

ARTICLE I.—THE PROGRESS OF NEW ENGLAND
AGRICULTURE DURING THE LAST THIRTY
YEARS.

Agriculture in Some of its Relations with Chemistry. By F.
H. STORER, S.B., A.M., Professor of Agricultural Chemistry
in Harvard University. 2 vols. 8vo. New York: Charles
Scribner's Sons, 1887.

THE farmers of the country will hail with great satisfaction Professor Storer's two volumes on "Agriculture in some of its Relations with Chemistry," which has been recently issued from the press of Charles Scribner's Sons. Until recently they have suffered, more even than they were aware, for the want of an accurate and scientific agricultural literature. Such as they have had has been largely the work of European authors. Many of the best modern treatises upon subjects relating to farming have been written in foreign tongues, and even when originally in English, or translated into it from the German or French, they have but partially met the wants

of American readers. To be of greatest advantage to these the author must know them and their surroundings better than a foreigner usually does or can.

The American farmer prefers to learn from an American teacher. Professor Storer addresses his own countrymen, and they more willingly listen because of this relationship. Such works as this and those of Professor Johnson are a Godsend, and will be valued more and more in successive years. If, indeed, a generation hence, the experiment stations recently provided for by Congress, shall, by careful experimentation, greatly broaden the present limits of agricultural science, none doubtless will rejoice more heartily than these gentlemen, or more willingly accept the supersedure of their works.

Professor Storer's two volumes embrace a wide range of subjects. He has viewed them from the standpoint of a chemist, but the reader will find that he is more than a chemist. The first contains eighteen chapters. The two first treat of the general relations of soil and air to plants, and of the atmosphere as a source of plant food. The next two take up the relations of water to the soil, and its circulation through it. In the fifth and sixth he discourses upon tillage. The remaining twelve, together with the first ten, perhaps with more propriety it may be said of the first fifteen, of the second volume, are devoted to the great subject of fertilization in its different branches. The remainder of this volume treats of the disposing of farms, the growth of crops, barley, oats, hay, and pastures.

These subjects are scientifically treated, and in language as little technical as accuracy of statement will allow. It is sufficiently popular to be easily understood by intelligent readers. The work is a most valuable contribution to the agricultural literature of the country.

Thirty years ago, a visitor to the agricultural towns of New England was likely, and in some sections quite sure, to find in progress a rapid diminution of population, accompanied by what was still more to be regretted, a deterioration of its quality. He was also quite certain to discover a lessened productiveness of the soil; barns once too small to house the crops which they were built to shelter, of capacities far beyond existing re-

quirements; herds and flocks of diminished numbers and not unfrequently absent altogether; much good land not farmed at all, and very little in such a manner as to secure maximum crops; the large streams shrunk in volume by the removal of heavy forests, and brooks formerly perennial absent for the greater part of the year; the timber supply fearfully lessened, and the forest area much increased; school districts needing consolidation partly because the natural increase of population had largely failed; the price of labor enhanced by its scarcity, and farming rendered unattractive by the decaying strength and rude ways of most who pursued it. In short, agriculture had not kept itself abreast the time. "The farming? the farming?" said Horace Greeley, in 1872, to a friend sitting beside him in a New Hampshire railroad car, and observing the fields through which they were passing, "What do I think of the farming? Where? I see no farming." The sting of the great journalist's report was in the truth of it.

About 1860, thoughtful farmers of New England saw the low condition of its agriculture, and in alarm and despondency exclaimed, "What shall we do to be saved?" And to these came a response, as clear as a clarion at early dawn, "Repent of your agricultural sins and bring forth fruits meet for repentance." It was the voice of God, and those who have since heeded it, have been saved from the ruin which indolence and stupidity always engender.

Not far from this time, New England took a new departure in farming. Then—some a little earlier and some a little later—new forces appeared, forces of great and lasting power which, for convenience may be designated intellectual and physical. To some of these attention is called, not only as the causes of new prosperity, but, taken in the order of their manifestations, as marks in the progress of a new agricultural development.

