Science.

Cheap Mode of Filtering Water.

As efficient a filter as can possibly be constructed may be made in a few minutes by any person, and at the cost of a very few pence. Procure a clean flower-pot of the common kind, close the opening in the bottom by a piece of sponge, then place in the inside a layer of small stones, previously well cleansed by washing, this layer may be about two inches deep, the upper stones being very small; next procure some freshly burnt charcoal, which has not been kept in a damp or foul place, as it rapidly absorbs any strong smells, and so becomes tainted and unfit for such purpose: reduce this to powder, and mix it with twice its bulk of clear, well-washed, sharp sand; with this mixture fill the pot to within a short distance of the top, covering it with a layer of small stones, or what is perhaps better, place a piece of thick close flannel over it, large enough to tie round the rim of the pot outside, and to form a hollow inside, into which the water to be filtered is to be poured, and which will be found to flow out rapidly through the sponge in an exceedingly pure state. The flannel removes the grosser impurities floating in the water, but the latter absorbs much of the decaying animal and vegetable bodies actually dissolved it; when it becomes charged with them it loses this power, hence the necessity for a supply of fresh charcoal at intervals.—*Monthly Observer, No.* 1.

Simple Electrifying Machine.

Have a dry tumbler-glass upon the table; and place thereon a dry japanned tea-tray (not too large) then take a half sheet of foolscap or cartridge paper, hold it before the fire till quite dry and warm, but not to scorch it; lay it flat upon a table, and with a piece of India rubber give it twelve or fourteen brisk rubs from left to right. Lift it quickly and carefully by the extreme corners, and drop it upon the tray (it will fall like a lump of lead. On presenting the knuckle to the edge of the tray, a spark an inch long may be obtained; remove the paper (by holding the corners as before), and present the knuckle again, you will now receive a second spark, (or rather the negative brush); replace the paper, and you get the positive spark again. This plan of removing and replacing the paper may be repeated several times, with onee rubbing; but the electricity should be perfectly discharged by touching the tray each time after drawing the spark.

Solid Gas.

Murdock first used gas to light up his office at Redrath in 1792. "It would," says Liebig, "Be one of the greatest discoveries of the age, if any one could succeed in condensing coal-gas into a white, dry, solid, odorless substance, portable, and capable of being placed on a candlestick or burned in a lamp." Already is the desire of Liebig being accomplished. A mineral oil flowed out of coal in Derbyshire, obviously produced by slow distillation from the coal. On examination it has been ascertained that *paraffine*, a solid waxy substance, hitherto never produced from coal, be formed in commercial qualities by a slow and regular distillation. This is condensed coal-gas—a solid form of olefiant gas desired by Liebig. In forming cakes, this product, dissolved in an oil of a similar composition, may be readily obtained instead of the waste gases now thrown away. Should this discovery be as successful as it promises, a great change will be wrought in fuel as well as illuminating gas.

Interesting to Blacksmiths.

Horse-shoe nails, kicked about the world by horses innumerable, are not the useless fragments we might naturally deem them. Military men may discuss the relative value of Minie rifles and needle guns, but we all agree that the material of which the barrels are made should be sound and tough; gun-makers tell us that no iron is so well fitted for this purpose as that which is derived from horse-shoe nails and similarly worn fragments. The nails are in the first instance made of good sound iron, and the violent concussion which they receive when a horse is walking over a stoney road, give a peculiar annealing and toughening to the metal highly beneficial to its subsequent use for gun-barrels.

Personal beauty will fade, but the beauty of the mind endures for ever.

The Winters of the last Eighty Years.

Fifteen winters out of the 20, between 1771 and 1791, were severe; and only 17 out of 40 winters, between 1811 and 1851, had that character, or little more than half. The prevalence of numerous very cold winters is thus traced to the period between 1771 and 1791. The winter is severe when the mean of the four months, from November to February, inclusive, is below 36 degrees. Nine such occurred in 80 years, and five of them between 1775 and 1795, or more than half in the earliest 20 years. With regard to the months of December and January, it may be stated, that the former of these is reckoned unusually cold when its mean temperature is at or below the freezing point; and there were only five instances of this in the period of 80 years, three of which occurred between 1784 and 1796, and the other two in 1840 and 1846. January is intensely cold when its mean temperature is below 30 degrees. There are six instances of such in the 80 years, four between 1776 and 1795, and only two in the present century—namely, in 1814 and 1838. The latter will be remembered, for under its influence, plants perished which had withstood all the other extremely cold Januarys, even those of which the mean temperature was still lower than that of 1838, the mean of which was 27.79 deg.; while that of January, 1814, was 26.71 deg., and of January, 1795, 26.75 deg.—*English paper.*

The Farm.

