

natural philosophy; because it is they alone which can demonstrate the powers of those laws which determine the motion of matter. Of natural philosophy, the most useful branches to the agriculturalist are *mechanics*—"the science of the laws of matter and motion, so far as it is necessary to the construction of machines which, acting under those laws, answer some purposes in the business of life," such as the culture and manufacture of crops; *pneumatics*, "that branch of physics which treats of air, and the laws according to which it is condensed, rarified, or gravitated;" *hydraulics*, that branch of hydrodynamics which treats of fluids in motion, and in particular of the conveyance of water through pipes and channels; *electricity*, which endeavours to determine "the operations of a principle of very wide influence through nature; a cause which is, and perhaps can be no otherwise conceived, than as a highly attenuated form of matter existing in different substances, and passing from one to another with various effects, among such bodies as can be excited to give or to receive it;" *optics*, by which the laws of light, as affecting vegetation by the influence of color, are investigated; and *heat*, which, by diffusing itself through neighboring substances, gives to every object its existing form. By the aid of chemistry, "the manufacture of manures may be expected to continue to improve, the supply of manure further augmented and cheapened, and the development of the resources of the soil thereby hastened and increased." Of the branches of natural history, the most useful to agriculturalists are *meteorology*, "the science of the atmosphere and its phenomena;" *botany*, "which treats of the structure, functions, properties, habits, and arrangement of plants;" and *zoology*, as restricted to the natural history of quadrupeds and insects. The branches of the medical science useful to agriculturalists are *comparative anatomy*, which treats of the structure of the bodies of animals as compared with that of the body of man; and *zootomy*, which treats of the structure, and explains the principles of the art of healing the diseases of the domesticated animals.

Viewing the general aspect of these sciences as presented to the agricultural pupil, in the definitions just given of them, he must at once observe the advantages he would derive by studying them. It is well observed by Sir John Herschell that "between the physical sciences and the arts of life there subsists a constant mutual interchange of good offices, and no considerable progress can be made in the one, without of necessity giving rise to the corresponding steps in the other. On the one hand, every art is in some measure, and many entirely, dependent on those very powers and qualities of the material world which it is the object of physical inquiry to investigate and explain." It is evident that most farming operations are much affected by external influences. The state of the weather, for example, regulates every field operation, local influences modify the climate very materially, and the nature of the soil generally determines the kind of crop that should be cultivated. Now the pupil should desire to become acquainted with the causes which give rise to those influences, by understanding the laws of nature which govern every natural phenomenon. The science which investigates those laws, is called *Natural Philosophy*, which is divided into as many branches as there are classes of phenomena occurring in the earth, air, water, and heavens. Those laws, being unerring in their operation, admit of absolute demonstration; and the science which affords the demonstration is called *Mathematics*. Again, every object, animate or inanimate, possesses an individual character, so that it can be identified, and the science which makes us acquainted with its characteristics, is termed *Natural History*.

Farther, every object, animate or inanimate, is a compound body made up of certain elements, of which *Chemistry* makes us acquainted with their nature and combinations. The pupil thus sees how suitable those sciences are to the explication of the phenomena around him, and their utility will be the more apparent to him, the more minutely each science is investigated.

MODE OF CHURNING IN SOME OF THE COUNTIES OF NEW YORK.

At a meeting lately held in the County of Norfolk, C. W., on the occasion of a dinner being given to the Hon. H. J. Boulton, M. P. P., a Mr. Bowlby in reply to a toast to the "Agriculturists," described one of the "Yankee" methods of Churning as follows:—

It seems to be a favorite practice with the politicians of the evening, to press into political matters on the other side of the water, and compare the working of different measures among the "srowd Yankees" with laws we have in existence here. Now, sir, why cannot the agriculturists profit by the same practice as the politicians? I would simply draw your attention for a moment to the manner in which butter is made in some of the principal counties in New York. They churn all there by mill. They churn it slow, and continue the operation about four hours when it is sweet and cold; by which means they obtain about one third more butter from the same quantity of milk, and that usually of a better quality, than we generally get in the ordinary way of setting the milk and churning only the cream when sour. By this method of keeping dairy, the labor of churning is considerably increased to obviate which they use a tread wheel power suitable to the number of cows kept; for 10, 15 or 20 cows, the power is propelled by a large dog; or more frequently a sheep is used, the preference is given to the sheep as it is steadier than a dog; it can be kept in a small yard close at hand, while a dog will soon learn to con. up missing about the time of churning. When their dairy is very large they use horse power. Their whole business is reduced to a system. Instead of turning their milk into pans, &c., to raise the cream, as is usually done here, the labor of which, in skimming and cleaning dishes alone, exceeds that required for finishing their whole dairy, they turn the milk drawn at night into one churn or more according to the number of cows kept, in the morning they repeat the same process, mixing the morning and evening's milk so that it will cool and be ready for churning about ten o'clock the same morning. When the weather is very warm they add cold water freely to keep the milk at the proper temperature while churning, which operation they continue till two in the afternoon. If the butter is likely to gather soon they stop the motion of the churn, or lessen its motion and churn slow. By this process the same amount of butter will be obtained by less than one-half the labor required in the usual method of making it.

That the dairy business would be remunerative in the townships is readily proved from the fact, that large dairies are kept in Genesee County, which is considered the best county in the State of New York for growing wheat, and being in the vicinity of Rochester, it demands a good price, from 10s. to 12s. per bushel, while here wheat is only 5s. or 6s. per bushel. Their land is worth \$50, \$60 and \$80 per acre, while our land, that will yield equally as much pasture, is worth \$10, \$15 and \$20 per acre. Notwithstanding their great advantage in the price of grain, and disadvantage in the