Among the first of these, perhaps the very first, in importance if not in time, was the advent of—

1. *The New Colleges of Agriculture and the Mechanic Arts.*—In 1862, without their asking for or even desiring them, the Congress of the United States gave to each loyal State and Territory the foundation of a College of Agriculture and the

Mechanic Arts. The country needed them but was not then ready to receive them. They were obliged, therefore, to struggle on into active being as best they could. There were no agricultural professors prepared to man them and direct their work. There were no text books for the use of their students. There was no well-defined conception on the part of any one of the precise products these were expected to yield. The two necessities first mentioned have been measurably met. The last, as yet but imperfectly determined, is assuming a shape more and more definite year by year.

These colleges are less than twenty-five years old. It is yet too early to forecast their future. All things considered, they may be said to have accomplished as much as their friends could have reasonably anticipated. They are furnishing a good general and agricultural education to such as resort to them at a very reasonable expense.

2. *The Boards of Agriculture*.—In most or all of the New England States, Boards of Agriculture have been organized. These have rendered important service to the cause which they were intended to aid, by diffusing among the farmers important agricultural information mainly by means of meetings for the discussion of farm topics, the results of which have been annually published as reports of the several boards. Many of these volumes are very valuable contributions to the agricultural literature of the country. Some are worthy of places beside the reports of the Royal Agricultural Society.

3. *The Patrons of Husbandry*.—A more recent organization than either of the foregoing has found a home in New England, and is proving efficient in the intellectual improvement of the farmer, the value of which is asserted upon less personal knowledge, but in full confidence. Allusion is to State Granges of the Patrons of Husbandry. These are the institutions of the farmers, by the farmers, for the farmers. They have been established in various sections of New England for a dozen or fifteen years. One of their important aims is the promotion of the social culture of their members. The farmers have never been a gregarious class. They have lived mostly in sparsely located families, mingling but little even with each other. Too many of them rarely go from home except it be

to meeting and to mill. They have lacked, consequently, the stimulus of association with others of a like calling. They have realized less than any other class the power of combination or the weakness of isolation. The Grange is teaching them these, and they are learning their united strength. Large numbers of the members of the state legislatures—in some a majority—are farmers. These, if so disposed, could dictate the legislation of their respective states. But, without organization, they have not a tithe of the power possessed by the less numerous bodies of representatives of other industries. That the life of this organization may be vigorous there is reason to anticipate. That it will prove a power for good there seems to be little reason to doubt.

4. *Agricultural Fairs*.—Still another power demands recognition, which may properly enough be called intellectual, inasmuch as it affords object lessons of great value to great numbers. Reference is to the agricultural fairs held all over New England each autumn. In their improved character these do not date beyond the limits of this paper. Thirty years ago even the managers of these had but vague ideas of the characteristics of the various breeds of cattle entered for exhibition, and a herd book was as illegible to them as a Hebrew Bible, and its lore as unfamiliar as the Pandects of Justinian. But woe now to the exhibitor who seeks to enter a grade animal as a thoroughbred. Shame and derision would cover any man who, at this day, should claim, as did a popular agricultural author at an early fair of the New England Agricultural Society, that the wrinkles on a merino sheep were the result of shearing. The day or two spent upon the fair ground are often to the observing farmer the most profitable of his whole year. He then and there imbibes, unconsciously perhaps, important facts and ideas which are afterwards effective in furthering his prosperity.

But, let us turn for a moment to some of the mechanical agencies which have appeared during the last thirty years to aid the uplift of New England farming. The earliest to which attention will be invited, and the most important, perhaps, is :

1. *The Mowing Machine*.—McCormick's reaper astonished the world at the London Exposition in 1851, and the mowing-

machine grew out of it soon after. The latter made its first appearance in New England about 1855. In other sections of the country it may have been present a little earlier, but not much. It has proved a great value to the farmer, as one good machine will cut as much grass as six or seven men. Indeed, machines have already been constructed, and are in use among us, which are capable, under favorable circumstances, of mowing twenty acres a day.

The mowing machine has not only aided in the solution of the labor question, but, by imperatively demanding the removal of stumps, fixed rocks and stone heaps, as well as the filling up of holes and wet places, has led to the material improvement of hundreds of farms.

