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FIFTH ANNUAL SESSION

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OF THE

NATIONAL AGRICULTURAL CONGRESS,

AT PHILADELPHIA, PA.,

September 12th, 13th and 14th, 1876.

"THE TEST OF NATIONAL WELFARE IS THE INTELLIGENCE AND PROSPERITY OF THE FARMER."
—GEORGE WILLIAM CURTIS

CHICAGO,
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EZRA WHITMAN.

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For the purpose of acting as Standing Committees, and as President, Vice President and Secretary of Sections or Departments, whenever necessary, the following gentlemen are requested to serve during the coming year and at the next meeting. These committees will please bring before the Congress any matter that they may deem important, and to them will be referred such business as the Congress may deem appropriate.

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HISTORICAL SKETCH OF NATIONAL AGRICULTURAL ORGANIZATIONS.

By W. C. FLAGG.

The earliest attempts at forming an Agricultural Organization, really national in its scope, I think, was the result of the efforts of Solon Robinson, afterwards, well known as the agricultural editor of the New York Tribune. The meeting was held at Washington, in Sept. 1841, and accounts of that and subsequent meetings, may be found in the old Albany Cultivator, now the Country Gentleman, in the Union Agriculturist, now THE PRAIRIE FARMER, and probably in other papers. It met again in December, and then in the following year at Washington, and then seems to have become extinct. This organization was known as the Agricultural Society of The United States. James M. Garnett, of Virginia, was its President. John S. Skinner, its Corresponding Secretary, John F. Callan, its Recording Secretary, and Edward Dyer, its Treasurer at the December election, and the same with the substitution of Elisha Whittlesey for John S. Skinner, were chosen the following May.

The United States Agricultural Society was organized in June 1852, by 152 delegates from 23 states and territories. This society continued in existence until the war. It held several large fairs and field trials, and through meetings and publications, did much to promote the art of agriculture. Marshall P. Wilder, Ben. F. French, Ben. Perley Poore, and others, appear among its prominent members.

The National Agricultural Congress.

The National Agricultural Congress, an account of whose fifth annual meeting is herewith given, may be traced to the year 1870, when "at the suggestion and under the auspices of the Cotton States Agricultural and Mechanical Association, the Augusta Board of Trade, and

the Municipal Government of Augusta," delegates from 11 states and the District of Columbia, convened at Augusta, Georgia, and organized "The Agricultural Congress," whose objects were declared to be "the advancement of Agriculture, and the Arts of Husbandry." Hon. H. V. Johnson, of Georgia, was chosen President, Gen. A. R. Wright, Corresponding Secretary, L. Comington, Secretary, and J. J. Cohen, Treasurer, all of Georgia, with a vice president for each of the eleven states represented, and numerous standing committees on cotton, wheat, corn, labor and immigration, entomology, &c., &c. No formal addresses or business, beyond organization, appear to have been transacted, and the congress adjourned to complete its organization &c., at Selma, Alabama, in December 1871.

Meanwhile, under the auspices of the "Tennessee Agricultural and Mechanic Association," a similar gathering "composed of delegates from 11 states, representing more than 40 different Agricultural Societies and Associations," was held at Nashville, Oct. 3d-5th, 1871. This body organized the "National Agricultural Association." The preamble recites as reasons for organizing: "To extend the usefulness of the various associations and societies, organized for the purpose of promoting the interests of agriculture in the United States, and in order to create unity and harmony, as well as concert of action, in reference to those measures calculated to increase the efficiency of this, the most important of our national pursuits; and especially secure the proper consideration of questions, pertaining to the industrial and commercial interests, of this large and productive class of our people." F. Julius Le Moyne, of Pennsylvania, was chosen President, with a Vice-President

from each of ten states, and J. B. Killebrew, as Secretary, and F. H. French as Treasurer. Both of the latter were from Tennessee. The meeting was spent in organizing, and adjourned to meet at St. Louis, in May, 1872, having first appointed a committee to attend the meeting at Slemma, and to propose a consolidation of the two organizations.

In October the Agricultural Congress met at Selma. The attendance was not so large as at the previous meeting. R. J. Spurr, of Kentucky, was elected President, and Charles W. Greene, of Tennessee, Secretary. The proposition for a union of the two organizations was favorably received and the Congress adjourned to meet at St. Louis.

May 27, 1872, the two societies met at St. Louis and continued in session four days. The two organizations were made one under the name of the "National Agricultural Congress." Some 17 states were represented. Addresses, some of them of great interest, were delivered by Maj. T. W. Woodward, on the Influence of Forests on Rainfall; by Com. M. F. Maury, on Science—Its Applicability to Agriculture; by Prof. J. B. Turner, on Education of American Farmers; by H. N. McAllister, on the proper Spheres, Objects and Duties of Agricultural Colleges in the United States, &c. John P. Reynolds, of Illinois, was elected President. Vice Presidents were chosen from 40 states and territories. Charles W. Greene, of Tennessee, was made Secretary, and Lee R. Shyrock, of Missouri, Treasurer.

The second meeting of the National Agricultural Congress, or the fourth counting from the original meeting, was held at Indianapolis, May 28-30, 1873. No set addresses were made. Twenty or more states and territories were represented. The Congress was welcomed by Gov. Hendricks and the Mayor of the city. The topics of Trans-

portation, Agricultural Colleges, &c., were discussed and made the subjects of formal reports and resolutions. Gen. Wm. H. Jackson, of Tennessee, was elected President, and Charles W. Greene, then of Tennessee, but subsequently of Illinois, and now of Indiana, was re-elected Secretary.

The third, or fifth meeting was held at Atlanta, Georgia, May 13-15, 1874. Some ten states were represented. Addresses were made, or papers forwarded, by the President; by J. R. Dodge, of the Department of Agriculture; by Pres. A. D. White, of Cornell University; by J. B. Killebrew, of the Tennessee Board of Agriculture; by W. C. Flagg, of Illinois; John A. Warder, of Ohio, and others. President Jackson was re-elected President, and George E. Morrow, of Wisconsin, Secretary.

The fourth, or sixth, session was held at Cincinnati, Sept. 22-24, 1875. Only five or six states were represented and the members were mostly new. Addresses were delivered by J. B. Killebrew, of Tennessee, Dr. J. M. Gregory and W. C. Flagg, of Illinois, and papers were submitted by Col. Edward Daniels, of Virginia, and others. W. C. Flagg, of Illinois, was elected President, and George E. Morrow, re-elected Secretary.

This brings us to the date of the meeting whose proceedings are given herewith, which is the fifth of the consolidated societies or the seventh dating from the Augusta meeting.

The Augusta meeting's proceedings were published in a pamphlet of 21 pages; those of the Nashville meeting in a pamphlet of 26 pages; those of the St. Louis meeting in a pamphlet of 84 pages; those of the Indianapolis meeting in the *Farmers' Advocate*, of Jackson, Tenn.; those of the Atlanta meeting in the *Rural Sun*, of Nashville, Tenn.; and those of the Cincinnati meeting, in the Cincinnati dailies of that date.

PROCEEDINGS.

JUDGES' HALL, INTERNATIONAL
EXHIBITION GROUNDS, PHILADELPHIA,
September 12th, 1876. }

The National Agricultural Congress was called to order by the President at 3 P. M., and was opened with prayer by the Rev. G. W. Minier, of Illinois.

The order of business proposed by the Executive Committee was read by the Secretary and approved by the Congress.

Addresses of Welcome.

Dr. Alfred L. Kennedy, President of the Polytechnic College of Pennsylvania, then addressed the Congress as follows:

Mr. President and Gentlemen of the National Agricultural Congress:—It would have been a source of great gratification to us all, had the President of our old Agricultural Society greeted you to-day. But he is absent by reason of sickness and the duty has devolved on myself:—an humble member. I need hardly assure you that the duty is a pleasing one. Would that I were able to do it justice!

In this year of American jubilee, the present and the past embrace each other. The old and the new kiss one another. On this spot, consecrated to the brotherhood of nations and the reunion of the American people, the Philadelphia Society for Promoting Agriculture, now in its eighty-second year, welcomes the National Agricultural Congress, just four years old.

The two centuries meet. They meet and show how similar were the aims of our fathers to those which animate us.

The Philadelphia Society for Promoting Agriculture was organized when Philadelphia was the Federal Capital. The founders of the society apprehended no restriction to the field of its operations. These were to be as wide-spread as the Union. It was, therefore, national in its objects and its membership embraced the leading agriculturists of the new Union, who came hither to the seat of government. Did time permit, it would be a filial duty to trace the history of the society, learn how, having created and defended a nation, our fathers' next care was to promote that industry upon which our national prosperity essentially depends.

The removal of the capital to the District of Columbia, lost to the society her national character. From her, numbers who learned within her halls the value of organization, have gone to the several states; have built up there state and county societies, and she stands to-day, hemmed in it may be, but hemmed in by her own children who have settled round her.

Recognizing your objects and those of our founders as almost identical, we hail your presence and anticipate its results with profound gratification. For agriculture greatly needs to

be promoted, and as a means to its promotion, to be better appreciated. To secure this wished-for consummation a national agricultural association is the most effective. Let us look a little at the estimate placed on our art. "Agriculture is the noblest employment of man." Our children write this truth in their school exercises, and the politician who solicits our votes shouts it from the stump. But is it generally believed? If it were, if it were, I say, regarded as true that the practice of the art of the farmer is ennobling, then the intelligent and benevolent gentlemen who direct our reformatories would feel themselves constrained to provide that labor for their inmates. But even in Philadelphia—I say it with shame of the city of my birth—in our House of Refuge—our house of reformation for juvenile offenders—they are employed in mechanical pursuits adapted rather to a state penitentiary, instead of being put at the reformatory labor of the field. We welcome you gentlemen because we hope that you will enjoin upon the directors of the reformatories of the country the wisdom and propriety of so locating those institutions that agriculture may be utilized as a means of reform.

When the London "Punch" delineates the typical American—and Mr. Punch is a pretty correct delineator of *sovereigns*—he represents him as tall, lean and lank.

Now, to correct these physical defects in the *genus homo* is of course an easy task to that vocation which has transformed the original wild stock of the bovine race into the beautiful symmetry of the Devons and Durhams.

But the typical American is not only too "wiry." He is too nervous and too impulsive. Can rural pursuits cure him? Most assuredly. The feverish life of cities, relieved only by a feverish rush to a fashionable watering place after his wife and daughters, entail bodily ills and mental woes upon him. He needs salubrious air much. The sweet serenity of rural scenes more.

Sound minds in sound bodies must constitute the foundation of the American race, if it is to maintain its proud claim to be the "coming race," and to this end more of our business men and our men of wealth must live on farms.

The railroads have given us quick transit. When Richard Peters, a former president of our society, whose farm lay just beyond Agricultural Hall, had crossed Market street bridge on his drive home, he was longer in reaching it than you, Mr. President, would be now, starting from the bridge by the cars of the Pennsylvania railroad in reaching Bryn Mawr or Rosemont or Pool or farming districts miles away. By the Reading railroad, a student of the college with which I am connected came daily during the last term, sixty miles to lectures, returning in the afternoon. The journey of 120 miles didn't hurt him. He led his class. Why do not business men more generally avail themselves of these

facilities? For two reasons. 1. They do not appreciate the advantages of a country life to themselves and their posterity. 2. The relation which they establish between themselves and their tenant farmers is not what it should be. It is known as "farming on shares," and is professedly arranged upon the principle of co-operative industry, which in agriculture, as everywhere else, is based upon the fact of human fraternity. But that principle may be abused, and as applied in our present system of tenant farming, it is too frequently abused. We claim too much of our tenant farmer when we claim an equal share of everything he produces. We are like that school of political philosophers who would put a tariff on everything imported, instead of upon half a dozen specified articles of import. The nation suffers because it heeds these foolish philosophers, and we suffer from our foolish farm leases. We welcome you gentlemen, because we believe that a National Agricultural Congress can effect a reform in the terms of these contracts.

Hither to these beautiful grounds the American people come, from the North and the South, to shake hands "all round," and thank God that negro slavery—that one accursed thing which threatened to divide our nation—has gone forever. But with it went the class of planters, who, although they advocated a system of social disposition, were at Washington the stern and eloquent champions of political liberty, and constituted the great agricultural equipoise in our national councils. Unfortunately—taking advantage of our conflict—British capitalists—to say nothing of their government—seized the opportunity to cripple and destroy our merchant marine. Commerce lost enormously in property. She lost also the *prestige* which ever on a republic like ours rightly belongs to her. The field was thus left open to the third and remaining branch of industry, manufactures, and well did her teeming millions seek to improve the occasion. By combinations which covered the land, they controlled national legislation. With what result let the prostrate energies of a great people attest. We welcome you gentlemen, because we hope through you to see now, with "Liberty throughout the land," the agricultural equipoise at least in some degree restored in our national councils. We need—how greatly we need—an active, refined body of farmers, wielding an influence that shall make itself felt in the Capitol and at the White House. The reconstruction of the nation will not be complete until agriculture and commerce shall be restored to an equal place and influence with their twin sister, manufactures, when the Union will march forward in trine harmony. As a means to this great end we must win to our art the retired capitalist, the man of active business, and him of elegant leisure, winning them by presenting the peculiar charm of our vocation. A vocation which surrounds us with the beautiful in nature, and continually invites us to the interpretation of her

mysteries. A vocation in which we seek to control the refined chemistry of the gases, to draw them from the atmosphere, and to transform them into new combinations for human sustenance. A vocation in which we seek to control the more subtle agencies of vitality and so to direct the forces of animal and vegetable life that they may produce "some 40, some 60, some 100 fold." We seek to deal with the undecomposable elements of matter, to compound them into sources of fertility and cover the earth with verdure. We find in our work, day by day, new proofs of a beneficent Providence and of our dependence on His bounty. "Paul may plant, and Apolles water, but God giveth the increase."

And now, gentlemen of the National Agricultural Congress, I extend to your president the right hand of agricultural fellowship and again welcome you to Philadelphia.

Captain Burnet Landreth, Chief of the Bureau of Agriculture, of the International Exhibition then delivered the following address:

Mr. President and Gentlemen of the National Agricultural Congress.—It has been intimated to me that it may be proper to offer a few remarks pertaining to the great interests of agriculture, in which most, now assembled, it is presumed, are directly concerned. I recognize the duty of each of us to do what within him lies to advance the general good, and in the special matter of Agriculture the rule is with me imperative,—else I should hesitate on this occasion in the presence of those at whose feet I might seek instruction.

The arrival of this grand Centennial epoch, with its memories of the past, its pride in the present, and its hopes of the future has warmed our blood, and led to increased fellowship between men of all sections, and all interests, and finds vent in expressions of admiration at their works. Indeed, it is only necessary to witness the gratification evident in every eye to realize the fact, that good results will endure long after we, who are now assembled on these International Exhibition Grounds, shall have returned to our respective homes, and that our children whom we have brought hither to partake with us of present, enjoyment and gratification will relate to their children in another generation the glories of this day.

Happy shall we be as a nation, as a people united by geographical bonds, by a common kindred, and a common interest, if we recognize in its full extent the moral as well as the material force of the great centennial occasion, which has brought together, face to face, for the first time, the myriads which no other opportunity has afforded, and which, it is very certain can never occur again to them.

But to go back to agriculture—the interest which most immediately and directly concerns us in this exposition. How much we have to

be proud of—how much is collected together, in the ample structure devoted to it, calculated to quicken the flow of blood within us—just as in an inverse ratio the labor-saving machinery therein has lessened the unhealthy flow and consequent exhaustion in the harvest field, and elsewhere on the farm. A retrospective glance at the progress of the last half-century (I am not able to extend my personal vision so far, but gain the facts at second hand) reveals processes and progress, which all ages, all preceding time has failed to equal. One single era of fifty years has done all that. If it be a passing question in the mind of any one who hears me, whether the language used be not too strong, it were only necessary to convince him it is within bounds, to have witnessed the recent trial of mowers and reapers held under the auspices of the Centennial Commission—more especially the reapers. Let me ask those who are old enough to go back to the days of the sickle, when handful by handful the grain was grasped, cut and laid down with careful precision lest a straw should be misplaced—or even later in the order of mechanical succession which followed the grain cradle, an American invention and invaluable improvement on the sickle, which, indeed, in the opinion of farmers still living, left no room for further progress in that direction. The acme of perfection has been reached! Not so, thought the ingenious mechanical minds of our countrymen. All hail! to those who have so far succeeded in the great field of invention and made it yield golden fruit for the benefit of the whole human family. Step by step were advances made; each successive harvest told practically of the improvements on old inventions and ideas, or exhibited new principles evolved, elaborated, and turned to the advantage of mankind.

It has truly been said that he who makes two blades of grass grow where only one grew previously, is a public benefactor; so it may be said with equal force that he who enables us to gather them with the least expenditure of sweat and toll is his equal in that direction, and the meed of praise should be awarded him with no stinted hand. Indeed I make no doubt that future generations will erect statues of enduring bronze and marble to those who have so benefited the world at large. I may appear enthusiastic on this subject, but as I have no private purpose to subserve, it may be allowable thus to give vent to feelings engendered by the recent trials on the Centennial grounds on the banks of the Neshamony. It was only the other day when the reaper cast the grain upon the platform, and an intelligent aid, the workman walking behind, or uncomfortably seated, was necessary to remove it. In a little while the self-raker came to relieve him and permit his labor to be directed in a more profitable sphere—one more hand added to the producers of public and private wealth. As in the case of the

grain cradle, perfection appeared to have been reached, but lo! not so; the harvester appeared upon the field, carrying upon a revolving apron the cut grain to a platform on which men rode, binding the straw into sheaves. Still further progress was in store, and to-day no manual assistance is required—the automatic binder encircles the straw with a thread of wire, ties it with the precision of the sewing machine, and deposits it upon the ground ready to be carried to the stack-yard. Such was the work exhibited to crowds of appreciative men who had met together to witness the trials.

Thus we might go on with our illustrations of Agricultural machinery, among which only less important in degree is the threshing and separator. I was recently in conversation with an old farmer who told me he had reached middle age when the flail was the only threshing instrument (it was not entitled to the dignity of a machine) unless it were the oxen's feet as in the days of ancient Rome and Egypt. Then nearly simultaneously came the "sweep" and the endless-chain horse-power, and my informant assured me that so far as he was informed, a single-horse tread or endless chain power erected by himself was the first machine for threshing set up in Philadelphia county. Placed near a public road it was the wonder of all passers by, who would dismount to get a closer view of the "perpetual motion"—perpetual so long as it did not choke, or the horses legs tired not. Now where do we stand when scarcely forty years have been added to that period. The same farmer who related to me his experience, himself threshes by steam, and machines exist by which it is claimed 2000 bushels of grain may be threshed within a working day—not only threshed, but if need be, winnowed, bagged, and made ready for transportation to mill or market. I might refer with equal pride to our improved portable steam engines, to the hay tedder, an invaluable aid when aid is most needed; to the hay loader, an endless-chain which elevates the cured grass and in a few minutes deposits it upon the wagon ready for the mow—to the grain drill, sowing with speed and almost mathematical precision, and tho' last, still looming up in the future as an agency of immeasurable power and worth—the steam plough, with which I have personally had some practice.

