

*intelligent supervision*, or the reasoning judgment which directs the unconscious operation of moving mechanical apparatus.

Labor and Science were at one time considered to have practically only such relations as we may now conceive to exist between the unconscious mechanism and the principles which govern its motion—that is none whatever. But the modern relation of Labor and Science is that of *pupil and teacher*, the *practise* and the *principles*, or rather the *servant* who should implicitly obey the directions of the *master*.

Formerly the man that could wield with most force the axe or the hammer was *chief*, but now a child has the strength to set in active motion or regulate at will *powers* so vast that the mind fails to conceive the number of horses the united energy of which would still be unequal to accomplish the same amount of work—the lately constructed steam-hammers and steam ships being illustrations. Or again, the deft fingers whose accuracy and activity with the spinning wheel measured the rank of the laborer, is now displaced by the *spinning-jenny*, where a child can with greater accuracy and speed, produce thousands of threads for one that his predecessor could. And so on throughout the fields of labor, even to the watch-maker, whose self-acting lathes can now produce continuously the most perfect specimens of workmanship, the raw material and motive power being supplied.

But since the most perfect machine gets very soon out of order (friction and wear or accident being always present), there must be a specially educated intelligence to exercise supervision over, and make such adjustment or repairs as may from time to time be rendered necessary, and such a specially trained mind is expected in the workman of to-day.

We can have no better illustration of the changed relations of Labor and Science than in the case of Agriculture; but the associations of the past, and the yet unchanged methods of many localities, have been most detrimental to its progress as to that just pride in the labor or *rauer* skill of the farmer.

Until within the last 20 years the farmer meant the laborer who, during long hours, and by dint of hard labor, with bent back under the hot sun, held the plough, scattered the seed, harvested with the hand, sickle, or scyth, raked, made into sheaves, pitched into barns, threshed with the flail, winnowed, and even ground, by hand the grain upon which he depended for support. Or who, with the hand hoe made the drills, cultivated during the growth, and unearthed in the fall the roots so necessary to him; or with scythe or sickle, and rake and fork made his hay marketable. The dairy and household duties meant severe

labor and long hours for the females of the family, with a low grade of products. His animals, like himself, had hard fare and little attention, and were of proportionately small value.

Under these conditions it might have been truly said—what relation had Science with Agriculture, and what social position could the farmer claim other than that of the most unskilled laborer? In what way could collegiate training be of advantage in tilling the soil? And what scope had the well-educated man to utilize his acquirements unless he chose some profession, the very antithesis of farming? But to-day how changed may all this be!

With his labor-saving machines the farmer can mount into a comfortable and cushioned seat, and direct a gang of ploughs, and into another and deposit the seed with accuracy and rapidity. Seated on the harvester he mows, and rakes and binds. Another machine can hoist and deposit the sheaves in the barn; and another threshes, winnows and assort the grain—ready for sale or the flour-mill.

Or, seated on a machine, he can drill and sow, with another he cultivates during the growth, and another digs and assort his roots ready for removal, and sale or use. Or, with the machine mower and rake and fork, his hay is rapidly cut, and gathered and stowed away.

The cheese and butter factories have revolutionized the dairy, and the carding, spinning, weaving and sewing machines have made easy the duties of his household. High grade stock and improved conveniences enable a minimum of work to produce the best quality and a larger quantity of animal products.

There is really no department of human labor that has been so largely relieved of toil, and proportionately benefited, as that of the farmer by the labor-saving machines that science and invention have produced within the past 30 years. Nor is there one that now demands so high a degree of special education and practical skill in so many departments of art and science as agriculture demands of its votary to-day. And since education and social status are (other things being equal) convertible phrases, no profession can claim a higher position than can agriculture, and no other is of so much benefit to the country as a whole, and to each individual unit of the population.

It has been truly said that the “book farmer” and the “amateur” are failures, and it is not difficult to understand why,—they do not know enough, and their education is only theoretical and very limited at that. Technical education must be practical as well as theoretical, and time and opportunity is necessary for proficiency in either.

Unless by rule or custom, the farmer, ignorant of *chemistry*, knows not how to prepare the soil, or choose manures,—ignorant of *botany*, how to favor the growth of his plants,—ignorant of *mechanics*, how to keep in order or repair his labor-saving implements,—ignorant of *design* and *construction*, how to lay out with taste and convenience his numerous buildings,—ignorant of *animal physiology* and *pathology*, how to provide for the health and comfort of his stock, or to relieve them when suffering,—ignorant of *commercial education*, how to correctly keep an account of his outlay and income in so systematic a manner as to enable him to correct errors of management as soon as they occur,—and ignorant of *literature*, how to make known to others the results of his experience by tongue or pen at scientific meetings, or how to represent his class in the halls of legislation.

In fact, no human calling demands so varied a culture as that of the agriculturist, and there is no department of Science or Art that is not laid under contribution either to illustrate or to conduct his operations, and hence there is no profession that can occupy a higher social or political standing than that of agriculture—when its votaries devote to its study the requisite energy and ability.

Though I may have dwelt thus long on one department of *labor*, there is not another of which the same may not be said; there is a variation it is true, but it is in kind and not in degree. Hence it is not overstraining language to say that INTELLIGENCE is the *labor* expected of the farmer or workman of to-day, and, to be able to perform their duties, special mental training is requisite. They must not only be intimately acquainted with the processes they conduct, and the form of moving parts in their tools, but with the principles that regulate such processes, or demand such special construction. No amount of physical strength, or manual dexterity will reveal the cause of failure in a process, or an irregularity in motion, or indicate the arrangement or construction necessary to produce a desired result. The ever varying design that characterizes all kinds of manufactured products can only be evoked from mental labor that has been specially instructed, and the machinery necessary to produce these designs requires a greater exhibition of intellect.

The day has passed, and is not likely to return, that enabled the producer who had only learned the manipulative part of his profession to control the market for his wares. The apprentice system turned out good workmen only; the designers and inventors, often self-made, were the products of an additional and quite a different process of instruction.

To-day the apprenticeship system has