2. *The Steel or Chilled Iron Plow.*—The advent of steel and chilled iron plows is more recent than that of the mowing machine. Thirty years ago many farmers were just relinquishing their wooden mouldboard plows and hitching to new ones of cast iron. The latter were a great improvement upon the former, the draft of which, in deep plowing, required half the teams of a neighborhood. The iron plow was of easier draft and did better work. It was satisfactory until better ones presented themselves made of steel or chilled iron. When a farmer saw with his own eyes, upon his own land, an Olliver chilled iron plow doing precisely the same work by a draft of eight hundred pounds, to do which a cast iron plow required eleven hundred hundred and fifty, he very wisely abandoned the latter and procured the former.

But soon after the Olliver came the sulky plow, suggesting by its appearance a pretty poor cross of a devil's darning needle upon a one-sided grasshopper, full of brag and very saucy. Its looks were not prepossessing, but a half dozen years experience has shown that, riding comfortably upon one of these drawn by three good horses harnessed abreast, a single man will invert two acres of tough sod land, to the depth of eight inches and a half, in a single day; and, if need be, two acres and a half. Indeed, the improvement in plows within the last fifteen years has reduced the cost of heavy plowing more than fifty per cent.

3. *The Improved Harrow.*—Kindred remarks may be made of the improved harrows which have been introduced during the period under consideration. The farmer who has walked beside or behind an old-fashioned spike-toothed harrow from breakfast to supper, day after day, will hail these as gifts from above. Pulverization of the soil is second in importance only to its fertilization. To a certain extent it is fertilization, as it secures admission to its bosom of air, heat, moisture, carbonic acid, etc., which render assimilable the plant food locked up therein. Improved harrows, like the "Acme," the "Disk," and others of like character, upon which the workman rides forth over his field like a warrior in his chariot, have justly remanded to disuse those of earlier periods as they do better work with greater comfort and at less expense.

4. *Wheel Horse Rakes.*—The modern horse rake has changed hay raking from hard work to pleasant recreation, enabling the proprietor of a hay field to superintend his work while, at the same time, contributing to it his own full share. With a spry stepping horse and such a rake he gathers into windrows in a part of the afternoon the morning's mowing of two machines or of a dozen men, enjoying the while a pleasant and refreshing ride.

5. *The Hay Tedder.*—Within the last twenty years the farmer has made profitable acquaintance with the hay tedder, which hastens the drying of the hay crop and thereby reduces the cost of its harvesting.

6. *The Manure Spreader.*—At a date quite recent, the manure spreader has come to render comparatively light one of the hardest and most disagreeable works of the farm. While it may not have yet realized its highest promise it has lessened by one-half and more the labor and cost of spreading manure upon land, performing at once the double work of pulverizing the materials applied and of scattering them rapidly over the surface with an evenness unattainable by the dung-fork or shovel.

Upon terminating here a list which might be greatly extended, it may be said that these six implements alone have reduced the cost of the farm operations to which they apply more than fifty per cent. What improved machinery is to the

manufacturer, what reduced grades and steel rails are to transportation, what better processes are to the miner; increased knowledge and better implements are to the farmer. To ignore these renders profitable farming impossible, and agricultural bankruptcy inevitable.

It may be said in reply to such as ask if these agencies have improved materially the general farming of New England, that it is too early yet to expect full results, as they are but a part of the foundation support of a new agricultural structure, and, like all foundations, they are mostly below the surface and make little show. Yet, some parts of the superstructure beginning to rise upon them are as clearly in sight as the head lands which mark the New England coast or the mountains which guard its western border.

For instances of this fact, compare the dairying of to-day with that of 1850, or even of 1875. Intelligent dairying is now an exact science, and managed under rules as precise as many which prevail in the laboratory. Indeed, a well conducted creamery is a laboratory. How largely, during the period under consideration, has been diffused a correct knowledge of the composition and offices of fertilizers and how generally is the farmer learning to supplement home supplies by the phosphates, nitrates and potash salts of commerce! Compare the splendid specimens of Short Horn, Devon, Hereford, Jersey, and Dutch cattle, to be seen at any of the large autumnal fairs, with the unimproved descendants of the importations of two hundred and fifty years ago, and now known as native stock. Since the war, has been introduced the old South European system of preserving green fodder for winter use by burying it in the ground, and the French terms "Silo" and "Ensilage" have been incorporated into our language without the change of a single letter. Very largely has brute power been substituted for human, and the great truth partially adopted which was taught twenty years ago by that devoted apostle of agriculture, the late ex-Alderman Mecchi, of Tip Tree Hall—"Never use a man when you can use a horse, for a horse's labor is cheaper and more reliable; never use a horse when you can use a steam engine, for the engine can be kept at half the expense and will last twice as long." During the last thirty