The difficulties in securing and agreeably directing manual labor, will continue to urge onward mechanical minds to further triumphs over matter, and we may reasonably calculate on advances in the near future: these advances cannot, however, be prompted by the adoption of resolutions or simple expressions of approbation by this convention. But other interests may be forwarded and pressed upon the attention of our farmers, and those to whom is committed the government of state—notably among these, that of forestry, and the establishment of schools for instruction in that all-important in-

dustry, now looming up in so vast proportions.

On the 15th instant there will be assembled in the Judges Pavillion the Second Annual Convention of the American Forestry Association, and in their name, and by authority of their president, I invite you to attend.

I will not further occupy your attention whilst others better able to interest you are present. If I shall have said a word to excite pride in our common pursuit, my object will have been accomplished.

A brief response was made by the president.

On motion a committee of three, on credentials, consisting of Col. Thomas Clairborne, of Tenn., Dr. Thos. P. Janes, of Ga., and Prof. N. S. Townsend, of Ohio, was appointed by the president.

Vice-president, J. R. Dodge, of the District of Columbia, having taken the chair, the president delivered the annual address, entitled "A Retrospect of American Agriculture."* On motion the thanks of the Congress were tendered for the address.

Remarks concerning the objects of the Congress were made by A. J. Dufur of Oregon, Lewis F. Allen of New York and Mr. Hawley of New York.

Mr. Bev. A. Martin, of Georgia, presented a series of resolutions in reference to a Secretary of Agriculture, whereupon, on motion, it was resolved that a committee on resolutions be appointed to which the resolutions just presented and all other resolutions, except those relating to routine business be referred. Adjourned.

The Congress met at 8 o'clock P. M., in the hall of the Belmont Hotel.

Joseph Harris, of Rochester, N. Y., delivered an address on "The Outlook of American Agriculture." Remarks complimentary to the address, and suggested by it were made by Messrs. Allen, of N. Y., Davie of Ky., West, of Oregon, and others.

The president announced the following committee on resolutions: Messrs. Welch, of Iowa, Roberts, of N. Y., Martin of Georgia, Whitman, of Maryland, and Woodward, of Pennsylvania.

The Secretary, Prof. Geo. E. Morrow, of Iowa, delivered an address on "The Objects and Work of the National Agricultural Congress." A discussion of the subject was participated in by Messrs. Allen, Hawley, Roberts and others. Adjourned.

*This address and others presented will follow the general proceedings.

SECOND DAY.

The Congress was called to order in the Judges' Hall at 10 A. M.

In the absence of the author, the secretary read a paper on "American Agricultural Literature," by Dr. E. L. Startevant, of Mass.

Hon. J. R. Dodge, Statistician of the Department of Agriculture of the United States read an address upon "The Uses of Agricultural Statistics," for which the thanks of the Congress were tendered.

Resolutions in reference to the census were presented by Horace J. Smith, of Pennsylvania, and referred, under the rule, to the committee on resolutions.

Hon. Thos. P. Janes, Commissioner of Agriculture of the State of Georgia, read an address on "Agricultural Reform." The thanks of the Congress were tendered for the address. Adjourned.

3 O'CLOCK, P. M.

The committee on credentials reported, presenting the names of delegates, &c.

Delegates, &c., Accredited to the National Agricultural Congress.

From ALABAMA.—Dr. J. T. Tichenor, President of the Agricultural College of Alabama, Auburn.

CALIFORNIA.—John H. Gardiner, Rio Vista.

CONNECTICUT.—T. S. Gold, Secretary of the State Board of Agriculture, West Cornwall.

DELAWARE.—D. J. Murphy, Newark Grange, James McKane, Newark Grange, William Dean, Newark Grange.

DISTRICT OF COLUMBIA.—J. R. Dodge, Department of Agriculture; Judge J. W. Gray, Pres. Potomac Fruit Growers' Association; Dr. J. E. Snodgrass, Secretary Potomac Fruit Growers' Association; Chalkley Gillingham, Potomac Fruit Growers' Association; Dr. George Gross, Potomac Fruit Growers' Association.

GEORGIA.—Dr. Thos. P. Janes, Commissioner of Agriculture, Atlanta; J. S. Newman, Dept. of Agriculture and Secretary State Horticultural Society, Atlanta; Prof. P. H. Meil, Jr., Chemist Dept. of Agriculture, Atlanta; Col. T. J. Smith, Master State Grange, Oconee; Hamilton Yancey, Col. Geo. W. Adams, Bev. A. Martin, Dahlonga, Col. Geo. R. Black, Dr. H. H. Cary, La Grange, all from the Georgia State Agricultural Society; Col. W. T. Newman, Georgia State Grange; Col. T. G. Holt; P. J. Berckmans, Augusta.

ILLINOIS.—From Illinois State Farmers' Association: Hon. John Wentworth, Chicago; Jonathan Periam, Chicago; H. D. Emery, Chicago; Milton George, Chicago; Thos. McD. Richards, Woodstock; Hon. D. J. Pinckney, Mt. Morris; M. B. Lloyd, Orion; Lewis D. Steward, Plano; A. J. Alexander, Gilman; Gen. L. F. Ross, Avon; A. C. Hammond, Warsaw; Maj. E. A. Giller, Whitehall; John W. Hunter, Owaneco; Geo. W.

Minier, Minier; Hon. Malden Jones, Tuscola; Hon. E. Roessler, Shelbyville; B. Pullen, Centralia; Capt. Geo. Hunter, Carlinville; Hon. J. M. Washburn, Carterville; Hon. John Landrigan, Albion. From Henry Co. Agricultural Board: M. B. Lloyd, Orion. Dr. A. G. Humphrey, Galesburg; W. C. Flagg, Moro.

INDIANA.—From Delphi Grange: George Gillford, Delhi; H. B. Gillford, Delhi.

IOWA.—From State Agricultural College: Pres. A. S. Welch, Ames; Prof. Geo. E. Morrow, Ames. From Iowa State Horticultural Society: Prof. H. H. McAfee, Ames. From Ames Grange: Master A. J. Graves, Ames. C. F. Clarkson, Melrose; L. E. Williams, Montrose; James Hall, Lacona.

KENTUCKY.—Col. W. J. Davie, Commissioner of Agriculture, &c., Frankfort; John R. Proctor, Kentucky Geological Survey.

MARYLAND.—Hon. Lloyd Lowndes, Jr.; Cornelius Staley; L. A. J. Lamott; A. Bowie Davis, Brookville; Wm. B. Hill; Maj. Wm. B. Matthews; George Thomas; Gen. John Carroll Walsh; Gen. L. Giddings; J. Howard, McHenry; Edmund Law Rogers; William Ward; Col. Edward Wilkins; Col. John R. Emory; Gen. E. L. F. Hardcastle, Easton; L. L. Waters, Princess Anne; George Hayward; Ezra Whitman, Baltimore; Wm. B. Sands, Baltimore.

MASSACHUSETTS.—Prof. Levi Stockbridge, Mass. Agricultural College, Amherst.

MINNESOTA.—From State Grange: Thomas Tunis Smith, St. Paul. From State Agricultural Society: Wyman Elliott, Minneapolis.

MISSOURI.—C. V. Riley, State Entomologist, F. B. Chamberlain, St. Louis.

NEW HAMPSHIRE.—From State Board of Agriculture: Hon. Moses Humphrey, Chairman of the Board; J. W. Sanborn, Supt. College Farm.

NEW JERSEY.—From State Agricultural Society: P. T. Quinn, Newark; W. A. Monell; Hon. Amos Clark; E. G. Brown. From State Grange: J. W. Nicholson, Camden; Wm. M. Iliff; Enos G. Budd, Budd's Lake; David T. Haines; J. V. D. Duryea.

NEW YORK.—X. A. Willard, President N. Y. Dairymen's Association, Little Falls; Prof. I. H. Roberts, Cornell University, Ithaca. From Batavia Farmers' Club: Henry Iver; Geo. W. Scott. Lewis F. Allen, Buffalo; Geo. A. Martin, Buffalo; Joseph Harris, Rochester; H. Bowlby Willson, 19 West 46th street, New York.

OHIO.—Prof. N. S. Townshend, State Agricultural College, Columbus; Dr. John A. Warder, Pres. National Forestry Association, Clevel. From Butler Co. Grange: S. Silver; Jos. Allen. From Muskingum Township Farmers' Club: Marietta; Levi Bartlett; Jes. Wood; I. G. Barker; M. A. Staz.

OREGON.—A. J. Dufur, Portland; M. Wilkins, Willamette Forks; James Bruce, Corvallis.

PENNSYLVANIA.—Burnet Landreth, Chief of Bureau of Agriculture International Exhibition,

Philadelphia; Dr. A. L. Kennedy, Society for Promoting Agriculture, Philadelphia; Horace J. Smith, Philadelphia; John A. Woodward, Pres. Centre Co. Agricultural Society; A. Y. H. Adams, Agl. Editor Herald, Carlisle; Dr. E. A. Hertz, Lancaster Co. Agricultural and Horticultural Society; J. L. Landis, Lancaster Co. Society; Henry M. Engle, Marietta Agr'l Society. From Merion Grange: Wm. H. Holstein; Edwin Moore; Geo. W. Righter. From Bucks county Agricultural Society: Robt. K. Tomlinson; Robt. Ivins, Langhorne; M. Amanda Heston; Rachel W. Shallcross; Henry M. Engle, Lancaster Co. Horticultural Society, Marietta; John A. Smull, Harrisburg.

TENNESSEE.—Col. Thos. Clairborne, Nashville. VIRGINIA.—From Catocin Farmers' Club: D. H. Vandeventer; Col. S. E. Chamberlin, Waterford; C. Gillingham.

FROM OTHER NATIONS.—Prof. Thos. Segelcke, Royal Agricultural College, Copenhagen, Denmark; Prof. Jayme Batalha Reis, General Agricultural Institute of Portugal, and Vice President of the Royal Central Agricultural Society of Portugal; C. Rovere, Sec'y of the Portugal Commission; A. Caubert, Delegate of the Society of French Agriculture; James Perault, Canada.

Representatives from five nations and twenty-one states, including those from five agricultural papers, seven Granges, fourteen societies, seventeen official government associations, and seven agricultural colleges, comprising 133 persons were known to be present, besides many not reported to the Secretary.

On motion a committee of one from each state represented, to nominate officers for the ensuing year was ordered.

Hon. L. F. Allen, of New York, read an address on "American Live Stock," at the conclusion of which a vote of thanks was unanimously tendered.

Pres. X. A. Willard, of the New York Dairymen's Association, delivered an address on "American Dairying." The thanks of the Congress were voted therefor.

Mr. Davis, of Maryland, gave some interesting reminiscences of the first refrigerator in Maryland.

The President announced as the committee on nominations, Prof. N. S. Townshend, of Ohio; W. J. Davie, of Kentucky; L. L. Waters, of Maryland; Col. Thos. Clairborne, of Tennessee; L. E. Williams, of Iowa; John H. Gardiner, of California; N. C. Meeker, of Colorado; T. S. Gold, of Connecticut; Dr. J. E. Snodgrass, of District of Columbia; Dr. H. H. Cary, of Georgia; M. B. Lloyd, of Illinois; Alfred Gray, of Kansas; Prof. Levi

Stockbridge, of Massachusetts ; T. T. Smith, of Minnesota ; C. V. Riley, of Missouri ; Hon. Moses Humphrey, of New Hampshire ; J. V. D. Duryea, of New Jersey ; X. A. Willard, of New York ; A. J. Dufur, of Oregon ; Dr. A. L. Kennedy, of Pennsylvania ; Col. S. E. Chamberlin, of Virginia. Adjourned.

8 P. M., BELMONT HOTEL.

The President stated he had received from H. Bowlby Wilson, of New York, a paper on "Money considered as an industrial tool." On motion the paper was referred to the committee on resolutions.

Hon. Alex. Delmar, of Philadelphia, who was to have addressed the Congress on "The Grain Crop of 1876," stated that the paper he had prepared was largely statistical, and that instead of reading he would ask leave to print it ; but consented to give the substance of the paper in extemporaneous form. The thanks of the Congress were tendered him.

The question of publishing the proceedings of the meeting was then discussed, and on motion of Prof. Roberts, of New York, it was resolved that each person who had presented a paper should be permitted to publish it in such periodical as he might desire, and that he be requested to furnish each member of the Congress a copy at its expense. Adjourned.

THIRD DAY.

JUDGES' HALL, 10 A. M.

Resolutions by Dr. Kennedy, of Pennsylvania ; and Prof. C. V. Riley, of Missouri, concerning the Rocky Mountain Locust, were presented and referred to the committee on resolutions.

Invitations to visit the special agricultural exhibition in the Kansas and Colorado building, and that of the department of agriculture in the Government building were accepted, the visits to be made during the noon recess.

Col. Thomas Clairborne, of Tennessee, delivered an address on "Our Southern Agriculture," for which the thanks of the Congress were voted. Extended discussion of the agricultural capabilities of the South was participated in by Messrs. Davie, of Kentucky ; Tichenor, of Alabama, and others. Adjourned.

3 P. M.

Prof. Townshend, of Ohio, in behalf of the committee on nominations, reported as follows :

The committee impressed with the energy and courtesy of our present President, Willard C. Flag, of Moro, Ill., unanimously recommended his re-election.

For vice-Presidents see list. [Printed in the

list of officers.]

Our present excellent Secretary George E. Morrow, for various reasons, which to the committee seem sufficient, declines a re-election. The committee have the pleasure to recommend Horace J. Smith, of Pennsylvania, whose work in this grand exposition is a sufficient guarantee that he is eminently the man for secretary.

Your committee recommend Ezra Whitman of Baltimore, for treasurer, and that President, Secretary and Treasurer act as Executive Committee.

For the next place of meeting we recommend Chicago or Baltimore. The time of the meeting to be published by the president.

The officers recommended by the committee were unanimously elected and the president and secretary elect briefly acknowledged the honor done them.

The question of the place for the next meeting was then taken up, and Buffalo, Atlanta, Nashville, Chicago and Baltimore were suggested. Chicago was finally fixed upon.

Mr. Davie, of Kentucky, suggested that the time of meeting be fixed at the same date with that of some other large organization.

Pres. A. S. Welch, of the Iowa Agricultural College delivered an address on "Agricultural Education or the True Work of National Industrial Schools." At the conclusion Mr. Davie, of Ky., moved that the thanks of the Congress be extended to Pres. Welch for his able address, which motion was unanimously adopted.

Ex-Secretary Morrow reported the expenses of his office and that of the president for the past year as \$43.75 and that he held \$2 of the funds of the Congress making the balance due \$41.75 for which an order on the treasurer was ordered to be issued. He also reported the receipt at this meeting of \$92, being \$3 each from 30 members and \$2 from another.

An address was then read by Prof. Norton S. Townshend of the Ohio Agricultural College on "Agricultural Education," and the thanks of the Congress were extended to him.

The topics of the addresses of Pres. Welch and Prof. Townshend being under consideration, Prof. Thomas Segelcke, of the Royal Agricultural College of Denmark at Copenhagen, was called upon. He said that they had but a small country, but their agricultural college had been established 20 years, and he thought their people were well pleased with the result. The two principles of practical and theoretical instruction should be combined. They have five departments of agriculture,

veterinary science, forestry, surveying and gardening, and teachers in each of the various branches. Besides the State Agricultural College, with 70 different teachers, and taking two years for its course, they have a lower class of schools for the poor, occupying only ten months. He returned thanks for admission to the meetings and for all the friendship extended to him in the United States. He had spent three months here, one-half in the exhibition and one-half traveling through the country, and had always been received most kindly; and he felt it a duty to express his thankfulness for the courtesies extended to him.

The subject of agricultural education was further discussed by Messrs. Stockbridge, of the Massachusetts Agricultural College, Mainer, of Illinois, Kennedy, of Pennsylvania, Tichenor, of Alabama, Williams, of Iowa, and Riley, of Missouri.

The following gentlemen were unanimously elected honorary members: Prof. Thomas Segeleke of Denmark; Prof. Jayme Batalha Reis, of Portugal; C. Rovere, of Portugal; A. Caubert, of France; James Perrault, of Canada.

The committee on resolutions made their report, and after discussion the following were adopted:

Concerning Agricultural Statistics Presented by W. C. Flaggs.

Resolved, That a committee of three be appointed with the power to appoint subcommittees in the several states and territories, whose business it shall be to secure uniform legislation in the several states and territories on the subject of the collection of statistics; and such additional legislation by the United States as shall give full and reliable information in regard to all branches of agriculture.

[J. R. Dodge, of District of Columbia; T. P. Jones, of Georgia, and Alfred Gray, of Kansas, were appointed the committee.]

Concerning the Rocky Mountain Locust Presented by C. V. Riley of Missouri.

WHEREAS, The people of some of the Western and Northwestern states have again been afflicted by the Rocky Mountain Locust Scourge, and

WHEREAS, The devastation of this insect form a most serious obstacle to the settlement and welfare of much of the country between the Mississippi and the mountains, and these devastations have become a national calamity, and

WHEREAS, There is much to learn of the native breeding places of the pest, and some hope that by more thorough knowledge of those native breeding places, and of the causes of the migration therefrom, we may be

able to prevent the invasion of the more fertile country to which the species is not indigenous; therefore

Resolved, That it is the emphatic opinion of this congress that some action should be taken by the National Government that will have for its object the palliation or extinction of this crying evil.

That we consider that Congress owes it to the people of the West to take this matter into consideration, and we call upon the next National Legislature to follow the example of other nations under like circumstances, and appoint a special commission for the thorough investigation of the subject.

That the passage of some such bill as that introduced during the last Congress by Senator Ingalls, of Kansas, while contemplating the investigation of a few other insects of national importance, such as the cotton worm of the South, would have been of vast moment to the people of the South and West, and would have brought about the needed investigation into the locust question.

A SECRETARY OF AGRICULTURE.

Presented by Bev. A. Martin, of Georgia:

Resolved, That it is the opinion of the National Agricultural Congress, that the agricultural interest of the country is one of, if not the most, important in the Union; and should receive the fostering care and protection of the Government.

Resolved, That we urge upon Congress the justice and the wisdom of creating a position in the Cabinet upon an equal footing as to rights, privileges, &c., to be called the "Secretary of Agriculture," whereby the interests of agriculturists may be fully represented and consulted, as well as the Monied, War, Naval and other interests less important than agriculture.

Resolved, That we suggest to the state and county agricultural societies throughout the Union, that they petition Congress to this effect, to wit: That the agricultural interests be represented in the National Cabinet, and by a successful farmer.

Resolved, That the Secretary be instructed to forward a copy of these resolutions to the President of the United States Senate and the Speaker of the United States House of Representatives, with the request to lay them before the bodies over which they preside.

UNIFORMITY OF WEIGHTS, MEASURES AND MONEY.

Presented by Dr. A. L. Kennedy, of Pennsylvania:

Resolved, That the season of an International Exhibition is an eligible one during which to arrive at a general agreement on the subject of a uniform system of weights and measures, and one monetary unit in the United States.