From the Maine Farmer.

Feeding Stock Scientifically

When we have had a scarcity of fodder in the country, we begin to enquire very anxiously how we can economise our fodder so as to keep our cattle and other stock in the usual good condition at the least cost. This comprehends the science of feeding stock, and every one who has had the care of stock during the winter will soon find out that it is a science of no small importance to the farmer. It, indeed, not only appeals directly to that *sensitive* appendage of mortality, the *purse*, but it also calls upon his humanity and mercy, as applied to the helpless animals under his care.

It requires a great degree of skill and art to carry a stock of cattle, horses, &c., through our long winters in such a manner that they shall *hold their own*, as we say,—or, in other words, so that they shall not fall away from the condition they were in when they came to the barn. It requires a greater degree to make them gain in flesh during the winter, without incurring more expense than the grain is worth.

The communications of our old friend, Martin Mower, in our last number and this, on this subject, are worthy of consideration; and as he is testing his theories by actual practice in his own barn and on his own stock, keeping a careful record of the outlay and the receipts, they will form a safe guide for others.

It will be seen that he relies mainly upon the turnip (Ruta Baga) for the basis of his economy in feeding. We have always been, and probably always shall be, a fast friend to the turnip culture in Maine, although we are aware that many of our friends and readers have *repudiated* them, and sometimes beg us "not to coax them to sow any more turnips," &c. One farmer, a few years ago,—and he was a pretty good farmer too,—observed to us that he had as lief have a given number of bushels of cold water for his stock, as a given number of Ruta Bagas. We suppose he had, in the way we saw him feed them out—cut into coarse pieces with a shovel, and thrown out to the cattle in the yard, while a brisk nor'wester was playing around them, keen enough to make icicles in your heart. We dare say a bushel of cold water fitly given would have been better.

It would, indeed, be strange, if, while in England the turnip is considered their greatest and most economical aid in feeding their stock, having been the means of quadrupling the number of their farm animals, since its culture was first introduced among them, the same feed should have no nutriment here, and be a useless crop to the farmer.

The fact is that an ox, or a cow, or a horse, has the same organization in Maine as in England,—requires the same elements for its nutrition here as there.

It is also a fact that the turnip can be grown as economically here as there, and, when grown, possesses the same elements or ingredients.—Why not be as valuable, then, here as there, in and of itself considered?

The only difference in the expense of feeding turnips, between our country and England, is this,—Their winters are so mild that they turn their cattle into the fields and let them help themselves, while we must gather and house them. We think, however, that the English mode is rather a slovenish one, and the economy of it doubtful, even there.

The steaming of turnips and mingling them with other material, as practised by Mr. Mower, is undoubtedly the best mode.

Supplement to Stock Feeding.

The blood of living animals stands at a given temperature, called blood-heat. This heat must be, and is, kept up from three sources, viz: by excluding the cold, or applying external heat; or the liberation of caloric or heat, from the carbon of their food; or from the carbon and hydrogen contained in the fat of their own system.

We may consider the animal structure a perfect furnace, formed by the architect of nature, of which our stoves are but an imitation, which we will take to illustrate. The means of heat are the same in both cases. Will we place the stove in the field, where all the heat radiated causes a current of cold air to rush to the point rarified? or will we exclude the external air, except what is necessary to support combustion, and thus circumscribe the heat radiated within the enclosure, (on the air-tight principle)?

For heat, will we use coal, wood, and the grosser kinds of carbon, or will we use oils, and fats, which contain more hydrogen and less oxygen? The only difference in the parallel is, nature combines the nutritive with the combustible, thus serving the triple purpose of supplying heat, waste, and increase of the body.

The feeding art consists in selecting and supplying material food with reference to this difference; for the animal creates nothing,—it only changes *vegetable* into *animal* matter, first, by decomposition or modification, which is a chemical process; and second, by organization, which is a living process, and which the chemist is yet unable to explain.

But the chemist can take both animal and vegetable matter to pieces, and give the exact amonut of each separate element that either contains; and he has thus demonstrated that the animal and vegetable kingdoms are made up of identically the same elements, differing only in their proportions in combining, so that the herdsman, by this help, can collect materials containing the exact amount of each element to form the kind of animal he wishes to grow, and that without loss. And if he wishes fat, flesh and bone, or milk to predominate, he will furnish food with a surplus of the elements favoring either of those objects.

The health of animals can be sustained only by a mixed food.—1st. starch or sugar to supply the carbon gived off in respiration; 2d, fat or oil to supply the fatty matter which exists in the animal body; 3d, gluten or fibrine, to make up for the waste of muscle and cartilage; 4th, earthly phosphates to supply the bones; 5th, saline substances, sulphates and chlorides, to supply the daily ejection of excretions.