years many New England farmers have experimentally found that stagnant water will enter drain tiles when properly laid, and that by its removal worthless swamps may be converted to fertile fields, greatly to the increase of their scanty acreage and the annual income of their farms. An agricultural literature has made its appearance more extensive and better by far than any which has preceded it. To this the volumes of Dr. Storer are a valuable contribution. The intelligent farmer can now lay aside as obsolete his copies of *La Livre de la Ferme*, Morton's *Cyclopedia*, Stephen's *Book of the Farm*, and other works of high excellence in their day, since better ones covering the same ground are now within his reach. Able agricultural professors have taken the chairs awaiting them. The new colleges of agriculture and the mechanic arts bear upon their rolls the names of hundreds of students, a good proportion of whom have taken the agricultural courses of study of their respective institutions. During the last decade the depopulation of the agricultural towns has been arrested and the number showing lessening populations during that of 1860-70, has been reduced from eight hundred and eighty-nine to seven hundred and sixty-six.

To show the decline and rally of population the following tables have been compiled from the United States Census returns :

A TABLE SHOWING THE DEPOPULATION OF NEW ENGLAND TOWNS DURING THE THREE DECADES, 1850-60, 1860-70, AND 1870-80 :

<i>1850-60.</i>			
STATES.	Whole No. of Towns.	No. Losing Population.	Percentages of Losing Towns.
Maine.....	372	145	39
New Hampshire....	201	95	47
Vermont.....	247	133	53
Massachusetts.....	331	111	33
Rhode Island.....	34	5	15
Connecticut.....	156	53	34
	<hr/> 1,341	<hr/> 542	<hr/> 37 av.

STATES.	Whole No. of Towns.	No. Losing Population.	Percentages of Losing Towns.
Maine.....	580	319	55
New Hampshire.....	231	168	73
Vermont.....	248	148	59
Massachusetts.....	335	163	48
Rhode Island.....	37	16	43
Connecticut.....	167	75	45
	<hr/> 1,598	<hr/> 889	<hr/> 54 av.

1870-80.

Maine.....	528	280	53
New Hampshire.....	236	125	53
Vermont.....	232	137	59
Massachusetts.....	340	136	40
Rhode Island.....	36	9	25
Connecticut.....	167	79	47
	<hr/> 1,539	<hr/> 766	<hr/> 46 av.

A TABLE SHOWING IN PARALLEL COLUMNS THE PERCENTAGES OF TOWNS LOSING IN POPULATION DURING THE LAST THREE DECADES :

STATES.	1850-60.	1860-70.	1870-80.
Maine.....	39	55	53
New Hampshire.....	47	73	53
Vermont.....	53	59	59
Massachusetts.....	33	48	40
Rhode Island.....	15	43	25
Connecticut.....	34	45	47

Facts like the above indicate an agricultural progress during the last thirty years as marked as it is cheering. It surpasses in amount all we shall find, if, taking the year 1850 as a starting point, we travel back to the days of the Pilgrim Fathers, or, farther still to those of the crusades.

The depopulation indicated by the above tables is indeed real, but very largely temporary. The back flow has already commenced, as these very clearly show.

This decline of population may be attributed to several causes. The late war with the South was one. Emigration was another. A third may be found in a preference by many for other pursuits. The first was inevitable, but no longer

exists. The others were results of poor husbandry, and might have been avoided had the farmers possessed the exquisite enterprise and the requisite knowledge. What might have been may be. Banish poor farming from New England and agricultural prosperity will take its place just as surely as atmospheric air will fill a vacuum when the opportunity occurs.