Resolved, That a committee of one from each state here represented, be appointed to corre-

spond with committees that are, or may be appointed by American and Foreign organizations on this subject, and that said committee, after such correspondence, shall report such modification of our system of weights and measures, as may to them seem most desirable.

[See committee with list of standing committees.]

FARMS FOR REFORMATORIES.

Presented by Dr. Kennedy:

Resolved, That the Secretary be, and he is instructed to address the officers of Reformatories for juvenile offenders, in the institutions of the United States not already provided with farms, and to urge upon them the importance of introducing agricultural labor as a portion of the discipline of their institutions.

THANKS TO SECRETARY.

The following, offered by Mr. Davie, of Ky., was unanimously adopted:

Resolved, That the thanks of the Congress be given to the retiring Secretary, Mr. G. E. Morrow, for the able, constant and effective performance of his duties as secretary of this body which was with him a labor of love and not of profit.

Resolved, That this resolution be spread upon the minute book of this Congress.

THANKS TO PHILADELPHIANS.

The following, offered by Geo. E. Morrow, was unanimously adopted:

Resolved, That the thanks of this Congress are tendered to Horace J. Smith, Dr. A. L. Kennedy and other of our Pennsylvania members, for their effective aid in obtaining places of meeting, and to Capt. Landreth and Hon. Jno. B. Hawley for the use of Judges' Hall and other attentions shown us on the Exhibition Grounds.

On motion adjourned to meet at the Belmont Hotel this evening after adopting a resolution that the Executive Committee be authorized to take such action as to them seemed best, regarding the publication of the transactions.

EVENING SESSION.

This session was informal. Remarks were made by A. L. Murdock, of Boston, and Dr. Snodgrass, of Washington. The following gentlemen were elected members of the Congress:

L. Williams, Montrose, Iowa; Jas. Hall, Lacona, Warren county, Iowa; M. Wilkins, Willamette Forks, Oregon; James Bruce, Corvallis, Oregon; F. B. Chamberlain, St. Louis, Mo.; Rev. G. W. Minier, Minier, Ill.; L. Fallon, Buffalo, N. Y.; J. E. Snodgrass, Washington, D. C.; Dr. A. G. Humphrey, Galesburg, Ill.; Jno. A. Small, Harrisburg, Pa.; Virgil G. Gilmer, Nashua, N. H.; Horace J. Smith, Philadelphia, Pa.; C. Gillingham, Accontent, Va.

The session of the Congress was then declared closed by Pres. Flagg.—HORACE J. SMITH, *Secretary*.

NATIONAL AGRICULTURAL CONGRESS.

A RETROSPECT OF AMERICAN AGRICULTURE.

By W. C. FLAGG.

Fellow Members of the National Agricultural Congress:—In coming before you at this, our Fifth Annual Meeting, to deliver the address which the position I have the honor to occupy requires, the place and the year suggest the proper topic of discourse. Standing at the birth place of the American nation, at the close of the first century of its existence, it is natural that our thoughts should revert to the past condition and progress of our American Agriculture.

American Agriculture was peculiar in the fact that it placed a large body of civilized inhabitants on the virgin soil of the New World, under a climate very unlike that of the parts of Europe from which our immigration came. Yet, during the two centuries and a half which we may say in round numbers covers our civilized agricultural history we may be said to have rapidly run over the usual course of agricultural development.

AGRICULTURAL DEVELOPMENT.

Our progenitors, as in other countries, first commenced to gather the spontaneous products of the forest and flood. They were fishermen, hunters and woodsmen, rather than farmers; just as many of our inhabitants in the wilds of Maine and Oregon are to-day. There succeeded a period of pastoral agriculture, not so well defined in the wooded Atlantic States but marking a distinct stage in the great prairies of the West and Southwest. During this period the breeding and grazing of cattle, horses and even sheep and swine, alternated with hunting, fishing and other occupations of the backwoodsmen. We see this going on in Texas, Kansas and Colorado to-day. Next in order, apparently, came a one idea agriculture in the form of growing a staple upon which the farmer risked his whole chances of success, and which occupied but a small portion of his time, leaving abundant leisure for more savage pursuits during the rest of the year. This was seen in the tobacco culture of the Atlantic coast, in the early day, and in the cotton culture of the South at a later period. It is seen in a later and modified form in the wheat culture of the Genesee valley and of the Northwestern and Pacific States. It has generally proved, in the long run, exhaustive and impoverishing, and consequently is succeeded by mixed agriculture in which the farmer seeks a diversity of crops according to his intelligence; and attempts to check the waste of fertility which is going on. Not unfrequently the alternative of abandoning the worn-out lands has been chosen, and real estate declines in price, and population diminishes

while the farmer and his family seek "fresh fields and pastures new" in the Great West. Such is now the condition of parts of New England, Virginia and other states. In a few places only we have reached the point of development known as intensive agriculture and which may be rather called market gardening than strictly agriculture. Our market gardeners and nurserymen seem more and more to shelter themselves and their products under glass, and this again suggests that the violent alternations of our climate may prevent the adoption of intensive agriculture in many parts of our Union.

RAPID PROGRESS OF THIS DEVELOPMENT IN AMERICA.

All these various phases of agricultural progress have been experienced in our country in a brief space of time, and somewhat modified by the general diffusion of trade, may be all seen at work in different sections of our country to-day. This somewhat confuses the understanding in reviewing the agricultural history of our country; but the difficulty is more apparent than real.

ABORIGINAL AGRICULTURE.

Although the western world has been discovered nearly 400 years, the first permanent settlements in the notably agricultural states of our Union are hardly two centuries and three-quarters old. Previous to that time, and indeed for many years after, American agriculture was the art of usually unskilled Indians, and occupied but a very small part of our arable land. The Plymouth settlers of 1620 found the red men growing corn, the squash, the pumpkin, a species of bean, a kind of sun-flower and tobacco. Their hoes were made of clam shells, or of the shoulder blades of the moose. Their manure was fish, in the hill. Hendrick Hudson in his first visit to the river that has received his name says that he saw corn and beans enough to freight three ships. The author of the history of New York states that three to four hundred acres were found in cultivation about some of the Indian villages. In the country of the Senecas in 1687 the forces of the Marquis de Noyville claimed to have destroyed 1,200,000 bushels of maize. This seems an extraordinary story; but over half of our Illinois counties each produce annually a much greater average. The early settlers of Virginia bought such an amount of corn from the natives that we may suppose it was grown there also to a considerable extent. The Indians of the new Gulf States were still more advanced. They cultivated maize, peas, beans, pumpkins, melons and sweet potatoes. De Soto and his followers in their romantic raid found great stores of corn and even of corn meal among nations that had passed from the condition of hunters to that of a fixed tillage. This was in the lower Mississippi Valley. Still farther West the Pueblo Indians of New Mexico and Arizona have for an indefinite period prose-

cultured agriculture with irrigation. In the Illinois country, Marquette found abundance of corn, beans and melons. Bartram thought from his examination of old Indian town sites that the persimmon, honey locust, Chickasaw plum, mulberry, black walnut and shell bark hickory were cultivated by the aborigines, as were the apple and peach at a later period when introduced by Europeans. From the Kennebec, and even the northern shores of Lake Superior, to the Mexican border and beyond, the Indian was probably advancing in agricultural art and in Mexico and Peru had settled down to established courses of industry. But it was agriculture without metal tools and without domestic animals. It is said that the North American Indian had no domestic animal except the dog, and that he was not used even for the chase, but was simply a pet. The agriculture of the aboriginal period was mostly the work of women, using tools of stone, shell or bone in the more sandy and fertile soils along the streams.

EARLY AGRICULTURE OF THE UNITED STATES.

There was no immediate change made in this state of things by the coming of the white man. The dense forests, the abundant game, the Indian hostilities, the predatory animals, the want of markets, all delayed the progress of agriculture. But some advance was made in the century and a half that elapsed between the landing of the May Flower and the battle of Bunker Hill.

At the time of the Declaration of Independence our population was probably less than 3,000,000 including 500,000 slaves. In New England which had nearly one-fourth of this population, the great body of the people were farmers, working on small farms, but probably devoting a good deal of time to the pursuits of the hunter, fisherman and wood cutter. Elliott quotes from "The American Traveler" an estimate of the exports of New England in 1770 from which I gather that of £370,500 valuation of exports, £12,000 were horses and live stock and £13,000 pickled beef and pork. Nearly all the remainder were products of the forest or fisheries—mainly the latter. New England therefore at that time probably did not much more than supply her own population with agricultural products.

In Virginia and Maryland where the growth of tobacco commenced at an early day, the agricultural exports were much more important. Jefferson states that Virginia exported 70,000 hogsheds of tobacco in 1758, and at the time of the beginning of the revolution estimated the annual exports of that state to equal £850,000, which includes 55,000 hogsheds of tobacco, 800,000 bushels of wheat, 600,000 of Indian corn, 4,000 barrels of pork, 1,000 barrels of beef, and 5,000 bushels of peas, besides flax seed, hemp, cotton, horses, &c. Six-sevenths at least of the exports of Virginia at the time appear to have been ag-

ricultural products. Tobacco was already exhausting the soil and its culture diminishing, and Jefferson rejoiced at the fact and advocated the growth of wheat and live stock.

In South Carolina I believe the principal agricultural product of the colonial period was rice, though some strong efforts had been made, with partial success, to establish silk culture. Here as in Louisiana, under the French, attempts were made at growing other tropical and semi-tropical products with a varied success. The growth of the sugar-cane was begun. Indigo was planted and cotton was experimented with, though the lack of cheap ginning processes prevented its extensive culture until the subsequent period.

Far up in the French Louisiana, in what was afterwards the Illinois country, wheat and cattle were already staple products and on occasion of need, a large surplus could be furnished to the regions about New Orleans.

Clear around the Atlantic and Gulf coasts from Maine to Louisiana, and scattered along the great river, Mississippi, the beginnings were made of the great agricultural empire whose chief development has taken place at a period far subsequent even to the revolutionary period.

In 1790, when our first census was taken, we had a population of 3,929,214, settled on an area of 239,935 square miles. One-thirtieth of this population was found in cities of 8,000 inhabitants or over. The population of that period, although we have no classification of its occupations, must have been very largely engaged in agriculture or kindred pursuits that could be prosecuted with it—such as hunting, lumbering and fishing. Every person in most communities had a direct interest in practical agriculture.

There was not at that period, nor a time long subsequent, anything of what is now called Scientific agriculture—or the use of scientific facts and scientific methods in the study of the best practical agriculture. Agricultural implements down to within a period in the memory of many now living were scarcely better than in the days of Hesiod or of the Scriptores, Rei Rusticæ. The improved races of horses, cattle, sheep, swine and poultry, unless it may be thoroughbred horses, were little known or sought. From Maine to Georgia the westward sweep of cultivation, like a forest fire, consumed the streets and burnt out the land. I wish I could say that in this last respect we had made a stay of the devastating hand of a pioneer and pilfering husbandry; but better methods seem only to be born of necessity.

AGRICULTURE OF 1876.

At the end of the first century of our national history, we find a population of 38,558,371, settled on 1,272,239 square miles. Our population has increased ten-fold, our settled area five or six-fold. But one-fifth of this vastly increased population lives in cities exceeding eight thousand

in population, and the relative number, importance and wealth of the agricultural class has declined—very greatly in New England, comparatively little in the Gulf States. At the last census barely one-half of our industrial population was found to be engaged in agriculture ranging as low as 12 and 13 per cent. in Massachusetts and Rhode Island, and as high as 80 and 81 in Mississippi and Arkansas. The "extensive" practice of agriculture limits agriculture to the sparser populations. Superintendent Walker, of the census bureau, states that as yet agriculture in the United States does not support a population of more than 45 to the square mile. Where the population exceeds that density it is supported by other industries.

In New England to-day, coming to details, agriculture in many of its aspects appears to be in a decline. The farms of Massachusetts are increasing in size, and there is a remarkable disappearance of farms of a small size. Throughout New England the subdivision of territorial property appears to have reached nearly its limit. The American population is deserting the farms in the older and more thickly settled communities and its place is filled by foreign population of fewer wants and greater economy. Farm lands in the midst of a population unsurpassed for intelligence and high character are selling for less than the cost of the buildings, and for less than farms a thousand miles away from the sea board. This has been the result wrought out more rapidly than elsewhere on the comparatively thin soil of New England. The more fertile soils of New York, New Jersey and Pennsylvania are on the same road it may be presumed, but have not gone so far. Maryland and Virginia, unequaled in many respects as to climate and commercial advantages, were long ago plundered and impoverished by a profligate practice of agriculture, and their worn-out farms are deserted by migrating heirs, and sold for low prices to a new order of settlers. The Carolinas and Georgia differ but in degree; and it seems only a question of time when the whole American continent shall have been run over by this marauding husbandry.

This seems a gloomy view, but is corroborated by the observation of intelligent foreigners. As I write, I take up Harper's Weekly of a late date and read a late notice of Lord Houghton, who has lately visited us.

Lord Houghton is represented as saying: "With regard to agriculture within the next fifty years, America will have been reduced, notwithstanding its immense space, very much to the condition of the European countries in general; that was to say, she would have to recuperate by artificial means the natural wealth that was now being exhausted."

I take up the London Quarterly Review, of July, 1876, and read "Nothing now strikes a traveler more than the poverty of the land almost in the neighborhood of large towns, which

industry could easily have relieved, had it not been tempted away to distant, richer soils."

CAUSES AFFECTING OUR AGRICULTURE.

Several very important facts have been brought to bear on American agriculture during the last century that have essentially changed its conditions in different parts of the Union.

WASTE OF SOILS.

1. First in point of time is the deterioration or waste of soil. The Atlantic shores were cleared of their forests with little forethought of the denudation that would strip the hills of their sometimes scanty covering of soil. The soil that was not transported from its original bed was cropped until it yielded returns that would not pay for the cultivation. The virgin fields to the westward prevented attempts at any due preservation or restoration of fertility. The new lands of the West have been a continual discouragement to an improved agriculture in the East.

IMPROVED TRANSPORTATION.

2. This discouragement has been prolonged by improved transportation. The New England farmer finds that Western corn is brought from Illinois or Iowa and sold for a less sum than he can usually produce it for. Reduce the unnecessarily high freight rates and even this, cheapest of the cereals, can be carried from the hundredth meridian (which I assume to be the Western boundary of profitable grain growing in the Mississippi Valley), to the sea board; and more and more replace the local production. The case is still stronger in the growth of wheat whose culture continually recedes Westward, until it now nearly reaches the boundary line of profitable cultivation. The census of 1870 shows that New England did not produce more than half a bushel of wheat to each person of its population, nor more than two and a half of corn. All the sea board states gave a similar, though not so extreme a result, which can usually be traced to the fact that Western grain is underselling Eastern grain in its own markets.

This produces a great temporary disturbance in Eastern practices of agriculture and in the prices of Eastern farm lands. It does not effect the East alone, Ohio, Indiana and Illinois farmers are disturbed and discouraged by the underselling competition of states still farther West. The cattle of Kansas and Texas and the wheat of Minnesota are troublesome to the late pioneer states. Agricultural production grows less profitable all along the line from the Atlantic to the Mississippi.

If we pass to the other end of the line, along our Western frontier, we find a precocious, premature development of agriculture. Great crops of corn are grown quickly, but the cattle and swine and other live stock for its conversion into more compact forms have not yet arrived. These come with the wealth of older communities. Immense areas of wheat are harvested

where there are no mills to convert them into flour, and few mechanics or other than farmers to purchase the product. Hence we have immense shipments of cheap, raw products over long lines of railway to tide water. The high rates of freight and the low prices of products which usually come together, depress the market to an extent that makes production no longer profitable.

Hence we may say that while improved facilities for transportation have done much to increase and extend agricultural production, and to equalize the values of agricultural products and of farm lands it has not been an unmixed benefit. It will not be, perhaps, until the Western line of profitable cereal growth has been reached, when we may anticipate a reflex movement in cereal crops and their more general production in the East as well as the West. Corn will carry with it cattle and other live stock, and renewed and more general attention will be paid to the preservation and improvement of the fertility of farm lands.

The chief advantage of modern transportation to the agricultural class I apprehend to be in the impulse that is given to intercommunication, the waking up of dormant energies, and the dissemination of improved implements, improved varieties of agricultural plants and animals and improved processes.

AGRICULTURAL MACHINERY.

3. But one of the most remarkable facts affecting American agriculture, has been the improvement of Agricultural Implements and machinery. Least progress has been made, so far as economy of force is concerned, in implements used in turning and pulverizing the soil. Yet the plough, the harrow, and the cultivator of to-day, are wonderful advances beyond these of the Revolutionary period, or even of half a century ago. Down to within a period in the remembrance of many now living, the plough was of wood, pointed with iron and its wooden mould board perhaps, covered with strips of hoop iron. The reader of Gould's elaborate report of the trial of ploughs, in the New York Agricultural transactions of 1887, will remember the immense distance between the primitive American plough, described by Mr. Allen and the modern implements of Holbrook. Still more remarkable in the amount of labor saved, and the quality of work, have been the implements used in seed planting—the drill and the corn planter. More marked yet, is the work of the harvesting implements, the reaper, the mower, and the horse rake, and the threshing machine. It is true that these improvements save labor in an unequal degree. A single person can rake, perhaps 20 acres, mow 10 acres, and harrow, roll or plant, equal or greater amounts of land; but he cannot plough in any equal ratio. It is true also, that in many cases the cost of the work done, is not sensibly diminished. But the fact remains, that a much

larger number of bushels of grain, or tons of hay, and consequently of human food, can be made with far less expenditure of human labor, than ever before. A much smaller number of persons are needed in agricultural processes, a much larger number are set free to engage in other pursuits. In the ten agricultural states of the Northwest in 1870, but one-third of the people of the United States averaged 53 bushels of corn for every man woman and child, and nearly 75 bushels each of cereals.

The ultimate result or tendency of this immense increase in the power of production, which, however, has its limits in the productive capacity of the soil, and the extent of its arable acres, is difficult to foresee. It does not add in any equal ratio to the wealth of the agricultural class. The free-hold farmer of America, seems to me to follow very much the course of the manual laborer in other departments of industry. He obtains a subsistence, more or less bare, according to his conditions; but the main profits of increased production go elsewhere, usually I think, to the trader or the transporter. The annual production and addition to one national wealth, is undoubtedly immensely increased, but if we can trust the census reports, this wealth accumulates in the great cities.

DIVISION OF LABOR.

4. Another, and remarkable modification of agricultural industry in America, has come from the division of labor, as our civilization and settlement advances. In the cabin of the pioneer, all arts and trades may be found. The husbandman builds his house, makes his implements, grinds his corn and makes his shoes. The wife spins, weaves and makes the clothing, gathers the simples that answer as medicines, and performs a hundred functions unknown to more advanced communities. Later developments are changing all this, and go farther in the direction of destroying the much advocated "mixed husbandry," and enforcing the hitherto condemned custom, of confining agriculture to the raw products. The making of cheese, butter, cider, wine, vinegar, canned and dried fruits and vegetables, sugars, syrups, starch, brooms, &c., &c., under a law of our social development became specialties, and leave the farm-houses for the factories. The farmer's work becomes therefore, more and more specialized and confined to culture of the soil proper. It remains to be seen whether this will be an advantage, or the contrary. It is opposed to the rural economy, taught by many European and American agriculturists, but will bring the advantages of greater concentration of purpose and skill of labor.

