Scientific.

Elementary Instruction.

No class in the community have an equal interest in geology with farmers. No science is so interesting to farmers as geology in connection with chemistry. The two sciences cannot be separated and justice done to either. While the elements of our globe, especially of soils, require chemical tests to determine their character, these very elements are absolutely essential for experiments to determine the fundamental principles of chemistry. Oxygen, the most powerful chemical agent in creation, is also the most abundant material in rocks and soils. The one as an element, the other as an agent, are alike essential to each other, and both indispensable, as at the foundation of all agricultural science.

A knowledge of each is as feasible as it is important—entirely within the comprehension of a child six years old. Each is a science of facts more than of abstract reasoning—of facts, too, equally instructive and delightful to every young mind.

Take an example:—The child has placed before him two glass tumblers—the one containing quartz, the other lime, or sand and chalk. The name of each is of course as readily learned as the name of iron, lead, gold, tree, horse, or any other subject in nature or art. Into each tumbler is poured some sulphuric or muriatic acid. In the tumbler of lime the pupil observes an action—in that of quartz no action. He is told that this action is called effervescence. He hence learns to recognize lime and quartz, and the more certainly from the recollection that the one effervesces with acids and the other does not.

Here is an example of geology and chemistry, alike useful to the farmer and interesting to the farmer's child, or any child. The same simplicity and direct fundamental instruction run through the whole of both of these exceedingly practical sciences.

I may hereafter point out a few of the leading principles of these two sciences; their connection with each other; their essential importance to all classes, and, most of all, farmers; their exceeding fitness for the early instruction of children, and the entire feasibility of having them among the "first lessons" taught in each of the eighty thousand American schools.

Simple Elements.

Oxus is the Greek word for *acid*; ginomai, in Greek, means *make;* hence the literal meaning of oxygen is *acid maker*. Combined with sulphur it forms sulphuric acid; with nitrogen, nitric acid; with carbon, carbonic acid, &c. Respiration, combustion and fermentation are the three principal operations producing the combination of oxygen and carbon; the results, carbonic acid.

Acids combine readily with metals, earths and alkalies—as iron, lime and potash. By chemists these combinations are called salts, designated by the termination *ate*. Sulphuric acid combining with various basis, produces sulphates; nitric, nitrates; carbonic, carbonates. Sulphate of lime is gypsum or plaster of Paris; sulphate of iron, copperas; of soda, glauber salts; of magnesia, epsom salts. Carbonates of iron, copper and lead, are ores of those metals.

About a century ago water was found to be composed of oxygen and hydrogen, and common air of oxygen and nitrogen. About half a century since oxygen was found by Sir Humphrey Davy to be an element of rocks, of course of soils, as it was of the alkalies, potash and soda. The other elements in the earths and alkalies, combined with oxygen, were found by the same great chemist to be metals very peculiar in character.

It hence appears that oxygen is an element in air, earth and water, existing abundantly in solid, liquid and aerial forms. In the whole it constitutes nearly half our globe. It is, of course, the most abundant element in the material world. It is also the most important agent in producing changes in matter essential to human existence. It is very appropriately called *vital air*, as neither animal life nor any life can exist without it. It is no less essential to combustion than life. It also acts with great energy upon metals and other solid substances. In this action it produces three very large and important classes of oxides—oxides, acids, and salts. Iron rust is the oxide of iron; the dross of lead, oxide of lead; burnt lime, the oxide of calcium; pure potash, the oxide of potasium; pure soda, the oxide of sodium; silex or flint, the oxide of silicum. The combination of one part oxygen and four of nitrogen, constitutes the atmosphere; three parts oxygen and one nitrogen form nitric acid—aquafortis. Combined with other substances, it forms numerous acids. Saltpeter is the nitre of potash. The large quantity of oxygen it receives from the nitric acid fits it for a material for gunpowder—giving to that powerful agent its principal powers.

A plate, tumbler and scrap of paper, with a little water, will enable any teacher or parent to perform an experiment on oxygen equally simple, instructive and interesting. In a deep plate pour some water. On the water place a scrap of thick paper, piece of cork, or other light substance; on that another piece of paper, or cotten moistened with oil. On lighting the paper or cotton, place over it a large empty tumbler. The combustion continues for a few seconds, and when it is extinguished the water occupies about one-fifth of the space in the tumbler, showing the necessity of oxygen for combustion, and that it constitutes about one-fifth the air we breathe. What man, woman or child would not like to be familiarly acquainted with an element so abundant—an agent so active as oxygen, especially when such an acquaintance is equally simple, useful and delightful?—*Josiah Holbrook.*

Physiology of Dew.