It is still claimed that the boys and girls upon the farms are forsaking the calling of their fathers. If this be so, as it doubtless is to some extent, it argues enterprise on their part. Its only preventive is to make agriculture as attractive as other pursuits. To do this it must be made as profitable. Avocations are attractive in proportion as they are remunerative. Men do business to make money. Success in farming comes from the good tillage of good-sized areas. A peanut stand may yield a man a frugal living, but it will not make him rich, although his margin of profit be large. The doggerel whine so often heard,

"A little farm well tilled,
A little wife well willed,"

is a mean half heresy which may satisfy a narrow mind, but an enterprising New England husbandman, worthy of his blood and of generous soul, wants a good-sized wife and a good-sized farm; with fruitfulness within doors and fruitfulness without.

There has often been a desire in the hearts of enterprising persons to perpetuate their families. Men are not jealous of their ancestors, nor of their descendants. The ambition is a natural one, and commendable. But humiliating as the fact may be, a family will not stand upon nothing, and the only lasting foundation upon which it can be sustained is landed estate. Experience has indubitably demonstrated the truth of this remark. Personal property from its very nature is insecure and affords an unsafe basis. Land is the only one yet discovered which can be trusted.

The most signal example, perhaps, of the continuance of families through many centuries, is to be found in the noble houses of England. Take from these their landed support and one-half of them would disappear in less than a century; while eventually the other half would share their fate. We do not

applaud the English aristocracy. It began in robbery and has been continued upon unequal privileges. Yet, from the Norman invasion to the present day, it has been permanent.

We do, however, admire that better nobility of which our own land affords numerous examples.* Allusion is to families existing in all the older parts of the country founded in early colonial days by immigrant ancestors who came into honest possession of landed estates, which have continued in the ownership of their descendants, and been tilled by fairly requited labor ever since. The owner of such an estate can say with justifiable pride, as his eye sweeps over his paternal acres, "These low grounds, formerly worthless, but now the best upon my farm, were drained and made productive by my father. From these upland fields, as docile now to the plow as the meadows, my grandfather removed the rocks and piled them in their division walls, every stone of which is a monument to his industry. When my first Anglo-American ancestor built by yonder brook his log cabin, the surface of this estate was covered by primeval forests. His stalwart arm, then his sole dependence, bared to the sun the ground we now stand upon. The little clearing gave him bread. Since enlarged it has supported his descendants. We have never been rich, but have always had enough and something to spare to neighbors less fortunate than ourselves. Little have we besides these acres. We have paid honest wages to those who have labored with and for us. This farm, that little school house at the cross roads, and the white spired church on yonder hill have made us what we are. It is our ambition to serve well God and our generation, and transmit to our children a better inheritance than we received from our ancestors." Can one conceive of a higher nobility than one composed of such men. A nation made of such material would be invincible, "and the gates of hell could not prevail against it." Said the late head of an old Massachusetts family to a young man just starting in life, and asking his advice, "Buy land and keep it."

*The writer of this paper can easily count a dozen farmers in Concord, N. H., who are now living upon farms which have been in their families ever since they were cleared from the forest by their first Concord ancestors, more than one hundred and fifty years ago.

Whenever the mass of New England farmers, rising to the level of their opportunities and availing themselves of the advantages which modern science and mechanical ingenuity are offering to them—as many of their number are already doing—shall pursue their business with the devotion given to other pursuits, agriculture will become fairly remunerative and the familiar lines of the Latin poet,

“ O fortunatos nimium, sua si bona norint,
Agricolas ! quibus ipsa procul discordibus armis,
Fundit humo facilem victum justissima tellus,”

will apply to them in a sense loftier far than any by him conceived.*

* Since this article was written, the Boston Daily Advertiser of the 9th of September inst., has published an able article headed “An Agricultural Reaction,” a portion of which we quote: “A Vermont town clerk has just received a letter from an Iowa farmer, inquiring if farms may be bought in the official’s town. The western man intends to sell out and settle in Vermont, believing that he can thereby have a larger and surer income. . . . This authentic instance of a looking to New England for good agricultural results may fairly be taken as a token that the rush for the West is one day to be succeeded by a reaction. . . . Recent observations in certain hill towns in western Massachusetts showed that the tide had turned. An appreciable degree of reoccupation where there had been deserted homesteads was noted. The worst, it was evident, had been faced. Land given over as scarcely worth cultivating was receiving more generous treatment.”

JOSEPH B. WALKER.