THE NATURAL SCIENCES.

5. Scientific progress has had its effect on American agriculture. One hundred years ago there was no agricultural chemistry, meteorology, botany, geology or zoology, comparable

with the present. Johnson's *How Crops Grow*; and *How Crops Feed*; Darwin's *Animals and Plants under Domestication*, and the now respectable array of more special books, bearing on many branches of agricultural science may even be considered the product of the last quarter of a century. Attempts at scientific agricultural education have been commenced in nearly every state of the Union, under the agricultural and mechanical college grant. A greatly extended test and use of fertilizers, has been made in all the old states. The effects of our variable climate on animal and vegetable life, begin to be comprehended in the light of public and private observations. The physiology of plants, and the discovery and dissemination of new varieties of grains, vegetables and fruits, are studied and prosecuted with vigor. The principles of animal life in the breeding and feeding of domestic animals, are studied and applied as never before.

I do not say this in boastfulness, for I believe as compared with other nations, we have much to learn, though I hope we have also something to teach. The desire, and I may add the necessity, of immediate results, has made our agriculture and our science somewhat superficial and hasty, and not always sound. I only claim that we are "marching on."

THE GENERAL RESULT.

In considering these and other causes now at work, I conclude that the agricultural class of the United States, in common with that of other countries, has reached a point where its next movement may be an important one, not only for itself, but mankind. The increased intelligence of mankind, resulting from more general and free intercommunication, is having its effect on the conservative and slowly influenced agricultural class. It awakens to claim and take a part in the direction of affairs—to share in that democratic possession of society and government, which De Tocqueville, more than a generation ago, regarded as inevitable.

Increased intelligence has improved our own soils, adopted better tools, selected better grains and grasses, grown heavier crops, bred better animals, and in many ways improved the quality and the quantity of our agriculture. The farm houses and the out houses, are more adapted to their purpose. But the increased intelligence which has brought all this about, cannot rest here, even when improved agriculture becomes far more common than now. With increased knowledge comes consciousness of the fact, that the agricultural class is unequally weighted in the race of life. The corn crop, as our statistician, Mr. Dodge, has said: "cannot be cornered," and the same fact is in a good degree true of all agricultural products. There is nearly complete mobility and free trade in agricultural products. If the demand becomes limited, or if there is over production,

the half-million farmers scattered over the Union cannot meet and resolve to plant half their land next year. They cannot adopt the tactics of the coal miners, the iron men or the book publishers, in preventing the free working of the law of supply and demand. They cannot control prices like the trader, and transporter for a like reason. The power, or at least the habit of combination is wanting.

UNEQUAL LEGISLATION.

With increased knowledge also comes the conviction that the statute laws, as well as the "laws of trade," have been controlled in the interest of others than the agricultural class. The laws of taxation in nearly every state with which I am acquainted are most burdensome to its farmers. The bank charters and rail road charters give dangerous powers over the commerce and transportation of agricultural products, as do the powers granted telegraph companies over the transmission of commercial intelligence. It has been deemed necessary to "encourage" manufactures by tariffs; book making by copyright; invention by patents; national banks by gratuitous issues of notes; periodicals by cheap postage; but the agriculturist with the exception of a tariff on sugar and wool and a cheap postage law in relation to seeds and clons, which Senator Hamlin and the express companies made haste to repeal, has been left to exemplify the working of the *Laissez faire* principle, so far as help was concerned.

This knowledge and these convictions will bring the remedy needful to a prosperous prosecution of agriculture—a fair field and no favor. It may come easily with the irresistible force of an enlightened and judicious public opinion; but it is more probable that, like other great movements against accustomed and vested wrong, its way must be fought out with tongue and pen.

Gentlemen, I have touched hastily only a few of the many topics that this subject and this occasion suggest. But, perhaps, I have said enough to show the vastness and the importance of the domain, geographical, scientific and economical, that an organization like this should attempt to occupy. I believe that the addresses of the able gentlemen who have consented to come before us, will adduce still more incontrovertible evidence of the fact; and I trust the day is not far distant when those annual gatherings, like those of the Agricultural Society of France, shall number their hundreds and thousands of specialists in every department of theoretical and practical agriculture. And when I look upon this vast array of the agricultural products and machinery of our country, supplemented by those of the remotest quarter of the globe. I think that even we, who, sometimes are half-ashamed of our own enthusiasm, do not half comprehend the magnitude and importance of the work in which we are engaged. When the farmers of the world become what we would have them; what the object lessons of this great exhibition, and the discussions of like gatherings shall make them, we shall enter upon that golden age of equality of rights and duties, which the democratic theory of government necessitates, but which can be only entirely reached through future years of earnest labor on the part of the friends of agriculture. The great work of the next generation I apprehend, is to secure the laboring class its rights of education and thrift; and the mass of this class is made up of the men in whose behalf we have gathered here to-day.

OBJECTS AND WORK FOR THE NATIONAL AGRICULTURAL CONGRESS.

By the Secretary, GEO. E. MORROW.

The name of this association—the National Agricultural Congress—suggests clearly two things as to its nature. First, it is a national organization; not for the few, not for those of a section, not for any private or personal schemes; but designed, so far as it is possible, to have its influence extend over all the land. Next, it is an agricultural association; its object is not, primarily, to advance religion, to discuss politics, to engage in works of charity, not any of these things, but, to quote from its constitution, “Its object shall be the collection and dissemination of information in relation to agriculture in the several states and territories, and concerning the climatic economical and other conditions affecting its progress and prosperity.”

It may also be said that in its relations to other associations for the promotion of agriculture, this Congress is designed to be friendly and co-operative, rather than a rival or critic, and again, I hope it may truthfully be said this is a modest and not an assuming or arrogant body. It is not claimed to be the only or the greatest instrumentality for accomplishing the end for which it labors; rather it is content to do what it can for the good of the agriculture of the country, rejoicing in any and every like work by whatever means it may be accomplished.

With the limitations and qualifications there still remains a marvelously wide field. We have all American agriculture and not any one specialty in whatever relates to the cotton of the South, the grain of the West, the dairy, the cattle on the plains of Texas or the hills of New England; in whatever concerns the producer of any agricultural product in his work, he may properly ask the interest and aid of this association. It may properly discuss the questions relating directly to production—tillage, varieties of seeds and animals, fertilization, etc.; it may and should go further than this and consider those things which affect the distribution of agricultural products—the great question of transportation, with its important and complicated effects on the agriculture of the different sections of the country, the home and foreign markets, tariffs; these and like topics appropriately may engage the thought and discussion of the members of the Congress. And so the important and as yet but imperfectly appreciated subject of agricultural statistics—how to secure their more prompt, accurate and thorough collection and dissemination—is directly within the letter and spirit of the object for which the association was formed. The vital question of agricultural education, and the equally important question of the education of the agriculturists; the relations of a host of sciences to agriculture, and

the means of best applying their teachings; all these and other topics of stupendous importance present themselves to the Congress. And lastly it may properly consider questions of legislation as these affect agriculture; not in any partisan spirit; not to seek any legislation in the special interest of agriculturists as a class—for as the farmers should oppose legislation in the special interest of any other class, they should equally oppose that which is offered as advancing their own special interests rather than for the good of all classes. But to consider and present the opinion of farmers on many questions in which they are vitally interested.

For the improvement of agriculture in its relations to the individual and to the class we need two things—more information and more interest. To know more about it and to take more interest in it, that we may the better make use of the knowledge we have and that we may acquire. In the effort to gain information, the Congress should consider all the topics named in a broad, national way. We should remember that the steam car and the telegraph, that improved means of communication and transportation have largely abolished the isolation of farmers. It is no longer true that those of any one section can feel themselves independent of or uninterested in the condition of those of other sections. It is a serious misfortune that there should be, on the part of so many connected with agriculture, so strong a tendency to narrow-mindedness. The Congress should seek to know both the actual and relative importance of subjects brought before it. Its sessions should be no place for the riding of the hobbles of narrow-minded men, to whom all the world seems to revolve around their little plans, interests or localities. It should seek to learn all that can be learned of the resources of all sections. The study of our agriculture by states or sections, as has been the custom in the past, is unsatisfactory, tending to produce this narrow-mindedness and imperfect conception of important and wide-reaching questions. The Congress may furnish a common meeting ground for the actual farmer, for the editor, the teacher, the scientist, the leader of societies connected with agriculture, and I hope it may be ever said of it that it is willing and anxious to hear the other side of all questions that its members are not so much advocates as they are seekers after the truth.

In the development of increased interest in agriculture, for which there is surely much need, the members of this association may do much, by showing that they are themselves interested; that men of education and position think agriculture worthy to be thought about and talked about, and not to be regarded as simply a disagreeable means of securing a livelihood.

I name three methods of work for the Congress. First, and in some sense chief, by popular meetings, usually held once a year. There is

power and influence in the sayings and doings of representative bodies of men assembled together "with one accord in one place." These meetings may discuss general topics, or, on occasion, special topics on which it is desirable to collect information or to stimulate and express public opinion. Second, by publishing its transactions, it will not be necessary to infringe on the province of national or state associations, but by presenting in a cheap yet permanent form the addresses and other actions of the annual meetings, a good which it is difficult to fully estimate, may be done in a series of years. As an illustration I need only refer to the addresses at the present meeting. It is not mere boasting to say that in no other way can an equally good knowledge of the history, progress and present position of our agriculture as a whole, and especially in some of its great specialties, be so readily and conveniently obtained as by a careful reading of what has been spoken during this meeting. Third, I name special investigations by commissions or individual members. This branch would not be prominent in the near future perhaps, but it might ultimately become important and effective. It is not probable the association would ever find it advisable to assume the management of agricultural exhibitions. In each of the ways named, the Congress can exert a healthful and important influence in increasing our store of information, in stimulating interest, and in forming and concentrating public opinion on matters requiring action, legislative or individual.

As most nearly representing my ideal of the future of this Congress, I would name some of our national associations of a scientific nature. As in them, so in this, I would have a division into sections for the more careful consideration of a variety of topics for which there might not be time nor opportunity before the general body.

That the work proposed may be done effectively, the Congress needs an increased membership. It now relies, and I hope always will rely, for its funds solely on voluntary membership fees. It asks the aid in this way of all friends of agriculture; and I believe this is the only aid for which it should ask; believing as I do that there is place and room and need for the association; believing as I do that it may have a prosperous and useful career, I look to those interested in agriculture for its support. It seems to me we have now reached a position from which we may ask this support, feeling that the Congress is able to give a full return for all it will receive.

The leading obstacles to success, as it seems to me, are three. First, the very magnitude of the work proposed and the wide field sought to be covered. As a rule, our successful associations connected with agriculture have had a special object, devoting themselves to the advancement of a specialty. The American Pomological So-

ciety, which has done a great work and won a deservedly high position; the American, Northwestern and various state dairy associations which have been so largely instrumental in the rapid advancement of the dairy interests of America, may be named as cases in point. This is a real difficulty and to prevent the injurious effects of it will require wise and prudent management. The second great obstacle to success is of kindred nature and is found in the vast extent of our country, making it costly in time and money for many who may be interested to attend the meetings of the Congress. This may be met in part by having the meetings held in different portions of the country, and is also partly met by the delegate as well as by personal membership which has been provided. By this, the presence of even a single representative may give expression and emphasis to the views of the members of a large society or the mass of farmers in even an entire state. The third obstacle to popularity is one which, if human nature were perfect, need not be named. It is found in the fact that the association makes no direct appeal to purely selfish motives. It does not promise immediate, direct and specified pecuniary advantage to its members. It offers no high salaries to induce men to become its leaders. It is not probable that it will try to advance the political aspirations of its members. It offers little in the way of fame to those who work with it. Its hopes and expectations are rather that, quietly, perhaps slowly, it may exert an important influence in advancing and developing the agricultural interests of the whole country, doing most for those regions and those individuals who will most earnestly and effectively work with it.

In the near future our American agriculture must take a higher position. In no other country has it advanced more rapidly, and in no other has it given greater returns to those engaged in it; but with advancing civilization, increasing population and rapidly growing competition, the mass of farmers must learn to rely more on mind than on muscle; to give more importance to knowledge than to mere physical strength; must grow to rely on themselves and not on legislation, and look for their profits to their farm products and not to increase in the selling price of their land. I look forward with hope to a higher intelligence, more wisely directed industry and a purer integrity among all farmers as the great means by which the difficulties and obstacles in the way of the general prosperity of the class may be overcome. I look forward to the time when the farmers of all sections of the country, knowing each other better shall respect each other more, and work together more harmoniously and intelligently, and, hence, more efficiently advance their common prosperity.

In all this, if it be wisely managed, the National Agricultural Congress may do much. It is young, but it has reached a position of which we have no need to be ashamed. We who are here may make this Centennial year the starting point of a career of vastly increased usefulness for this association which has called us together, and give it an impulse that shall cause it to be still young and vigorous at the second centennial of our country.

USES OF AGRICULTURAL STATISTICS.

By JOHN R. DODGE.

In this age of the world it can scarcely be necessary seriously to ask the question, What profit is there in *Agricultural Statistics*? There is no farmer of intelligence who is not himself a statistician. He observes carefully the facts of agriculture, and of all science and art applicable to agriculture, classifies them and makes deductions from them, and governs his practical operations in accordance with their teaching. He plows and sows, reaps and mows, harvests and stores and sells with the aid of his own system of agricultural statistics. But his own observation or desultory investigation must be quite too limited! The facts which affect him are not confined to his farm, his county, state or country, but include in their range the entire world—the world of agricultural production and consumption, supply and demand, price and value, freight and sale. In this age of telegraphs, too, the statistician must not only be ubiquitous in locality, but instantaneous in celerity of collection, classification and deduction. Herein lies the necessity of professional statisticians, whose function it is to reduce the truths contained in a world of facts to order, to make of agricultural statistics a science.

The uses of this science are golden in immediate result. The cunning tradesman, alert for crop news, scans the prospect and prepares to wrench from the farmer the results of his hard labor. Statistics stands guard over the farmer's interest, foils the schemes of the speculator and saves the producer's money. A farmer in Missouri writes me that my advice relative to prospective prices of pork saved him a thousand dollars in a single season. The speculating class is organized for the plunder of the farmer, and the necessity is imminent for the earliest and fullest information for his protection.

By agricultural statistics the farmer is able to compare and test the practical results of stock improvement, experiment in culture, and systems of agriculture. By it he can refute the universal applicability of the sweeping commercial adage, which is deemed by many a law, that the home price of a product is always governed by the ruling price in the country to which it is exported. Our corn crop is too heavy, both in avoirdupois and in cash, to yield perceptibly to the influence of foreign demand. Until recently the exports have not exceeded three per cent. The tail cannot "wag the dog" so easily. It is curious to see how uniformly and proportionally price advances as production recedes. In 1874 we had a so-called failure in the corn crop. I estimate it at 850,000,000 bushels. In 1875 the aggregate was enormous. I make it more than 1,300,000,000, and yet the value of the great crop was but one per cent. greater than that of the

"failure"—the one \$555,000,000, the other \$550,000,000.

As to wheat a different rule obtains. The price does not depend primarily and principally on quantity. With poor European harvests a large crop may bring a high price—with abundance abroad, a small crop at home, if it leaves a surplus, may bear a comparatively low price.

Statistics teaches also the true value and temporary uses of pioneer farming, of the production of specialties and the true value "in the long run," for permanent results, of rational, scientific, restorative agriculture. There are problems presented daily which only agricultural statistics can solve, and upon which largely depends the future prosperity of the farming interest. We cannot here enumerate them, but a reference to one or two may suffice. The enquiry has been often made of late, IS PRODUCTION DECLINING? It has been assumed that we produce in proportion to population less of the great staples of production than formerly. It is the province of agricultural statistics to decide the question. The census alone cannot determine it. Such is the fluctuation in rate of yield that the supply of a given staple may be actually increasing, while the product of the census year may be less than in its predecessor ten years before. For instance, corn for 1869 was returned 760,944,549 bushels, and in 1859 the figures were 838,792,742. It has often been asserted, on the strength of these returns, that corn production was declining, not only per capita, but in absolute comparison of quantity. Is it so? The year 1869 witnessed what in country parlance is called a "failure" of the corn crop. It is plainly folly to take such a crop for comparison. And this fact illustrates the absolute necessity of annual estimates, to supplement decennial returns. Since 1869 there have been six harvests exclusive of the present one. Of these six the largest and smallest stand in juxtaposition, the one in 1875, the largest ever made is 1,321,000,000 bushels, and the other, another failure in 1874, 850,000,000 bushels. The increase in a single year is fifty-six per cent. In 1870 and 1872 the product was nearly 1,100,000,000. The average of annual estimates, for the six years since the census, 1,047,000,000 bushels; and this confirms the opinion founded on careful study of the history of cropping in 1869, that it was scarcely more than three-fourths of a full crop. Now let us examine a period of twenty-six years. We find that the yield per capita in 1849 was 25.5 bushels; in 1859, 26.6 bushels, and in 1869, the year of a three-fourths crop, 19.7 bushels—the same result as that deduced from the period since that census. If we take the year 1875, the result is excessive, 30 bushels per capita, but include it in the period of six years past and we have 25.5—precisely the supply of 1849.

As to wheat, a general deduction from comparison of census exhibits is less erroneous. The increase in round numbers was from 100,000,000 to 173,000,000 and again in 1869 to 287,000,000. Now

the latter was a large crop, yet the average for the six subsequent crops is 266,000,000, while the estimate for the last year of the six was 292,000,000. Distributed according to population, there was 4.3 bushels per head in 1849; 5.5 in 1859; 7.46 in 1869, and for the period since 6.6 bushels. This shows an increase of more than fifty per cent. in the proportion of supply in twenty-six years, and is exactly in accordance with the history of the several crop years, and is a proof of the substantial correctness of these estimates.

The export figures illustrate further the fact of the large increase of wheat production. The total export of wheat and flour in fifty years is equivalent to 1,062,000,000 bushels of wheat, of which 91,000,000 were shipped during a single year, 1874. The exports of one-half of this period up to 1850, were only 178,000,000—less than twice those of 1874. The heavy increase during recent years is especially noteworthy, nearly half this semi-centennial aggregate having been shipped in ten years. While our population has nearly doubled since 1849, the quantity of all cereals taken together has more than doubled. The census reported 867,000,000 bushels; allowing something for incompleteness of that enumeration, the 2,000,000,000 bushels produced in 1875 allow a distribution of 46 bushels to each inhabitant, in place of 37.4 census bushels, or possibly 40 with a complete enumeration. Our average supply since the last census exceeds 40 bushels; and thus is demonstrated the remarkable fact that with our rapid increase in numbers, perhaps without a parallel, we not only keep up our high standard of cereal production but actually advance it. This is owing to our vast areas in instant readiness for the plow, to our advance in variety and perfection of agricultural machinery, and to the stimulus of a foreign demand which has never been so pressing as during the last ten years. It is possible to double our present population without diminishing this high rate of supply. There is more danger at present of over-production and unremunerative prices, than of scarcity. The proportion engaged in agriculture in the West is still too large, and far too large in the South, and the withdrawal of workers from rural to other industrial arts would not only greatly facilitate the creation of wealth, but would stimulate invention, labor-saving skill and industry in agriculture.