Dew is a dense, moist vapor, falling on the earth in the form of a mistling rain, while the sun is below the horizon. The most plentiful deposits occur, when the weather is clear and serene; very little is ever deposited when the weather is not so. It is never seen on nights both cloudy and windy. It is well known, likewise, that a reductoin in the temperature of the air, and of the surface of the earth, always accompanies the falling of dew, the surface on which it is deposited being, however, colder than the air above. The phenomena admit of an easy and elegant explanation from the well known effect of the radiation of caloric from bodies. This radiation constantly taking place in all bodies, it is obvious that the temperature of any body can remain the same only by its receiving from another source as may rays as it emits. In the case of the earth's surface, so long as the sun remains above the horizon, it continues to receive as well as emit heat; but when the sun sinks below the horizon, no object is present in the atmosphere to exchange rays with the earth, which still emitting heat into free space, must, consequently, experience a diminution in its temperature.

Thus the earth becomes not only many degrees cooler than the superincumbent air: and, as the atmosphere always contains watery vapor, this vapor becomes condensed on the cold surface; hence, the origin of dew, and, if the temperature of the earth is below thirty-two degrees, of hoar frost.—And, since the projection of heat into free space takes place most readily in a clear atmosphere, it is under the former condition that dew and hoar frost are formed; for if the radiant caloric, proceeding from the earth, is intercepted by clouds, an interchange is established, and the ground retains nearly, if not quite, the same temperature, as the adjacent portion of the air. Whatever circumstances favor radiation, favor also the production of dew; and, accordingly, under the same exposure, dew is much more copiously deposited on some surfaces than on others. Gravel walks and pavements project heat and acquire dew less readily than a grassy surface.—Rough and porous surfaces, as shavings of wood, take more dew than smooth and solid wood. Glass projects heat rapidly, and is rapidly coated with dew. Bright bodies attract dew much less powerfully than other bodies.

Dew acts an important part in the processes of agriculture, and in the nutrition and growth of plants. Large quantities of the most active agents escape from the earth during the processes of decomposition and evaporation, in the shape of gasses, and these combined with the aqueous vapor are deposited with the dew on the earth, or on the plants, and in either case are available to nutrition. Hence the advantages of frequently stirring the earth, and keeping the surface in a pulverized and absorbing state. In some parts of the world it rarely rains, but the dews are so copious, that vegetation does not seem to suffer from the want of water. Spreading a substance, no matter how flimsy, as a thin cloth, over vegetables, will preserve them from severe frosts, if it is not allowed to touch them; acting by intercepting the heat. Every one has observed that plants liable to destruction by frost, remain green much longer under the shade of trees than when exposed. Thus potatoes or any thing else planted in an orchard, will be unhurt by frost as far as the branches of the trees extend, while the tops in the uncovered spaces will be wholly prostrated.

The Farm.

Farm Work for September.

"The harvest-men ring Summer out
With thankful song and joyous shout;
And, when *September* comes, they hail
The Autumn with the flapping flail."

The *Summer* for 1852 has passed away, and Autumn, with its gentle influences, has come to lead us quietly and gradually into the embraces of Winter. If summer has its fierce heats, its sudden showers with the lightning's flash and thunder's roar,—its profusion of flowers and songs of birds, autumn has no less its own character, which distinguishes it from all other seasons. It has succeeded, perhaps, a season of intense heat, causing copious evaporation when the usual rains have fallen, and giving heavy dews and fogs. The peculiar feature of autumn is that of tranquility, but interrupted by the September equinoctial and some other changes.

In September, the vegetable tribes have advanced through their stages of production and maturity, and are approaching the verge of old age. But still, the earth is closed in beauty. The fields so lately mown are covered with the liveliest green by the young clover, or tinted with their varied flowers. The corn looks rank and strong and begins to beam with gold, while the pastures assume a cheerful hue, refreshed by the periodical rains.

The woods have exchanged the soft green of spring for the more sober shades that indicate maturity, but maintain their leafy pride and hide in their shade the various nuts which they produce. The birds which love to be near the habitations of men, have mostly left to people other lands and cheer the laborers of other fields. Now and then the bob-o-link, on russet wing, flits by, or the lark springs from the meadow, whistling as he mounts to the clouds.

