

ists admit the fact that the condition of constituents decides the value of manures as well as the constituents themselves. They further admit that each time any of the constituents of the rock which go to form soils becomes incorporated with a plant, and is again delivered back to the soil by the decay of this plant, that it possesses new functions which it did not possess before. Thus the potash in the ashes of a burnt hay stack has many times the value of the potash separated from the felspar rock; in other words, at each appropriation in nature for renewed growth, all the primaries are progressed and rendered capable of entering a higher-classed organism, and that all time has been required for this change of condition now noticeable in the amount of organic product, as compared with such conditions as existed before organisms made their appearance. And yet the primary constituents were the same then as now at least so far as their quantity is concerned. Unless chemists can synthetically form a plant by combining the unprogressed constituents of the rocks, they will have to admit that the progressed constituents have functions not found to be possessed by those which exist in a lower state of nature.

Mechanical philosophy has been more generally applied to the assistance of the agriculturist than has chemistry, simply because the power of observation in mechanical effects is possessed by a greater number of persons. The invention of the mowing and reaping machines has caused a greater breadth of land to be appropriated to the grass and grain crops, because these crops could be cut by merely increasing the animal power. The tedding machine for turning and making the hay represents fifty or more men with turning forks; while the unloading fork for storing the hay in barns again transfers from men to horses the principal part of the labor. The threshing and winnowing machines have reduced the labor of these operations, so as to do away with the inefficient flail, and abridge human labor. The amount of straw has been so increased by the greater breadth of land appropriated to grain-growing, that in turn it, with the increased quantity of hay, has sustained a large amount of animal life—not only ministering to the immediate necessities of man, but sending back to the great warehouses of nature—the soil and the atmosphere—millions of tons of progressed matter to be readily re-appropriated

in the forms of new growths. As population increases, the earth's surface from these causes is rendered capable of yielding increased amounts of products. The use of the subsoil plow and the consequent gradual deepening of the soils, render deeper surface plowing practicable; and thus many farmers have found an extra farm beneath the surface, not noted in their title deeds.

The hoe, the spade, and the digging fork are being displaced by horse implements of various kinds. The potato diggers now in use would alone save as much labor as would enable the agriculturist to furnish many brigades of soldiers for the use of the government. Indeed it is a sorry sight to see potatoes dug at this day by manual labor. Plows have been improved, so as to increase their efficiency, while the amount of power of the draft has been lessened. Horse tools for surface cultivation have displaced the clumsy and inefficient harrow and all the hand tools for corn; and root crops need no longer be cleansed of weeds by hand. The carrot weeders, the horse hoes, the cultivators, &c., may now be used in place of hand labor; and at this time the agricultural implements of America are sold in immense quantities in the colonies of England and France, Africa, the East and West Indies, and South America.

By the cutting and steaming hay, corn-stalks, &c., the amount of food necessary for animals has been materially reduced; and farmers are fast learning that there is economy in putting roots, and mixing them with chaffed and cut feed. Indeed, the book-haters are disappearing, and the improvements of each part of the country are being disseminated for the general benefit. Many of the larger farmers have introduced steam and caloric engines to facilitate the cutting and grinding of feed, threshing of grain and other purposes where mechanical power may be used at less cost than animal power. Progression is the order of the day, and the farming interests, above all others, are benefitted by its onward march.—PROF. MAPES in *Working Farmer*.

SMALL vs. LARGE FARMS

It is a question of considerable importance to the common farmer, whether he shall occupy a large or a small farm; whether he shall confine himself to a small business on a small farm and realize only a small income, or whether he shall extend his area,