Having reached the conclusion that corn production is not declining, and that the supply of wheat has increased fifty per cent., what can we say as to the meat supply and the numbers of horses? As to the latter, it is not found, according to the fears of too conservative farmers of a former generation, that multiplying railroads tends to diminish the use of horses. More horses are now used in taking people to the train than were formerly required to perform the whole journey. The census reports only the horses of the farm, without reference to those

of the town or city, but for comparison, taking the numbers in proportion to population, there were nearly twenty to each one hundred people in 1850, quite twenty in 1860, and notwithstanding the waste of the war, eighteen in 1870. The increase since has at least equaled the advance in population. Coming to cattle, while we know that the numbers in the census are too low, especially for Texas, California and the Territories, we may use them for comparison purposes. From 1850 to 1860 we find the number of all kinds of cattle slightly increasing, from 77 to 81 to each hundred of the population, and then witness a decline to 62 in 1870. Since that date the numbers have increased, but not materially faster than the population. The consumption in the war was a prominent cause of the decline, and a growing preference to horses as a substitute for working oxen tended to further reduction. The supply of sheep per capita was somewhat greater in 1870 than in 1860, the ratio rising from 70 to 73, but less than in 1850, when there were 93 per hundred of population. But the most marked decline in supply has been in swine, the figures in these decennial periods being respectively 129, 105 and 65. The tendency is to still further decline in some of the principal swine districts.

There is another statistical point of especial interest in this connection. While numbers have declined in proportion to population the value of all farm animals divided among the population would give about \$24 per head in 1850, \$34 in 1860, and \$44 in 1870. Not only has scarcity increased the value, but improvements in breeds has added size and weight, so that with smaller relative numbers we are able to feed our people and ship more beef and pork and lard than ever. Here is food for reflection. Here is the cause of advancing prices of beef and pork. And it is fortunate that increase in meat production is consonant with a higher and more intensive agriculture; that it is in fact one of the essential conditions of such improvement. And if we can act upon the suggestion of Mr. Harris in his address last evening, and perfect breeds of meat-producers that shall be able to assimilate a larger proportion of the fat-and-meat producing elements contained in the food supplied, we shall hasten the adoption of a system of agriculture that shall be restorative and not exhaustive.

We thus learn from statistics that grain-growing exclusively, though remunerative as a temporary expedient, is a speculation and not true farming. Land in the prairies worth \$50 per acre is bought for \$5, and its true value is discounted in installments; *i. e.* the soil is plundered piecemeal and converted into wheat and cash, to furnish means for fencing and house-building, and to supply capital to the pioneer farmer. In this point of view it has been remunerative as a pioneer expedient, but with a farm equipped for the work of a long future, the superior profit of a restorative system in which

domestic animals fill an important part cannot be questioned, either in the deep prairies of Illinois or the rich bottoms of the Missouri valley.

We are in a transition period. The influence of Western lands has modified Eastern agriculture, levied upon its best exemplars, discouraged the routine plodders who could not change their crops or their system, and driven the energetic to higher culture and cropping less subject to Western competition. In the future there is to be a higher price for Eastern lands, more money and labor and profit in working them, and a class of farmers who shall combine with hand-work more of head-work.

In further consideration of mathematics applied to our agriculture, let us briefly consider the peculiar status of

THE SOUTHERN INDUSTRIAL SYSTEM.

Statistics teach the cotton grower that an increase of a million bales may diminish the value of the crop by forty million dollars. It decides in the negative the question whether ten states can get rich on a production which averages only \$25 to \$30 for each inhabitant in gross, and less than \$5 in net profit to each. The one-idea rule is bad enough in farming; but it matters less that one's eggs are all in one basket, than that his basket carries eggs enough to purchase bread for his family. To enrich the cotton region, the simple necessity exists for farm production of at least five times the possible income from the whole cotton crop. With industry, diversity, and a soil fertilized with brains, there is now labor enough easily to realize such a result. When tradition, routine and overscolding yield control to science, machinery and efficient labor, it will be accomplished. The energy wasted in producing twelve hundred thousand additional bales of cotton, which are not only given away, but actually diminish the value of the remainder by \$45,000,000 as in 1870, is worthy of a higher reward. Rightly directed, as in manufacturing a quantity equal to that thrown away, it would have doubled the money returns of the cotton industry.

It should be a statistical lesson of easy application, that the crop of 1875, nearly equaling that of 1880, and the largest of recent years, bears the lowest price and aggregates the smallest value of any since that date. Should the lesson not be fully learned? let the planters ponder a problem in proportion. If a crop of two million bales in 1885 is forty-three cents per pound, and one of four and a half millions in 1875 brings only twelve cents, what will be the price of seven million bales in 1885?

Statistics have thoroughly exploded the idea of abject inter-dependence, by which one section was to grow nothing but cotton, another corn exclusively, and a third only pumpkins and potatoes, while an army of transporters and a legion of traders should eat and drink up and wear out agricultural production *in transitu*, and so promote good fellowship and illustrate

the freedom and thriftiness of trade and the long suffering of the producing Granger!

The South has taken one side of this question; California the other. The South is old, California is young; but the census estimates of rural earnings per man is \$286 for the land of cotton, and \$1042 for the land of gold. Of this \$286, cotton in 1889 yielded \$118 to each man engaged in agriculture in the Cotton States. The occidental shore was far away, beyond a high and rocky barrier, and self-possession compelled self-feeding; the large proportion of workers engaged in mining created profitable markets, and ambitious thrift demanded further production for exportation, which became a surplus for saving, not a fund to be transformed into "hog and hominy" and eaten in advance! Instead of expected semi-starvation while flour was floating around the Horn, five times the requisite home supply can be shipped to the starving of Europe; wines are forwarded by car loads to New York, are there slightly modified to imitate the color and flavor of foreign vintages, and sold at a marvelous advance under European names; and fruits and wool and other exports increase the hoard of the husbandman of the Pacific coast.

California has imported little, except to satisfy the lavish extravagance of the rich, and has sent much of her rural production abroad. She has sought out and utilized her resources more actively and perseveringly than any other state, and has illustrated strikingly the benefits which result from a practical union of the several productive industries. The South, on the contrary, with every variety of soil and climate, has discouraged variety in agricultural production, neglected ores like those of Pennsylvania, coals equal to the beds of Ohio, water-power unsurpassed in New England. She has spurned the lavished gifts of God and the skill and labor of man, while courting the selfish advances of foreign trade, and hopelessly seeking riches by swapping cotton for everything spontaneously produced by nature or laboriously wrought by human skill. Had her skies been less genial, her clouds less wonderfully propitious, and her soil a little unkind, famine and bankruptcy would long since have claimed a country wedded to a false system of economy and rural practice.

There are signs that a new day is dawning; with self-dependence, home markets, more labor better directed, and profitable use found for every mineral, tree and plant, as well as every human capacity, a new El Dorado will appear to compete with the golden West!

In this criticism upon so exclusive devotion to a single specialty of an industry followed to the exclusion of all others, let me not be misunderstood. Nowhere else in our country are the intelligence and culture of the community so generally employed in agriculture. No other farmers can so successfully cultivate their favorite staple. Nowhere is agricultural

discussion so popular and genial. And their wisest leaders, neither few nor unappreciated, have long been teaching a similar doctrine, which has never been impeached by any, and yet has been left by each to his neighbor to practice until a very recent date. May these wise counsels hereafter receive practical as well as theoretical assent.

STATISTICS OF THE CENTENNIAL.

A statistical view of this great exhibition is full of suggestion and encouragement to farmers, directly in the wonderful progress unfolded in the variety and perfection of labor saving agricultural machinery, and indirectly in the marvelous advance in other branches of industrial art, which furnish the home markets that make the farmer's *prices* in part and his *profits* in still larger proportion. The machines that did the work of a million farmers absent in the field of war, were not in existence ten years before, and the past ten years have been equally prolific in the multiplication and perfecting of implements of agriculture, until they have overflowed our own markets and flowed forth by cargoes to fill the markets of Europe, South America, Africa even, and the islands of the world's great ocean. *Fifteen years ago this Centennial display of American manufactures would have been impossible*, the fine woolens, the carpets, the cutlery, the glass and porcelain wares, having been mainly the creation of this propitious period of large demand and stable legislation. The benefit of this development to agriculture and the national welfare and credit, has been incalculable, a development that has given steady work and high wages to all industrial labor, and which put away for full five years the day of panic and monetary depression, which was the legitimate result of over-importation and reckless speculation. It has enriched the country by hundreds of millions, and has been the natural ally of agriculture, as unproductive speculative occupation has been its enemy and bane.

Before closing this brief line of remark, I would suggest as a preliminary to improvements in the collection of agricultural data certain

STATISTICAL DESIDERATA

For the perfection of statistical investigation, greater accuracy and higher utility in the results, there are many pressing requirements, among which the following are prominent:

1. A higher popular appreciation of the utility of statistics, a habit of more careful observation and accurate report.

2. Earnest inculcation by the press of the importance of systematic records of fact, and greater precision and conscientiousness in reporting them for publication.

3. In industrial associations, greater patience and persistence in statistical effort, and more care in avoiding erroneous judgments and im-

pulsive utterances, so naturally resulting from bias of self-interest.

4. In state legislation, a wise and uniform provision for the best attainable system of statistical collection.

5. In national legislation, higher appreciation of the great necessity and economy of early and accurate information concerning production and distribution, and a wiser and more liberal provision for the perfection of statistical methods.

There is yet a small portion of the rural population refusing, through ignorance and prejudice, to reveal the extent of their productions. In reporting original data there is frequently a hasty jumping at conclusions and carelessness of statement prejudicial to accuracy, requiring a cultivation of patience and the exercise of mature judgment. The organization of State Bureaus of agricultural statistics cannot be demanded too strenuously, or persistently, and the delegates of this Congress are urged not to cease individual efforts to this end in every state hitherto recreant to its interests and duty in this regard. Scarcely more than half a dozen states are now attempting systematic and regular work. In the South there is but one, Georgia, that has made a good beginning; and she is appropriating for the collection of agricultural statistics a sum as large as the present Congress of United States has provided for a similar purpose for thirty-eight States and ten Territories.

And here let me urge a vital point. See that you elect to Congress fewer lawyers and more representatives of great industries. Elect men intelligent in practical affairs, wise in measures tending to develop the resources of the country, well indoctrinated in political economy, and as representatives more interested in the public welfare than in their own.

The failures of the past in legislation for statistical investigation have been lamentable. Every man of intelligence knew the absolute necessity for a radically amended law for taking the Census of 1870. Much time was spent in maturing a bill, and Gen. Garfield and others in Congress were efficient in urging it, but the time of its discussion was mainly spent upon purely political features, such as the basis of Congressional representation, and it was abandoned, and the old and imperfect law was reenacted with slight alteration. Without recounting in detail the failures, allow me to express regret for the meagre dole to agricultural statistics by the present Congress. For collecting statistics in forty-eight States and Territories, for clerical work in recording and compiling the same in the home office, for records of domestic boards of trade and of agriculture, for transcripts and translations of foreign official reports and records of industrial organizations, for statistical statements and even special investigations for committees and members of both

Houses of Congress, for transcripts of official records for foreign governments and home societies, for employment of experts in special investigations, for writing matter for monthly and annual and special reports, the sum of *ten thousand dollars* is appropriated, not enough to pay the one item for routine work of record and tabulation! Without straw, without even clay, statistical brick making is thus required! And yet the annual report, a fractional part of this indicated work which is thus placed on starvation diet, is deemed worthy of publication to the extent of three hundred thousand copies, and an appropriation of \$130,000 is made for its publication. Such is legislative economy—"saving at the spigot." It is the wisdom of a bread-maker who would save his yeast only to spoil his flour. It is a feast of cheese-parings supplemented with a champagne supper. While \$130,000 is for volumes for Congressional distribution, and \$60,000 is for seeds and plants similarly distributed, \$10,000 is deemed enough for the division charged with the most onerous and important work of the Department of Agriculture. In addition to this stroke of economy, reduction of the Department printing fund will necessitate the stoppage of the monthly report with the November number. Better infinitely than such crippling and dwarfing of the work of investigation required by the organic act creating the Department, to cut off all appropriations except for seeds and plants and run the institution exclusively as a seed store, or else abolish it altogether. Yet we ought to expect in this day of progress, legislative action for the public weal and national improvement, on a high plane for the public good alone, increase of national production, advancement of intelligence and skill, and enhancement of general comfort and happiness.

In conclusion allow me to express the hope that the "Agricultural Congress" may be prominently instrumental, in the present and in the future, in stimulating a desire for practical knowledge among the rural population, in disseminating wise views of agricultural methods and systems, and in increasing the wealth and happiness of its great constituency.

AGRICULTURAL REFORM.

By THOS. P. JANES, M. D.

Mr. President and Members of the National Agricultural Congress:—I have been at a loss to know why your President invited me to address you, unless acting on the idea that "necessity is the mother of invention," he hoped that I might be the bearer of some novel thoughts, the offspring of the necessitous, struggling condition of my people. If this was his expectation, I fear he must content himself with disappointment. It is true that we have for the last decade struggled up from the ashes of despair through the most adverse circumstances.

The land-owners of the South were left in 1865 as the captain of a vessel after a storm in mid-sea, without rudder or compass, with even his sailors overboard, and his supplies exhausted. By a single stroke of the Executive pen two-thirds of the entire taxable property of the South was destroyed, and the productive power of the remainder seriously impaired.

In Georgia alone, the taxable property was reduced \$500,000,000 in forty-eight hours. These facts are mentioned in no spirit of complaint or reproach, but simply as a matter of history to illustrate our condition at the beginning of the last decade, and to show that we have been "practicing" for ten years what I propose to "preach" to-day.

I invite your attention to a few thoughts and suggestions on the subject of

AGRICULTURAL REFORM.

I will discuss it under the three leading heads: *Individual, State and National.*

As the aggregation of individual citizens constitutes a state politically, so the aggregation of the accumulations of individual wealth constitutes the material body politic of the state.

Without a pure, conservative, patriotic citizenship, good government is impossible.

Without economy, system, and industry in the individual, state or national prosperity is equally impossible.

In a government like ours the material prosperity and resulting contentment of the individual is indispensable not only to the advancement of the state in material wealth and greatness, but to her political, moral and religious purity.

The material prosperity of the individual being the corner-stone of national greatness, his advancement morally, intellectually and materially becomes a question of vital moment, and should command the most careful attention of the statesman and patriot.

The agricultural portion of every community constitutes its most conservative element because of their attachment to the soil, their isolation and consequent removal from the corrupting influences of trade, and the ennobling influence of their constant association with the de-

velopments of God's will expressed in the works of nature.

It is from this usually conservative, contented class, principally, that we hear now the cry of reform.

Why is this? Is it due solely to maladministration and corruption in official circles? Is it due to defects in the financial system of the country? Is it due to the failure of the general government to afford by internal improvements proper facilities for the cheap transportation of the products of the farm and the mine to market; or is it due to a failure of individuals to realize changes of circumstances which necessitate changes of policy and practice which have not been made, because of a reckless speculative spirit engendered by the extreme fluctuations of values resulting from the late civil war? It is due, perhaps, in part to each one of these causes, but mainly to *misdirected individual enterprise, speculative farming, and a ruinous credit system*. We are prone to look abroad for faults and errors rather than to ourselves.

It is useless to deny the fact that a general want of thrift and consequent depression pervade the tillers of the soil in our country. They are not accumulating money—the balance is too often on the wrong side of the sheet at the end of the year's labor. A scarcity of money is felt even in the centres of trade. Its cause is discussed in the club, the Grange and on the street corner. Its discussion has even invaded the halls of the National Congress. Large leaks have been discovered in high official quarters; reckless expenditures of the peoples' money have doubtless been made. The fostering care of national and state governments has not been sufficiently devoted to the *two nursing breasts* of the nation's wealth, *agriculture and mining*.

There should be reform in all of these respects—these *large leaks* should be stopped, but that will not remedy the evils which surround us. The *leaks on the farm* must be stopped before there can be any substantial prosperity for individual, state or nation. The farm must be made more than self-sustaining—the balance of trade must be in its favor.

To accomplish this, brains must control muscle, and machinery be substituted for the latter whenever practicable. Restless, speculative farming must be abandoned for a more conservative, frugal and cautious system conducted upon a solid cash basis.

Credit and high rates of interest have been and are still the bane of Southern agriculture. Left in 1865 with nothing but his land, the planter was compelled to resort to the disastrous expedient of borrowing money at extortionate rates of interest to defray the current expenses of the farm. To meet the demands of his creditors he devoted his attention to the production of cotton as the most marketable product to the neglect of supply crops. This necessitated a repetition of the same system year after year, which, with wasteful, unreliable and uncontrollable labor has been extremely difficult to discard. Indeed, as long as our chief staple sold as high as twenty cents per pound, some money was made even under this unnatural system. As cotton fell in price, the fallacy of the system of purchasing supplies with which to make it, became more and more apparent, and individuals began to search more diligently for the "leaks on the farm."

The true magnitude of the leaks were not fully realized until they were aggregated by the Georgia State Department of Agriculture, which commenced its investigations during the fall of 1874.

Taking Georgia as a representative of the Cotton states, the facts developed there demon-

strate the necessity of reform in that entire section. From statistics collected in Georgia we find that labor is *forty per cent.* less efficient than it was fifteen years ago—that the average farm laborers devote only 4.7 days of each week to their crops. This is substantiated by the facts of cotton production since that period; notwithstanding the natural increase in the laboring population, and the extension of the cotton area by the more extended use of commercial fertilizers, no more cotton is produced now than was produced fifteen years ago.

From partial railroad statistics collected last year, it is estimated that the farmers of Georgia purchased on a cash basis \$29,434,013 worth of farm supplies, exclusive of live stock, sugar, coffee and dry goods from April 1st, 1874 to the same date in 1875.

They paid in interest on the supplies which they purchased, *four and a quarter millions of dollars*. They wasted in one year, 1875, by the injudicious purchase and use of fertilizers, \$2,176,998, by paying from fifty to seventy dollars per ton for commercial fertilizers to be used alone; when an expenditure of *ten dollars* for material necessary to make a ton of compost, using home manures in combination with acid phosphates would produce better results in production of crops. That is fully attested by the results of practical experiment and chemical analysis.

They have bought corn and oats at more than twice the cost of raising them at home. They have bought horses and mules at twice the cost of raising them. All of these were bought for what? *Why to make cotton* which brings on the market what it cost to produce it.