So autumn has its own peculiar character, and these are a few of its foreshadowings. The hurry and bustle of haying being over, the husbandman pauses in his labor and takes a retrospective glance at his past efforts; then examining the standing crops, meditates upon what there is farther to be done. He brings into view the operations of the coming spring, and inquires whether this field shall remain in grass or be sowed with summer grains; whether the meadow now luxuriating in hassocks, hard-hack, skunk-cabbage and elecampane shall be browsed another year by the cattle, or shall he add a sturdy team, a stout plow with a little "book farming," and make it turn out two tons to the acre of good herdsgrass and red-top next July. In his survey he brings into view all the operations of the farm, the orchard, the garden, pastures, meadows, hill and plain, land and swamps. He finds still enough to do—that labor is most beneficently diffused over the year, so as not to cause too great a pressure of employment at any season; and the perfected crops being gathered, while waiting for the great Indian corn harvest and the roots and fruits, he turns his attention more particularly to the permanent improvements of the farm, such at first, as

Draining.—When the springs are low and little water is flowing from the hills is a good time to engage in this most important operation. You will plow deep and sub-soil in vain, if the cold water trickles from the hills and passes through the bottom which you have plowed in search of an outlet. It will exclude sweet and nutrient vegetation. When you contemplate plowing meadows and swamps, thorough draining must be the pioneer, or disappointment will be the result. When the drainage is complete, we have only to reiterate the remarks recently made of applying a suitable team and plow, at first, and there may be profit in reclaiming almost any swamp or meadow. They are among our best New England lands, being composed of the wash of the hills and rich accumulations of successive ages.

Ditching through the lower part of meadows does not accomplish the work desired; the water must be arrested and led off before it flows over the ground to be cultivated. In order to do this, the ditch must be placed near the base of the hill and the water conveyed away along its side, leaving the meadow dry and light and open to the influences of the sun and air. Then there will be success—good crops and cheerful hearts.

Sandy or Gravelly Knolls.—There are such places on most farms that have become unproductive. If they throw up vegetation in spring, a few hot suns cut it down, and thus labor and crop are lost. These are the places for the application of meadow mud. It supplies the humus, or vegetable matter which is lacking, and this, with the addition of compost, brings them up to fertility and profit. It is but carrying back to them the soil which they have gradually lost.

Blasting Rocks.—Since our plows are of more delicate construction, and the introduction of horse-rakes, large stones in the midst of the field are found to be serious interruptions to clean and pleasant husbandry. Any one apt with tools may "drill and blow." But there are certain essentials to be observed, or you "drill and blow, at a loss. The first important labor is to separate the rock completely from the surrounding earth and leave it free to expand when the powder presses upon its centre. This is often omitted by those engaged in the business. After the hole is charged, cover the whole with moist earth and place as much weight upon it as can be conveniently done; this helps to prevent the charge blowing out, causes an instant's resistance, and in that instant the sides of the rock yield to the pressure within. There are appropriate times in September for this work.

Manure Heaps are the gold mines of the farmer. Pile up the meadow mud before the autumnal rains prevent your getting it. Throw it into large heaps in convenient places, and let the air and frost work upon it. Cover the surface of the barn-yard with it; mix with green manure for top dressing or spring use. Lay up a stock for winter use, under cover if convenient.

Winter Rye.—This is a wholesome and economical grain. Sow early in the month, if you did not get the crop in in August.

Cutting Corn Stalks.—We have no doubt but that cutting off the tops of the corn stalks somewhat injures the crop of corn; but after all, what is gained in getting better fodder, and in harvesting it more conveniently, will compensate for the loss in the grain. There is no better fodder, in our opinion, than corn tops. At the south, some persons practice stripping the leaves from the stalks and tying them in small bundles, which sell for one to two cents a bundle. After the tops are cut they should be laid loosely among the hills and kept from the ground until partially dried, when they may be tied up in small bundles and shocked. After standing a week or two in this condition, they ought to be laid away in such a manner in the barn as to allow a free passage of air through them, to prevent moulding.

Farm Experience.—Twenty years' experience upon a farm has taught me that one acre of land, well manured and tilled, will produce more than two acres which received the same amount of labour and manure. That one cow, well fed, will be of more profit than two fed upon the same amount of fodder, this will apply to all other stock. That one ton of hay, cut when the grass begins to blossom, will produce as much milk as two tons cut when the seed is ripe.

How to Make Large Currants.—The currant likes a moist soil and a somewhat shady situation. Downing says, "No shrub shows the good effects of his manuring so completely as the currant. If you wish to get a very large fruit, *train* the bush on the north side of a trellis, and feed the roots with half rotten stable manure."

Inflamed Eyes.—Pour boiling water on some alder flowers and steep them like tea. When cold, put three or four drops of laudanum into a small glass of the liquid, and apply it to the eyes three or four times per day; which persevered in, they will become perfectly strong in the course of a week.

Blacking.—Put one gallon of vinegar into a stone jug, and one pound of ivory black, well pulverised, half a pound of loaf sugar, half an ounce of oil of vitriol, and one ounce of sweet oil; incorporate the whole by stirring thoroughly. This blacking is in great repute. It produces a fine jet polish, and is said to be less injurious to leather than most public blackings.