the objects agree and differ; and among those things in which animals, plants, and minerals agree or differ, must be considered the anatomical structure of the one, and the chemical qualities of the other. Hence, in a great measure, follows the second observation, namely, that the sciences mutually assist each other. Thus, arithmetic and algebra and geometry, and the purely mathematical sciences aid mechanical philosophy; mechanical philosophy, in like manner, assists chemistry and anatomy, especially the latter: and chemistry very greatly assists physiology, medicine, and all the branches of natural history.

The first great head, then, of natural science, is mechanical philosophy; and it consists of various subdivisions, each forming a science of great importance. The most essential of these, which is indeed fundamental, and applicable to all the rest, is called *dynamics*, from the Greek word signifying *power* or *force*. It teaches the laws of motion in all its varieties. The application of dynamics to the calculation, production, and direction of motion, forms the science of *mechanics*, sometimes called *practical mechanics*, to distinguish it from the more general use of the word, which comprehends every thing that relates to motion and force.

The application of dynamics to the pressure and motion of fluids, constitutes a science, which receives different appellations according as the fluids are heavy and liquid, like water, or light and invisible like air. In the former case it is called *hydrodynamics*, from the Greek words signifying *water* and *power*; in the latter *pneumatics*, from the Greek words signifying *breath* or *air*. And hydrodynamics, is divided into *hydrostatics*, which treats of the weight and pressure of liquids, from the Greek words for *balancing* of *water*, and *hydraulics*, which treats of their motion; from the Greek word for several musical instruments played with *water* in *pipes*.

COMMON SCHOOLS.

We intend in the future numbers of our journal, to devote a little more attention to the subject of schools, and popular education, than we have heretofore done. We have arranged to obtain a number of cuts from the Chief Superintendent of Schools, illustrating the plan of building, seating, and fitting up school-houses, so as to secure the objects aimed at, in the best manner. Every farmer and every inhabitant of the country is directly interested in the improvement of schools, and the promotion of the instruction of our youth. The subject will not therefore be inappropriate to our pages, if treated on general grounds. The Common School, as an agricultural cotemporary truly remarks, is justly regarded as the palladium of our civil liberties. It is, and must be, from this source that the mass of our citizens derive the groundwork of the knowledge which will enable them to sustain the principles of a free representative government. It is, then, of the highest consequence, that these schools be made to confer the greatest possible advantages on those for whom they are designed. In regard to their character and utility, much depends on the countenance and encouragement given them by parents. The improvement of children will be comparatively unimportant, if parents are indifferently disposed towards teachers and schools.—This subject is brought forward in a striking light