Was not reform necessary here, and was not the individual farm the place to apply it? Never in the history of any agricultural people has reform been more earnestly and vigorously applied than by the farmers of Georgia to-day. The leaks on the farm have been pointed out to them and they are vigorously applying the remedies. They are using every available means of making their farms self-sustaining. They are cultivating less area in cotton, but improving the preparation and cultivation of the soil and cheapening fertilization. They have nearly doubled the oat crop, and largely increased the area in corn. They are giving more attention to the production of clover, lucerne, the grasses and other forage crops, and are devoting more attention to raising stock. In no state in the Union have farmers advanced more rapidly in a knowledge of the true principles of soil culture and fertilization than have those of Georgia within the last few years. Nowhere are they learning more rapidly the application of science to agriculture. Nowhere are they more determined to use wisely the advantages of soil and climate which the God of Nature has so bountifully bestowed upon them.

Other Cotton States are not moving so rapidly because they have not used the same instrumentalities for collecting and disseminating information among their farmers; but they will soon wheel into line and make cotton a surplus crop, the proceeds of which may be devoted to practical development and productive enterprise.

The South must produce her supplies without diminishing her cotton crop, leaving the surplus grain of the West to swell our exports till combined with our shipments of cotton and tobacco, we shall regain our foreign commerce, turn the balance of trade in our favor, stop the exportation of gold from our ports, and turning the tide again in this direction bring prosperity and contentment to all classes of our people.

Until cheaper transportation can be afforded, more of the corn of the Northwest must be put into the more compact form of meat, and the unlimited water power of the South must, as it inevitably will in a quarter of a century, be util-

ized to convert our raw material into yarns and thus double the value, and hence contribute double the amount towards re-establishing the balance of trade in our favor.

There is water power enough in Georgia alone to manufacture all of the cotton and wool produced in the U. S. The following are some of the most important, reported by Dr. Geo. Little, State Geologist:

The Chattahoochee river falls 106 feet in 3 miles and gives at Columbus, 30,000 horse power, of which only 850 are used. One of its tributaries, Mulberry creek, affords 287 H. P.

The Savannah river furnishes the canal at Augusta with 12,000 H. P. One of its tributaries, Briar Creek, gives 515 H. P.

The Oconee, with its tributaries in Clarke Co., near Athens, gives over 3,000 H. P.

The Ocmulgee between the Georgia Railroad and the city of Macon, a distance of fifty miles, affords 36,000 H. P.; and its tributary, Yellow river, 7,000 H. P.

The Coosawathe, a tributary of the Coosa river, at one point in Gordon county, gives nearly 2,500 H. P.

Eight streams furnish at their principal falls, 91,302 H. P., of which but little is used, leaving nearly the whole of this vast power to run riot to the sea, murmuring, as it goes, at man's neglectful waste of Nature's forces.

Georgia spins but little more than ten per cent of her cotton. She loses annually \$25,000,000 by not spinning the whole. The Cotton States would receive \$250,000,000 more for their crop if it was sold as yarn, than they do by selling the raw material.

We of the South are far behind our Northern and Western brethren in the introduction of labor-saving implements and machinery, and consequently all more dependent upon expensive and unreliable human muscle for our farm labor. The difficulties of the Western farmers rest more in the lack of cheap transportation to the sea than in misapplied energy and misdirected labor. They have diversified their farming to the full extent admissible in their climate. Not so in the South. With a soil and climate susceptible of almost endless diversity of culture and products, her farmers have relied mainly upon one market product, which in consequence of a failure to produce provision crops, is sold without nett profit.

Georgia and Indiana have nearly the same population. Let us compare their material wealth and see what are the principal items of difference in the wealth of the two states. Georgia had in farms in 1870, 23,647,941 acres. Indiana had 18,120,648 acres. Georgia had on these farms only 6,831,356 acres improved, while Indiana had 10,104,270 improved. The Georgia farms were worth in cash \$94,559,468; while those of Indiana were worth \$634,804,189. The crops produced in Georgia were worth \$80,390,228; in Indiana, \$122,914,302. Hence, on the capital invested in real estate in Georgia, the agricultural products amounted to *eighty-five* per cent., while Indiana made only *nineteen* per cent. on her capital invested in farms. So it appears, Mr. President, that considering only the value of the land an investment in Georgia farms pays more than four times the profit of the same amount invested in the famous lands of Indiana.

Indiana had in 1870, \$52,052,425 invested in manufactures which produced new values amounting to \$108,617,728, or \$2.08 for one dollar invested. Georgia had in 1870 an investment of \$13,930,125, which produced \$31,196,115, or \$2.24 to one invested. In view of these facts, why is the average Indiana farmer to-day in a better financial condition than the same class in Georgia? The same source from which we get the basis of the above facts, U. S. Census, 1870, will to some extent explain the fact.

Indiana by an investment of \$13,061,890 in labor saving farm machinery, which is to some extent a permanent investment, expends in producing

her \$122,914,302 worth of agricultural products, \$10,111,738 less for labor than Georgia does to produce her \$80,390,228 worth. In other words, Indiana pays only *eight* per cent. of the value of her agricultural products in wages, while Georgia spends *twenty-five* per cent. of hers in wages. Again, Indiana diversifies her products and devotes proper attention to raising stock of all kinds, so that the farmer has nothing to buy except his sugar, coffee, salt and dry goods. While in Georgia the planter too often depends upon his cotton to buy meat and bread as well as to defray all other expenses of the farm. In every instance the cotton planter who raises his supplies and stock on his farm, is prospering. That is the key to the whole matter. Make the farm produce *first* its own supplies, and *after* that as large a surplus as is possible for market.

Much can be done towards accomplishing reform in individual practice by wise, judicious and just state action.

In this respect we need

STATE REFORM.

In order to reach a just understanding of this question, let us consider for a moment what is a state? It is a political body governed by representatives; a commonwealth. Under our system the people rule directly through their representatives chosen from small communities and supposed to represent the wishes and interests of the voters and tax-payers. In a commonwealth therefore, in which a large majority of the property owners are engaged in the fundamental food-producing occupation of tilling the soil, it is highly proper for that commonwealth to employ the machinery of its state government to promote this great fundamental interest upon which every business of life depends, directly or indirectly. If the tax payers by the investment of a very small amount in a State Department of Agriculture as a medium of communication between the different sections and individuals for the collection and dissemination of information, can realize a large saving in their annual expenditures or an increase in their productive power, then the investment is both wise and profitable.

In what way can the people of a state more wisely direct the energies of their government than in promoting the intelligence and wealth of the citizens. Instead of wasting the peoples' money in the discussion of questions purely political, on the passage of laws, local in their application, and in perpetual tinkering at the Code, let our statesmen study thoroughly the sources of material wealth of the state, the obstacles in the way of their development and the means of increasing the prosperity of the citizen. Let them look more to the means of preventing crime than to the enactment of laws for its punishment. Let them, by wise and just legislation, so encourage the productive forces of the state, that peace and plenty shall surround the citizens and there will be little need of criminal codes.

There is much that the producers of a commonwealth can accomplish through the agencies of government which can neither be reached by individual enterprise or by the organized effort of voluntary associations.

There must be the prestige of official authority, there must be the feeling of propriety-right on the part of the citizen which each experiences towards the state government which he aids in supporting, on which he feels at liberty to call for information, and to which he delights to contribute the results of his observation and experience. At the annual expense of one cent to each inhabitant, Georgia has established a Department of Agriculture which has been annually worth to the commonwealth more than two dollars to each inhabitant, though it has been in operation only two years. You may naturally ask "how has this been done?"

The farmers of Georgia purchased during the

last season 56,596 tons of fertilizers. Under the law, the Commission of Agriculture has especial charge of the inspection and analysis of fertilizers, and is authorized to forbid the sale of such articles as do not contain a reasonable amount of plant food. All worthless brands are therefore entirely excluded from the Georgia market.

The analysis of all others are published for the information of farmers, as well as the commercial value and selling price of each brand. Five hundred pounds of each brand are required for soil tests which are now being conducted under the direction of the commission by one hundred and ten practical farmers in all sections of the state. As the result of this system of inspection and analysis the farmers are not only protected from the impositions which were before practiced upon them, but as a result of the contrast of the chemical composition and commercial values of the various brands, he secures his fertilizers nearly twenty-four per cent. cheaper this year than last. Again, by scientific experimental investigation it has been found that the farmer can save seventy-five per cent. of his former outlay for fertilizers by composting home material with acid phosphate. This information has been disseminated through the publication of the State Department of Agriculture 'till nearly half the farmers in the state have adopted the compost system by which a million dollars are annually saved in the state. The increase in the oat crop of the state as the result of information as to varieties and time of sowing, is worth half a million dollars to the state this year. Statistics have been collected which show the errors of the past and point out remedies to be used in future. Stock-raising is being encouraged by the preparation and publication of manuals for the use of farmers.

A Hand-book of the state has been prepared for the purpose of making known the resources of the state—her advantages of soil and climate, and other facts for the information of intelligent capitalists in other sections of our own country, as well as those of the old world.

These are some of the results of the first two years' labor of this department which has only reached the threshold of its usefulness and profit to the state.

With the aid of the state geologist, Dr. George Little, of whose work I wish to speak presently, samples of more than forty beds of marl have been analyzed and a manual of its use is being prepared for the instruction of the farmers.

At an annual cost of one cent to the inhabitant, a geological survey of Georgia, conducted by Dr. George Little, shows unlimited mineral wealth—embracing 175 square miles of coal—iron ore of the best quality and almost without limit—copper ore in abundance and of the best quality—immense quantities of iron pyrites very pure, from which unlimited quantities of sulphuric acid, which we need to render bone phosphate soluble, may be manufactured—vast beds of white, red and black marble—a bed of excellent roofing slate, 100 feet thick—a solid mountain of granite, seven miles in circumference and 700 ft. high—lime and marl in inexhaustible supply—manganese, Baryton &c.—with as much gold as there is in California.

It will be seen then, Mr. President, that as individuals and a state we are attempting reform. The state of Georgia has established an official head for the advancement of her agricultural interests. She is having her water power measured and her mineral deposits examined by a skillful geologist for the information of manufacturing and mining capitalists. She asks the co-operation of her sister states in her efforts at reform and progress in all that pertains to the elevation of her citizens in intelligence, prosperity and happiness. She has invoked the aid of science in its application to the develop-

ment of her material resources, and recognizing it in its true light, as *nature's interpreter* has made it tributary to the art of agriculture from which it has been too long divorced by ignorance, prejudice and superstition.

Agriculture being the leading interest in a large majority of the states of the Union, it should receive the fostering care of the state governments.

Agriculture should be studied as a science as well as an art. The art should be practiced under the full glow of the light of science. There are many investigations to be made in every state which cannot be conducted by individuals. Even if individuals have the means and the public spirit to experiment for the benefit of their fellow man, the facts developed by individual investigations are not so readily received as those coming with the stamp of official authority. If each state in the Union had a state Department of Agriculture, the field of usefulness of each would be much extended by the additional means thus afforded for the collection of information and its dissemination after its collection.

A cordial interchange of information and improved seeds between the different states, would engender more kindly feelings, vastly increase the general fund of agricultural information, discover channels of profitable reciprocal exchange of products, and increase the productive capacity of all by a natural interchange of the results of practical and experimental knowledge.

We need in all the states a more practical statesmanship; one which looks more to the advancement of the citizen in intelligence and material prosperity—one which regards the government of the state more as an instrumentality for the promotion of the general welfare of the citizens, than as a system of machinery for the collection of taxes and the punishment of offenders.

We need to hear less of state rights and more of state development in material wealth—less of political reconstruction and more of the reconstruction of individual, and by consequence of state prosperity.

Let our platform be the *prosperity of the citizen and the development of the material resources of the state and nation.*

NATIONAL REFORM.

While the battle on the arena of national politics is being fought with the watchword *reform*, which meets with a hearty echo from the masses of the people, let us avail ourselves, as representatives of the grand army of producers, constituting more than half of the entire population of the nation, of the tidal wave of popular sentiment to demand certain measures of reform by 23½ millions of agriculturists shall be represented in the government of the United States. We have a Department of War and the Navy. Let us now insist upon a Department of *PEACE* presided over by a representative of the great productive interest of our Country *Agriculture*. Let us demand in the emphatic language of men who know their rights, that the Commissioner of Agriculture be made a Cabinet officer.

Let us insist, until we shall be heard by the recognition of the existence of 23½ millions of Agriculturists who feed and clothe the nation.

For the want of a voice in the council of the nation, the material interests of our people are languishing, our commerce declining, our factories idle, and our furnaces and foundries are cold.

Our National Department of Agriculture has accomplished much good, but there is still a field of usefulness awaiting it, when with a proper organization of the agricultural forces of the country, its head shall take his legitimate position as one of the political family of the President.

Each state should have a Department of Agriculture which collects information either direct-

ly from the farmers, or from local organizations.

The State Departments should labor together, co-operating with each other and the National Department, all reporting to the latter the results of their investigations, and supplying annually samples illustrative of the productive capacity of the various sections of the country.

A perpetual fair of the agricultural and horticultural products of every section of the country should be on exhibition at the National Department.

When extraordinary results are attained in the production of any staple article by improved methods of cultivation or fertilization, the means by which they are attained should be published for the information of the masses.

The workings of the National Department should be of a practical character, free from all partiality of sectional bias. Its head should labor with an eye single to the material development of the whole country as the surest road to individual and national prosperity.

He should study well the productive forces of the entire country, probe the secrets of success in other nations and with eclectic skill appropriate such advances in the science or the art of agriculture as are adapted to our surroundings. He should guard with jealous eye the rights and interests of the producers of the country, and as their representative head, defend them from encroachments or infringements.

Too long has the public mind been divided from practical issues involving their vital interests to those of an ephemeral nature, born only of a fanatical brain. While we have been wrangling over questions either of a purely political or sectional character, our practical cousins over the waters have stolen our commerce, supplanted our monopoly of the cotton supply, sought other sources for their supply of breadstuffs, and now coolly demand millions of gold in payment of her excess of exports over imports.

With the most magnificent country upon which the sun ever shone, with every variety of soil and climate, with a boast of our ability to feed and clothe the world still vibrating in the air, the balance of trade is against us. It is a vain sin to speak of a resumption of specie payments while we are shipping coin from our shores. It is vain to hope for national prosperity while the sources of wealth are languishing.

It is vain to expect relief from mere political reform. There must be reform in the field as well as in the cabinet. Means must be devised by which the farmer can pocket some of the profits of his labor, and these means must not involve a return to the primitive habits of our forefathers, but must involve the application of science, superior skill and judgment, the application of machinery to work now performed by human muscle, the introduction of improved methods of cultivation and fertilization, all resulting in increased production at reduced cost.

We must re-establish the balance of trade in our favor before there can be substantial prosperity in our country. We must produce more than we consume—not only that, we must sell more than we buy.

While laboring for national development and reform in agriculture, let us not forget her kindred creative industries, *mining* and *manufactures*. These should have a joint head in the national government represented by a *commissioner of mining and manufactures*, charged with the duty of collecting and also disseminating information relating to these great interests. At the capital should be two cabinets, one of specimens illustrative of the mineral resources of the whole Union, for the instruction of our own people, and that of those who may wish to cast their lot with us and invest their money in the productive development of our resources.

The other should contain specimens of the manufacturing skill of our country as well as

those from other nationalities.

I have thus thrown out a few thoughts, Mr. President, in the hope that the ball already started may be rolled on until the prosperity of our people shall correspond with the grandeur of our country in richness and variety of resources. That our people are not blessed with peace, plenty and contentment is not the fault of the Creator who has bestowed upon us a country vast in extent, varied in soil, climate and material resources, and abounding in all the elements which contribute to individual, state or national prosperity.

The fault seems to be more in the creative industries of our country which have failed to utilize to the best advantage the talents which the Master gave them, and in the state governments which have failed in their corporative capacity to foster with encouraging care the great fundamental industries which sustain them.

Let those who own and till the soil unite in one grand brotherhood, forgetting all that is unpleasant in the memories of the past, forgetting section, forgetting all save that we are citizens of a common country, engaged in a common cause, that we are stewards of the God of Nature, charged with the duty of developing and beautifying the land which He has given us, that on us rests the responsibility of improving and cheapening the methods by which man is fed and clothed, that we owe it to posterity that we not only preserve, but increase the productive capacity of the heritage which we leave them.

Be it remembered that we are but the pioneers on the borders of a new era of agricultural progress, in which science and art have joined hands in a noble and determined effort to rejuvenate the Mother of all employments, and cause her breasts to flow with abundant nourishment for all of her toiling children.

Mr. President, allow me to express the hope that this Centennial year of our national existence shall mark an era not only of agricultural reform, but of a return of fraternal feeling between all citizens of a common country; a sentiment based on the solid foundation of a common origin, the love of a common country, a community of interest and a common hope for a still grander heritage for our children's children, when the nations of the earth shall be again invited to rejoice with us over the fulfillment of another century's existence of our government of Sister States.

AMERICAN AGRICULTURAL LITERATURE.

By E. L. STURTEVANT.

The history of a literature is the history of a people! The habits of thought and the methods of work are all embalmed somewhere in books, and an examination of these last should give a correct understanding of the people among whom they originated. The past century in America has been productive of vast changes, and progress has been at times so rapid as to obscure many of the details of its course.

The people, an offshoot from many lands, occupying a new country, abounding in those possibilities which but required energy to develop, have from small beginnings become a great empire, wherein material progress has kept in advance of the intellectual. Hence its literature has been a peculiar one, and well represents the phases amongst which it has originated.

The American book! The American agricultural book! Have we any such? The question is a pertinent one, and must be answered with caution. Our ancestors brought with them to this land an European training, and an European method of thought, and taught their children the same.

For many years the minds of the cultured turned to Europe for their inspiration, and the United States achieved its political independence long before it did its intellectual independence. Hence an earlier literature is mostly founded on foreign models.

Our authors made books from foreign authority, or under foreign influences. The discussions of new methods usually originated abroad and were broadly transferred to our shores without discrimination and by an ambitious rather than a practical intellect. The motto of practice with science was either unknown, or quietly ignored, judging as we must authors results, rather than their claims.

Indeed, up to within comparatively a few years, our American agricultural books could be counted on the fingers of *one* hand, and even now scarcely would the *two* hands be required. Indeed, the majority of the American agricultural books which have issued from our home presses, have been esteemed too worthless for accumulation on our library shelves; of too little value even, for the individual collector. A few works on fruits, a few books on the garden, a very few special treatises on special subjects, a book or so on the horse, a veterinary volume of recent issue, and our list is nearly complete.

Had the time been given me, it would have been a privilege and a pleasure to note the books, the history of their authors, and their literary character and claims, indeed, of all the accessible writings which have been published in America. But such a plan requires, in justice, a more careful elaboration than my time for preparation will allow of, and a mere enumeration would afford but dry reading and very little information. As an indication of their number, I will only say that I have already catalogued some 5,000 *authors* of books or essays in the English language, and have many more in the rough, not as yet systematically arranged, and probably have overlooked many.

We may distinguish *three* eras in our agricultural literature: The era of the book, the era of the state and official or society publication, and the era of the newspaper! As I consider the second the most strictly American in its influences on the progress of our country and on other writings, I propose to limit myself to this branch.