Oily matter should be increased for fattening, and gluten or fibrine, and phosphates for growing animals, or milk; for milk is an index to the elements of animal sustenance, or growth. We have no exact experimental tests in growing or in estimating the economical saving of this method, but we have good authority for saying that we can approximate to exactness by keeping animals in a temperature that will save 25 per cent. in fodder, and the keeping them in health, that their digestive organs may fully perform their functions, and appropriate all the nutriment of their food, and that food having been selected with a due proportion of theelements of nutrition, would form an item of no less magnitude,

A saving of fifty per cent in wintering the stock in this State, would furnish a sum sufficient to support every boy in the State at an agricultural school, and something left for contingencies.

MARTIN MOWER.

Sandy Soils—Modes of Recovering Them.

Sandy soils, like all other soils, differ widely in quality, and hence it is difficult to apply a common remedy to them all. In answer to W. E., however, whose soil, from the tenor of his letter, is evidently blowey, we would recommend the following:

His immediate neighbourhood must doubtless contain much swamp muck, as his soil seems to be denuded of much vegetable matter, and has probably yielded up its origional organic constituents to floods passing over its surface. This muck should be returned to sandy soil to supply it with organic matter. In its return he should decompose it by such of the means we have given in our former volumes, as would bring into requisition the missing organic constituents of his soil. Thus, if by analysis it is found to be deficient of chlorine and soda, or either of them, decompose the muck before use in the soil with the salt and lime mixture, and he will thus supply the necessary deficiencies, while the organic matter thus added will correct the mechanical condition of his soil. If clay pits are near, his composts should be made in part with clay; this will have a beautiful tendency in increasing the adhesive powers of the soil, besides permitting the clay to retain the ammonia consequent upon the fermentation of his compost heap. Clay once charged with ammonia, and properly sub-divided in a sandy soil, loses some of its mechanical peculiarities, and ceases to form a mortar with the soil. In localities where muck cannot be procured, and organic substances are not readily obtainable, charcoal dust may be used for the purpose of rendering the soil retentive of ammonia; but this alone will not correct the over-pulverulent property of the sand. It will, however, accelerate the growth of clover, buckwheat and other green crops, the plowing of which will increase the organic matter of the soil, and add to its tenacity. All these remedies, however, are useless, unless the inorganic deficiencies of the soil are supplied. With these, even in small quantities, green crops may so readily be raised in sandy soils as to add materially to their density. Turnips sowed broadcast and plowed under in full leaf, is a good practice after the previous plowing in of clover crops. Some sandy soils are rendered more tenacious by the use of lime, particularly when accompanied by the addition of organic matter—others are injured by the application of lime. When the ultimate particles of sand are spherical, and they are often found to be so, when previously acted upon by water; slight rains lubicrate these polished surfaces, and cause the sand to pack. The addition of lime to such lands applied in the caustic form, roughens these surfaces, forming silicate of lime, and prevents the mechanical conditions before referred to.—Some sands are materially benefitted by the application of plaster, both from the addition of its chemical constituents, and its peculiar mechanical action in the attachment of particles. Sandy soils should be left flat in the fall, and when practicable rolled, to compact their surfaces. The very opposite practice should be pursued with clayey soils; for when they are left rough and the frequent freezings and thawings of winter render them pulverulent. The opposite action is desirable to blowey and sandy soils.—*Working Farmer.*

From the Maine Farmer.

Book Farming.

The time has not long since been when very many farmers had a strong antipathy to *book farming*, believing that any deviation from the method pursued by their fathers and grandfathers, even though it were as ludicrous as putting "a stone in one end of the bag, to balance the corn going to the mill," must be erroneous, and were ready to pronounce it *speculation* on the part of those who were not content to walk in the old beaten track. But things have greatly changed, and although a few still remain of the old school, who think book learning is useless, and object to taking an agricultural paper, (a medium through which a large amount of imformation to the farmer has been communicated within a few years past.) It may be questioned whether a good farmer can be found, who does not inform himself of the numerous improvements constantly being made in the various operations of farming, by perusing agricultural writings, or indeed, whether one can be found who is entitled to the *name*, of which one may justly feel proud, who does not take one or more agricultural papers. When we look back and see what has been effected in our own State during the last twenty years, are we not willing to acknowledge ourselves much indebted to the Maine Farmer, and other agricultural papers which have disseminated much useful information to the farmer? The writer acknowledges himself to be one of this class, having read the Maine farmer from his birth, and profited by it, as he thinks, even believing the information obtained from a single paper, in some instances, to be worth more than a year's subscription, to say nothing of the information upon other subjects.

A FARMER.

Fools invert, wise men buy. The genius who taught people to print with steam power, died a pauper.