It is not true that America was the first to issue governmental or society publications, but it

is true that such as she has issued, and they are many, have had an influence upon the community as being largely composed of the experiences of those who were too uncultured for fine writing, and too unlearned to seek inspiration from abroad. Hence, being oftentimes commonplace, and yet with an occasional attempt at something more original, they have not only been educators of the people to a certain extent, but their vast importance in training an observing and ambitious class, whose writings in turn have influenced others, has been almost completely overlooked. The great and most valuable historic feature of this class of writings has been in their affording an outlet for those of the farming, or amateur farming public, who had desires to write far ahead of their ability. These publications were in fact the school wherein a public was being educated, and preliminary to the era of the newspaper, which now in many respects has taken their place. These publications had also another influence. They brought before the farmer and disseminated the discoveries and the writings of scientific men, either through transcripts or compilations, and thus not only instructed, but spurred their readers to a thought, often, I am sorry to believe, the product of the spirit of denial. Additional to these purposes served by them, they also furnished a place for the original work of the few students of agricultural science, and not only gave their articles a perpetuation, but encouraged the efforts of others. These publications may be described as an *olla podrida* of the good, bad and indifferent, the articles both in number and quality standing in this order. To be classical, we may well quote an epigram of Martial, "*sunt bona, sunt quodam mediocria, sunt mala plura, quæ legis.*" Some good, more bad, some neither one nor t'other.

The earlier publications seem more valuable than later ones, and the later ones more valuable than those which precede them, and this is as we should suppose. At first the product of enthusiasm and of the earnest, hard work of the few, their articles were not only less abundant but more carefully considered; yet even here dependence on foreign thought is very manifest. The intermediate volumes of these publications are extremely miscellaneous, and give character to the whole. They are not the less valuable in their influence on the thought of their time, however little merit they may possess from a critical view. The later volumes commence to be Americanized in thought, and are gradually taking their place as repositories of knowledge and thought, leaving their miscellaneous contributors of the past to the newspapers, which have so wondrously increased in number.

Another thought is in place here. Although this era of the society pamphlets is a recent one, yet we can trace its various phases, by viewing its present position in the newer states. We can also underrate its importance and influence by ignoring the many local societies and their many annual pamphlets, and even the like influences of societies which have issued no printed matter. Space, however, forbids us to mention other than the state or sectional results, although our opinions may be unconsciously to ourselves modified by the local viewings.

We will proceed to review our ground by states, and in the order of the date of their first work. In our older states, it will be observed, that our remarks hold truer than in the newer ones, as they have proceeded farther in the development of their agricultural thought.

Pennsylvania has the honor of heading our list. This great state with a fertile soil and immense resources and peaceful in the earlier times, through the wisdom of Penn had opportunity to develop its resources while yet the Great West was unknown, and the more sterile East was but a line on the seaboard, with

the waves of ocean on the one side and as yet savage man on the other.

Its prosperous settlers regarded agriculture as the main stay of a state, and hence with the increased activity of a new nation, agriculture received a proper share of attention soon after the close of the war of Independence.

Philadelphia, the metropolis at that time, possessed a few earnest men, who organized the "Philadelphia Society for Promoting Agriculture," February 11th, 1785, thus initiating the first work of this kind, so far as our investigation goes, on this continent. This society was chartered February 14th, 1809, and has published volumes from 1806 to 1826. Minutes of its proceedings from 1785 to 1810, and one book certainly, perhaps more: "Hints for American Husbandmen, with communications to the Society."

March 29th, 1851, the Pennsylvania State Agricultural Society was chartered, and from that time to this has published (10) ten volumes, the last bearing date 1875.

The earlier publications of the Philadelphia Society we are not familiar with and must pass over. The later publications of the State society are essentially commonplace, and form but little exception to our general and preliminary criticisms. Yet there is an appearance in these volumes of a commencing differentiation, which may in the future secure more valuable results. A publication may preserve its tone from the personal character of its compiler, or it may be the natural outgrowth of the community from amongst whom it emanates. This latter course is far more desirable than the first, as possessing a deeper meaning and a greater permanence. These Pennsylvania publications show a low state of agricultural thought, scarcely elevated as yet by the leaven which is becoming more frequent in its preserver. A good soil, good and near market, a laborious, plodding people, have all combined to make Pennsylvania agriculture profitable; but considering this agriculture from the standpoint of possibilities, or from the outlook of the society report, we must call it backward. Let us hope that the abundant leaven in the agriculture of this state may shortly leaven the whole lump.

New York, with its rich valleys and its position so well suited to control commerce, possessed a large class who saw the importance of the products of the wood and field for the development of their commercial importance and wealth, and as early as 1791, founded the "Society for the advancement of Agriculture, Arts and Manufactures," which was incorporated for 10 years. Robert R. Livingston, Chancellor of the state was its President, and it seems to have published four volumes of transactions. We find on the catalogue of the Astor Library, "Transactions of the Society for the Promotion of Agriculture, etc.," parts I to IV, 4 vo., Albany, 1792-9, and also a reprint of volume I in 8 vo., and continued as Transactions of the "Society for the Promotion of Useful Arts in the State of New York." 8 volumes, 8vo., Albany, 1801-19.

We also find mention of a "Society for the Promotion of Agriculture, Manufactures and Arts," established by act of Legislature, March 12th, 1793, as well as the "Society for the Promotion of Useful Arts," incorporated April 2d, 1804. This latter society published seven volumes of its transactions prior to 1815.

April 7th, 1819, the legislature appropriated \$10,000 for two years, to be distributed among the county agricultural societies and established a Board of Agriculture, composed of the Presidents of the several county societies, or of a delegate therefrom. This board was empowered to publish annually a volume of such agricultural matter as they should select, and also to expend \$1,000 yearly in the purchase and distribution of seeds. In March, 1820, the legislature extended the act to a further term of four years.

January 10, 1820, this board was organized by the choice of Stephen Van Rensselaer, President, and George W. Featherstonhaugh, Secretary, twenty-six members being present. Three volumes are to be credited to this organization: "Memories of the Board of Agriculture of the state of New York," 8vo., Albany, 1821-5 (?)

In 1832, the "New York State Agricultural Society" was organized, and received its charter April 26, 1832 for twenty years, which was renewed March 18th, 1852. The proceedings of the society appeared in the Cultivator, established in 1834 as the organ of the society. The first transactions were published in 1841, and continued annually until and including 1873. Among its secretaries appear the names of Jesse Buel, Luther Tucker and B. P. Johnson.

In 1850, a Journal of the New York State Agricultural Society was commenced as a monthly; a double column, royal octavo pamphlet, but was afterwards issued irregularly. It was discontinued with 1874.

The State of New York has been liberal in its publications which concern agriculture. We find a valuable octavo "Report of the New York State Cattle Commissioners for the year 1868, on Texas Cattle Disease," 8vo., Albany (1869). We should also mention the "Agriculture of New York," comprising an account of the Classification and Distribution of the Soils and Rocks, Meteorology, Agricultural Production and Injurious Insects, by E. Emmons," 5 volumes, with one of plates 4vo.

Among other societies which published proceedings, we note the Farmers' Club, of Little Falls, N.Y., organized March 22d, 1857, and which published annual Reports. The New York State Cheese Manufacturer's Association organized January 7th, 1864, and subsequently merged in the "American Dairymen's Association (1865). It published two reports, both in 1864, and both published in 8vo., at Utica. In 1871 the New York State Dairymen's Association was organized. It published a volume of proceedings, 8vo., Albany, 1873. About 1872 the "Western New York Butter Maker's Association and Farmers' Club," came into existence. Its second annual report for the year 1873-4, is an 8vo., published at Dunkirk, N. Y., 1874. In 1874 there was also published the "First Annual Report of the Butter and Cheese Exchange of New York," also Ninth Annual Report of the American Dairymen's Association, published under the auspices of the Butter and Cheese Exchange, 8vo., (New York?) 1874, pp. 158.

In the earlier of these publications, of those we have seen, at least, the articles are rather long, rather labored, and while useful and of value, even from our present standpoint, yet they seem hardly American. The State Agricultural Society Transactions are American in so far as they leave an impression on the mind, for they contain very much that is local and trivial, and there is a tendency throughout on the part of the contributors to refer to foreign results when practicable. This is more noticeable in the earlier than the later volumes. Scattered throughout these volumes, however, are most valuable essays and contributions, and while these volumes cannot bear a very careful study for criticism, yet they are praiseworthy, and illustrative of the stage of thought, agricultural, we mean, at the time of their production.

The Dairy publications are indeed notable. They are thoroughly American in subject and tone, and are a credit to the state and the population which has produced them. They have stimulated investigation, and have produced an activity of thought hitherto unheard of in agriculture, and dairy thought has kept but little in advance of dairy practice. Would our space allow, we could dwell upon this wonderful development of speech and print, and practice, a trinity deserving of our highest commendation.

The influence of these publications as educators of writers for our press, is very marked. The names which appear there and in our periodicals are largely the same. A young man with brains attends a society meeting, and, as a matter of necessity, his name appears in the transactions as a talker, or the giver of an idea. The young man is emboldened to think and write by this public appearance, and agriculture is a gainer. Perhaps we have no such stimulus to agricultural thought as these transactions, and when the conditions are favorable, results appear which are surprisingly effective. Our Dairymen's transactions stand prominently forward as proof. It is through our society work, whether aided or unaided by the state, that our literature is to become Americanized. Book making and newspaper writing are apt to develop in many minds a love for authority, and a carelessness about the applicability of a principle, provided plausibility is gained. Our transactions aid in Americanizing our literature, by affording opportunity and space for individuality to appear and gain credit. What our transactions are capable of in this direction, is shown in our Dairy Reports; the tendency thereto, is indicated by the work of societies less differentiated.

A poor book or a poor newspaper occupies valuable room in my study, and soon finds its level in destruction. A society report, no matter how poor, finds welcome to my shelf, as, if it tells me not positive, yet it furnishes a negative data, which sooner or later will be of advantage to my work. Agriculture is a local art, and requires to be Americanized for our use, and praise indeed it is, to say of any agency, that it tends in this direction.

Would the space permit, it would be a pleasure to review the list of names which appear in these publications of a great state, and point out how much our agriculture is indebted to men comparatively obscure, yet even now influencing by their work. Like a pebble cast in the placid lake, so does our really honest writer, influence in ever expanding ripples, currents of thought, which in turn influence others, and so on towards eternity. We hardly appreciate, how that we in this Centennial year, are but the children of the present, born of the past, and destined to prove the adult of the future.

Massachusetts, with barren soil and fertile sea, the state wherein industry has overcome obstacles of poor soil and a discouraging severity of climate, has ever laid more stress on her fisheries and her commerce than on her agriculture. Yet even she has protected her infant agriculture by organized effort, and has encouraged the development of her rural resources.

In 1797, a few of her leading citizens formed the Massachusetts Society for the promotion of agriculture, and this society has been a power for good, through the changing years, even to the present time. It has imported improved stock, and tools, animals and fertilizers, and has ever been helpful to the struggling specialties of the farmers occupation. In 1797 the year of incorporation, the trustees published some agricultural pamphlets which afterward became a journal to which they mostly contributed. These were collected and published in ten volumes 8 vo. Boston, from 1801 to 1826, under the title of "Massachusetts Agricultural Repository and Journal." In 1858 they commence another series of publications under the title of Transactions of Massachusetts Society for promotion of Agriculture, new series, vol. 1, 8 vo. Boston, 1858. Part two was afterward published, but the edition mysteriously disappeared from the rooms of the society, and but two copies are known to be in existence. Part three was published in 1861, 8 vo. Boston.

April 12, 1837, a resolve passed the Legislature for an agriculture survey of the state, and the

Commissioner Henry Coleman made four reports. First report, County of Essex, 1837 8 vo. Boston 1838, pp. 139. Second report, County of Berkshire, 1838, 8 vo. Boston, 1839, pp. 194. Third report on wheat and silk, 8 vo. Boston, 1840, pp. 252. Fourth report, Counties of Franklin and Middlesex, 8 vo. Boston 1841, pp. 258.

In 1845 and 1846, the returns of agricultural societies of Massachusetts, for these years where collated and prepared by J. S. Palfrey—two volumes 8 vo. Boston 1846-1847. The continuation under Wm. B. Calbam, Secretary of the Commonwealth, were "Transactions of the Agricultural Societies of Massachusetts collated from the original returns for 1847-48 and 1849, 3 vols. 8 vo. Boston, 1848-50. The next publication was Transactions of the Agricultural Societies in the state of Massachusetts, for 1851 and 1852 collated from the original returns by Amasa Walker, Secretary of the Commonwealth, 2 vols. 8 vo. Boston, 1852-53.

April 21, 1852, the Massachusetts State Board of Agriculture, was organized as a Department of the Government. Annually thereafter has appeared the "Report of the Secretary of the Board of Agriculture of Massachusetts," 1854 to 1876—23 vols. In addition to these, and of late years bound with them, has appeared an "Abstract of the Returns of the Agricultural Societies of Massachusetts.

In addition to these publications, the state has published under authority of the Legislature, "Insects Injurious to Vegetation," by T. W. Harris, a standard and useful work, also a "Report on the Trees and Shrubs growing naturally in the Forests of Massachusetts," by Geo. B. Emerson, 8 vo. Boston, 1846. Several editions of these works have appeared.

Among the associated works in the state, bearing on agriculture, we may mention the "Massachusetts Cheese Manufacturer's Association," whose seventh annual report appeared in 1872, also the influential and prosperous "Massachusetts Horticultural Society," which was incorporated June 12, 1829, and has published transactions, &c., 8 vo. Boston, 1829-76. As a purely scientific feature, this state can also claim the "Bulletin of the Bussey Institution," an adjunct of Harvard College, which issued its part 1 in 1874, 8 vo. Cambridge. Part V. the conclusion of volume 1, appearing in 1876.

This agricultural work has had a great influence on the state. The history of the Massachusetts Society is an honorable one, and although its work has been desultory, yet its action has been high toned, and has been productive of large benefit. Its proceedings show a remarkable earnestness of agricultural thought, and although not wholly free from criticism, yet from the high character of its members, was a foreshadowing of an American agricultural literature. Its strongest influences on Massachusetts farming has been brought about from its cosmopolitan system of prizes, covering those special details of agriculture which required the most fostering, and through its importations, which have been numerous. It is still a strong society, and is still engaged in its good work.

The appearance of the Board of Agriculture was the natural result of the numerous county societies, and its proceedings are marked by a dignity worthy of a branch of the government. The effect of its own actions on agricultural thought may be traced in its own volumes. At the first, its secretary was obliged, probably from dearth of material, to write much himself, and give to his office much attention; but gradually, as its influence was felt among thinking farmers, material pressed forward almost in excess of the space allowed, so that of late years the secretary has had to perform but little labor, and that mostly of an executive or advisory character. To such an extent has this progress gone on, that while the first volume con-

ained 117 out of the 164 pages from the secretary's pen, and the third volume 98 out of 133 pages, the last two volumes contains but six out of 408, and 12 out of 356 pages respectively.

The significance of these facts are obvious. They show the advancement in agricultural thought, as strongly as may be, while an investigation of the contents of these volumes shows a gradual passage from a trivial thought, largely influenced by foreign reading, towards an Americanized and philosophical scheme.

These volumes are not perfect, they contain far too much that should have been omitted, and far too much of mediocre writing. Yet they are deserving of praise for what they are, and from their effect on the community wherein they have circulated.

Massachusetts is an old state, for America, and has advanced towards a mature growth, and these volumes indicate that while agriculture has hardly kept up with the other arts and sciences, yet has ever advanced, slowly, to be sure, yet with a steadiness that promises future results. Indeed, in these volumes, we begin to see trace of a national literature, a literature adapted to American wants. This interpretation is an encouraging one, as it is not through its secretary, nor through any one individual; in fact many leading talkers and writers, on the contrary, have acted as hold-backs, been setting back against the breaching of the ear of progress, yet in spite of this, advancing culture, the spirit of energetic progress has borne agriculture along in its train. What Massachusetts agriculture has become is not so much due to herself, as to the times and the locality wherein she has been circumstanced.

We shall next consider the societies and the aids to agriculture which centre about our National Government, and in our list shall include efforts which, although having a bearing on literature, are not strictly literary in their operations. The Columbian Agricultural Society, for the promotion of Rural and Domestic Economy, was organized at Georgetown, District of Columbia, Nov. 28th, 1809, and held the first agricultural exhibition in America in the form of a National Fair, at Georgetown, D. C., May 10th, 1810. The first field trial of implements in America was the plowing match at the fifth semi-annual exhibition, May 20, 1812. After holding a sixth successful exhibition, Nov. 18, 1812, the term for which the society had been organized having expired, it was dissolved at the close of that year.

These exhibitions and trials must have had a distinct influence, held so successfully in close vicinity to the seat of government, and favored with the presence of so many able men. As preceding the governmental assumption of the duty of aiding agriculture through the patent office publications, this organization is deserving of notice here. Under such auspices as surrounded them, these fairs could not have been influential in moulding agricultural thought.

In 1839, Congress, at the suggestion of Hon. Henry L. Ellsworth, Commissioner of Patents, appropriated \$1,000 for the "collection of agricultural statistics, investigations for promoting agriculture and rural economy, and the procurement of cuttings and seeds for gratuitous distribution among the farmers," and here we have the foundation of the valuable Patent Office reports (agricultural) which only ceased in 1862, when its duties were passed over to the "Department of Agriculture," then created. In 1840 and 1841 this paltry appropriation was omitted, but in 1842 was renewed, and afterwards increased very largely. The agricultural publications of the Patent Office commences then in 1839, then a break to 1843, and thence appearing annually, with the exception of 1846, when the appropriation and volume was omitted.

These twenty volumes compare very favorably with other agricultural publications of their times, but from defective arrangement of their matter, and trivial communications in form more suited to the newspaper, and from lack of system and condensation, have been valued less than they deserve. With the presence of a complete index, they would form a valuable addition to a library. Their contents are the product of very little original research, show but little striking observation, and are rather commonplace, as befitting the state of agricultural thought with which they are contemporaneous. While we can give them a little praise, yet they are entirely unworthy as the productions of a great government.

By an act of Congress approved May 15, 1862, the United States Department of Agriculture was organized, and entered into operation the following July 1st, and published its first volume of reports for the same year. These reports have continued annually, although sometimes a year or more behind time, up to the present.

In 1865, the Department issued a series of pamphlets, called "Monthly Reports," but these have not been strictly monthly, but intermittent in their appearance, several months being frequently consolidated into one. The object of these reports is stated to be the communication of topics of less permanent, (or of transient interest only,) than those which appear in the annual reports.

These publications, although of value, are exceedingly discreditable to the Department of the Government which issues them. The commissioners have not been strong or original men, and have puttered away in the beaten tracks, or have frittered away their appropriations for measures uncalled for by the public, and of little public interest. The volumes already issued are weak and narrow in their views, and the main effort has been apparently to interest rather than to instruct and elevate the farming public. So far as the Department is concerned they have no literary character, and such we must expect them to be, until the right man directs their appearance, and the party back, or man with influential friends is ignored in the appointment, and true merit wins. Never was there a better place for the right man to influence agriculture than here. Let the reports be true reports in fact as in name, and convey instruction and wisdom as well as interest. Let them leave to the newspaper those features which the newspaper can do so well and the Department publications so ill. Let the genius at the head be sufficient to demand the respect of the liberal farmer, be he North or South, East or West. Let the Department cease doing the work of the trader and seedsman, and spend its money to economise farming for the farmer, and let the result of its work appear in its reports. It is a disgrace for these reports to publish the work of others without credit, or at least it would be disgraceful for a high-toned society to do this, or even for an honest individual. It is a disgrace that with such expenditure as it makes, that so few results should show. Our population is largely agricultural. The Department was established for their interest, and these books, misnamed reports, should clearly succeed in showing the benefit they are to American agriculture. Our harshest criticism is that these reports are so far from what they should be, and are so poorly correlative with the circumstances under which they originate and appear.

In 1841, a "United States Agricultural Society" was organized, and efforts were made to establish a great school and library of agricultural science and experiment from the Smithsonian behest. On the failure of the realization of this hope, all interest was lost; indeed, this society never held a meeting after its organiza-

tion. Solon Robinson, of New York, was one of the prime movers of this effort.

Ten or more years later another and more successful movement was initiated. June 14th, 1852, a National Agricultural Convention was held at the Smithsonian Institution, in the city of Washington, and the "United States Agricultural Society" was formed. The first annual meeting took place at Washington, Feb. 2d, 1853. In July, 1857, a national field trial of reapers and mowers was held at Syracuse, N. Y. Three volumes, under the title of "Journal of the United States Agricultural Society," in 8 Vols., appeared in 1852-3, 1854-5 and 1856-7 successively. The first two bearing the imprint of Washington, the last of Boston. Another publication was the "Transactions and Monthly Bulletin of the United States Agricultural Society for 1858," edited by Ben Perley Poore, Sec'y, Washington, 1859. Also several special reports. Fairs were held annually at various places from 1853 to 1860 inclusive.

This attempt at a National Society failed, as its members were too far separated by an immense domain, to be able to attend its meetings, or feel a permanent interest. It, however, had a large influence in stimulating agricultural thought, and its transactions may be generally criticised as being no worse than we should expect. Indeed, we are sometimes disposed to call them good, but necessarily the farmer had to give place to the man of political or social prominence, and the past literature of the world appears more strangely than does that tour of home practice and home surroundings.

The American Pomological Society, were we treating of aught outside of general agriculture, would here demand a place as a society with an American literature, and praiseworthy at that. But fruit growing is a specialty so distinct from, and so little influenced by the farm, that we purposely avoid reference to this and kindred societies and publications from our scheme. The specialized industries are far in advance intellectually of general farming.

In 1820 was founded the Rhode Island Society for the encouragement of domestic industries. The publications originating from this society are largely devoted to manufacturing, and but comparatively little prominence is given to agriculture, a course which would be anticipated from the restricted area of the state and the prominence given to its manufacturers. We have, however, failed to examine its files, and so pass by with a mention.

In 1820 also, the New Hampshire Board of Agriculture was founded, and published one volume, which is now excessively rare. Its title is the New Hampshire Agricultural Repository, published by the State Board of Agriculture, under the patronage of the state of New Hampshire, 8vo., Concord. Printed by Hill & Moore, 1822, pp. 136. A summary of the contents of this publication is given in "New Hampshire Agriculture," Adams, Vol. 2, 1872.

This effort was premature. The publication, judging from its table of contents, was commonplace, yet its leading contributor, Rev. Humphrey Moore, appears to have been a man of considerable force, and alive to the necessity of the time.

In 1870 a new board was organized by the legislature, and the first Annual Report appeared in 1871, and has been annually followed by its successors. These reports have some good essays, and some useful hints, yet they are not too harshly judged by the term ornate and commonplace. Indeed, we fear that our judgment may be considered too severe, but our position is to state things as they seem to be, and not in connection with the circumstances under which they appear.

No other art that we are familiar with has, on the average, received such fragmentary and

shallow aid as agriculture appears to have submitted to for the past few generations.

In 1850, the "New Hampshire State Agricultural Society" was incorporated. This society has published ten volumes of transactions, but we are not familiar with them. The volumes bear the imprint of Concord, Manchester and Dover. From a superficial examination, our impressions are that they fall far short of what they could have been or should be. Is it a wonder, indeed, that they should receive the same criticism as would be given to the farming which they exemplify?

In 1841, the Louisiana State Fair Association was organized, and reorganized March, 1867. We have never found mention of any publications.

The Ohio State Board of Agriculture was organized Feb. 26, 1846. Its first report comprise proceedings from 1846 to '49. Its last is entitled "Twenty-ninth Annual Report," &c., for the year 1874.

These reports are among the most valuable that we have in our library, but hardly as American. They receive their tone largely from the character of their editor, and the state agricultural tone is largely concealed. We think, however, that intelligent, thoughtful agriculture is not as common in Ohio as it should be, and that these reports certainly indicate it. These reports part far from the commonplace, not so much through the efforts of the farmers, but through the good judgment of the editor, who seeks from miscellaneous sources material for his reports which shall be educational to his readers. In this there has been good success, and we know not of another place to turn to, to obtain translations of valuable German experiments. The abundant appendix contains usually the cream of the annual agricultural literature. In this, Mr. Klippart has been wise, but we think had been wiser, had the agricultural thought also of the population been more stimulated through meetings and discussions, than by a fair and exhibition. In this, however, Mr. Klippart is powerless, except as an agent, and our judgment is from a different point of view than his.

In 1864 a State Dairymen's Association was formed, which has held annual meetings, published annual reports, and has been productive of much good. It is to these specialized industries that we are to look for the strongest development of agricultural thought, and in dairying and fruit culture we need never look in vain.

When our general agricultural literature attains the present intellectual position of her specialized industries, the farmer may well feel proud.

In 1847, Delaware established a State Agricultural Society, but has published no report; yet one of the county societies at least, the "New Castle County Agricultural Society and Institute, formed in 1835, published its proceedings in a pamphlet form as early as 1843, 8vo., pp. 58.

In 1848, the "Maryland State Agricultural Society" was formed. Nov. 14, 1866, the Maryland Agricultural and Mechanical Association was organized. We find no record of any transactions or publications.

With 1850 we commence an era of agricultural interest, and each successive year new states fall into line by their agricultural organization.

In 1849, the Michigan State Agricultural Society was organized, and received its charter April 2d of the same year. Its first volume of transactions was for 1851-2, although we find access to Vol. 3 for 1851, 8 vo., Lansing, 1852.

The State Board of Agriculture was organized by act of legislature in 1861, and published its first annual report for 1862 and annually thereafter.

The society reports we need scarcely notice here. The board reports are noteworthy on account of the small membership of the Board of

Agriculture, and the consequences upon their publication. Indeed, we hardly have represented the agriculture of the state so much as that of a few individuals. This fact gives these reports a higher character among their class, however it may detract from their historic, philosophic character. In these reports we find evidence of the strong influence of the Agricultural College upon the printed agriculture of the state, and this is as it should be. Except for the differentiation which is brought about through age, and to this extent gives an old community an advantage over a younger, we would be inclined to place Michigan in the front rank as an agricultural state, forming our judgment upon the effort of the leaders of her agricultural thought.

A little youngness, no fault implied here, places these reports absolutely behind some of those we have already reviewed, but relatively to her surroundings, Michigan reports occupy a front place.

The Wisconsin Agricultural Society was organized March 12, 1851. We find access to Vol. 3 for 1853, Vol. 4, 1854, Vol. 5, 1860, Vol. 6, 1861, Vol. 8, 1861-9, including 8 years, Vol. 10, 1871, and thence annually.

There has been a commendable activity in agricultural thought as evidenced by the late volumes of this society, but the stream was rather shallow as would be expected from a young state, with abundant resources requiring development. As with some other of our Western States, Agriculture is in a measure in a transition stage, and the true raising of crops is complicated by questions of a more political or social character. These latter are of great importance, but relatively to the crop question they are now receiving from farmers more than their usual proportion of attention. Yet agricultural thought may perhaps be developed as well sometimes in off lines as in no defined line at all, and we of the East should be cautious of too harsh judgment.

In 1851 the Indiana State Board of Agriculture was organized. Its first report was published in 1852. Its ninth report is for the years 1862-67, inclusive, and thence annually.

We have on our shelves the reports for 1870, 71-72, and if by these the rest are to be judged, we must confess that they have not character enough for criticism. Indeed they come as near being absolutely worthless as a few hundred pages of printed matter can be, and it is to be hoped that the rag-money party of Indiana, if it once gets power, will do the public the mercy of running these volumes through the pulper and converting into paper money, among the first. Perhaps the destruction of so much emptiness might be considered as an equivalent in small part for the ill of a measure, otherwise to be commended by none who think in whole thoughts rather than in fragments.

The Virginia State Agricultural Society was organized February 1852, Volume I of the Journal of Transactions was issued in 1853, Vol. 2 in 1857 and Vol. 3 in 1858; at least thus they read in the copies preserved in the library of the Massachusetts Board of Agriculture. We find no mention of any others. For this we are sorry, as the quality of these three volumes make us wish for more. They are American; this is something in their favor. They are high-toned; and this is more. They have a certain earnestness of their own, and a certain character. Yet there is enough lacking to show the deficiency of the state wherein they were issued. We note that the appeals are to an aristocratic class, rather than to the laborer; not in words so much as in tone. We note the dependence of thought on Southern industries, a localization of ideas which should be cosmopolitan. We find errors, and why not? We find verbiage; and why note such a frequent occurrence? These volumes are

interesting, and have value. They are good, without being very good. They are bad, without being very bad. They are sufficient of both for criticism, and even this should be considered praise.

The Connecticut State Agricultural Society was organized and chartered June 22—1852. It has published transactions annually for 1854 and 1859 inclusive, to our knowledge. These are principally the reports of their fairs, collateral matter, and although excellent examples, comparatively speaking, of their class, yet do not deserve, as a series, any further of our space or time.

The Connecticut State Board of agriculture met for organization August 1, 1866, and published its first report for this year. Its fifth report was for 1871, none having been made in 1870. Its "ninth annual report," bears date 1875.

These reports are among the most valuable of our agricultural literature, and are noteworthy as coming the nearest to what we consider a report should be, than any others which we have examined. The leading idea is to have annual meetings for discussion, whereat leading men are ensured to be present; have a definite subject assigned, as near as may be, for each year; and the publication of the result of these meetings; of the results of special official study, such as of the chemist, botanist, entomologist, and pomologist; and of a little statistical data. We hence find in these reports advanced scientific views, and the advanced farmers practice combined. We cannot say that these reports contain more original matter than some others. Massachusetts, for example, but what they do contain is less diluted, and hence more acceptable as far as it goes. There is more to be hoped for in the future from these Connecticut reports than from those of any other one state, as indications are at present, for Mr. Gold, their secretary, has the wisdom which is allied to progress, and while conservative, is neither slow nor jealous of younger men. Ah! this jealousy of the older of the younger; this brake on agricultural progress; this feeling, which leads some men to try and maintain their own positions by tramping down opposition, rather than by exciting themselves for greater knowledge.

The Illinois State Agricultural Society was organized in 1853, and ceased to exist April 17, 1871, when the Department of Agriculture of the state of Illinois succeeded to its place. The first transactions of the society were Vol. I, 1853-4, Springfield, 1855. Vol. III, 1858-9. Vol. IV, 1859-60, Vol. V, 1861-64, Vol. VI, 1865-6. Vol. VII, 1867-8, Vol. VIII, 1869-70.

In 1862, the society started a journal, under the title. "Journal of the Illinois State Agricultural Society." It continued for two years only. The Department of Agriculture reports commence with Vol. IX, old series, Vol. I, new series, 8vo, Springfield, 1872. We have seen Vol. X, for 1872, Vol. XI for 1873 and Vol. XII for 1874. These reports are of little value except as recording the exhibitors at the shows. The Department of Agriculture reports seem even greater failures than those of the society. When it is remembered that fertile soil alone do not determine the largest crops, but the right application of intelligence towards the development of this fertility with crops, it is seen how essential education must be to the farmer. In 1873 the United States Department report of the average corn crop of Illinois with her fertile prairies is but 21 bushels per acre, as compared with Massachusetts 35 bushels per acre. The increase is a direct outcome of better practice, arising from a more educated public. I do not speak of common school alone, but of farm education.

Let us see! Indiana, an average corn crop in 1873 of 28.6 bushels per acre. Illinois as above 21 bushels. These states are two wherein the agricultural reports are of little worth, and have corresponding little influence, themselves transcripts of public condition, the blind not even striving to lead the blind. Ohio, an excellent agricultural report and 35 bushels of corn per acre. Michigan also a fine report and 31 bushels per acre. Wisconsin also a good report and 30 bushels per acre. Indeed we might test our judgment of the literature of our report by the average crop returns of the census, and be not even laughably wrong. Ye farmer hearers, note this!

The Georgia State Agricultural Society was chartered in 1853. We find no publications. The Southern Central Agricultural Society was organized in 1846, chartered in 1849, and issued one volume of 408 pages about 1850. Of late years the Georgia Agricultural Society has held meetings for discussion, and have published their proceedings in a pamphlet form. These prints show an agricultural interest which indicate progress and are creditable.

The Agricultural Society of the State of Minnesota was organized Jan. 4, 1854. We have no knowledge of any transactions being issued.

In 1854 also, the California State Agricultural Society was organized. The early reports were distributed in pamphlet form previous to 1859 and were but little more than a record of the fairs. We have seen "Official Report of the California State Agricultural Society, 3d Annual Fair, 1856," 8vo., pp. 80. Do. Fourth Annual Fair, 1857, pp. 190. Transactions of the California State Agricultural Society, 8vo., 1858. Do. 1859-60. In 1862 the first volume of transactions under directions of the California Board of Agriculture, 8vo., 1863, pp. 272. Do. 1863, do. 1868 and 1869 in one volume; do. for 1870 and '71 in one volume; do. for 1872.

These reports show remarkable zeal and a remarkable development of agriculture. They have not as yet become pruned down into shape, but offer a rampant growth, which requires direction. While we cannot speak highly of their literary character, we commend them as a future promise.

The Alabama State Agricultural Society was organized Jan. 10, 1855, and chartered Feb. 14, 1856. We cannot hear of any publications.

The Iowa State Agricultural Society was organized June, 1854. It published a "Report and Proceedings of the Iowa State Agricultural Society, &c., for 1855." Report of the Third Annual Exhibition, &c., 1856, and a "Fourth Annual Report," &c., for 1857, and thence annually. These reports are as commonplace as need be, without being absolutely bad. They seem to contain very little mature thought. Their general characteristic indicate realness. Yet why so here rather than elsewhere, I hardly can conjecture.

We find Maine quite prominent in the literary field. The first publication seems to have been Transactions of the Agricultural Societies in the State of Maine for 1850, 1851, and 1852. Part 1, arranged from official returns by E. Holmes, Secretary of the Board of Agriculture, 8vo., Augusta, 1853, pp. 407. The same for 1854. "Report of the Secretary of the Maine State Agricultural Society and Transactions of the Several County Societies for the year 1855". This is the first report of the State Society. The report of the Maine Society for the years in which the fairs were held are to be found in the Abstract of Returns of the Agricultural Societies of Maine, published separately and as an appendix to the Board of Agriculture reports. The Board of Agriculture was established April 1, 1856, and published its first report, "Agriculture of Maine," for this year, and thence annually. S. L. Goodal was secretary for the first 17 volumes, and then S. L. Boardman.

These volumes have had a marked influence on Maine agriculture, and have a high value. While not to be compared in many respects with some of the reports that we have reviewed, yet they have a character of their own, as reflecting in part the character of their population. In them we can trace the waves of agricultural excitement as they have passed over the community, and there is an atmosphere of simplicity and candor which is rather charming. Indeed, their contributors are in earnest to improve Maine agriculture, and they go at the subject earnestly. They are credulous with themselves and suspicious of others. They ever seek, and yet ever dread the new.

They are deficient, however, in the way of most others in not seeking definite facts and definite replies to nature. They are rather opinionated, and trustful of impressions. Often, however, we find a strong article, and of late we see a tendency to seek the advanced science of the day. As some reports might have the epithet "suburban" applied to them as a stray expression conveying a stronger meaning than a dozen sentences so may we call these volumes "rustic." We would be sorry to lose one file, and would retain them longer than very many others.

The Kentucky State Agricultural Society was organized in 1850. It published a "Transactions and First Report," 1856-9, 2 Vols., 8vo., Frankfort, 1857-60. No reports published since 1861, and in 1867 the secretary writes, "We have just been able to hold a fair yearly in order to keep the organization alive." We have never seen a copy of these reports, and know nothing of their character.

We find evidence of a "North Carolina Agricultural Society," in two volumes of "Transactions," said to have been for 1857 and 1858. But we can give no further information.

In 1864 the Colorado Agricultural society was incorporated. Its 3d fair was at Denver, in 1868. We find mention of transactions for 1870 and '71, but we have not seen them.

In 1864 the New England Agricultural Society was organized. But two volumes of transactions have been published, one in 1864 the other in 1865. These publications are, however, of little account, except as showing the influence of a progressive spirit at the first, which soon, however died out. The transactions for 1864 are taken up with the account of the exhibition and with essays, showing carefulness of preparation, and a good intent throughout. The second transactions are likewise a report of the exhibition, but free from any literary effort whatsoever, except what is copied from a foreign journal. Since that date, annual exhibitions have been held, but no reports published, and the society has been exercising an unfavorable influence upon New England agriculture from being made use of as a political engine for the advantage of its permanent officials, who are usually recognized as forming a ring; a ring so close that the majority of the officials even, much less any of the society, have had but little part in giving tone or character to the society through their acts; a ring so close, that even the ordinary practice of having a treasurer's report with vouchers has been omitted for years; a ring of extravagance, and a ring of irresponsibility; a ring which has given a flippant tone to agricultural writings, wherever it could have any influence. The New England Agricultural Society has influenced our New England agricultural literature, but to its injury. It has published since its first volume nothing whatsoever of merit. It has given encouragement through the press in connection with its exhibitions to the most venial elements.

In 1865 the Missouri State Board of Agriculture appeared in the first annual report. These reports have been continued to date, and are rendered of great excellence by the reports of

their state entomologist, Prof. Riley. It is rare to find so much practical science as has appeared here, and this effort of an individual sheds luster on the state.

About 1868 Nebraska must have established her State Board of Agriculture, for we find her Third Annual Report for 1870. We have never met with any agricultural publications from this state.

The Board of Agriculture of Vermont was established through legislative act, March 22, 1870, and was organized Jan. 19, 1871. Its first annual report appeared for 1872, and the second for 1873 and '74. These reports afford pleasant reading and offer a little information, and are rather good. We are at fault, however, to refer to the commonplace in enough different terms to prevent tautology. Yet these reports of Vermont are not discreditable; they show evidence of youthfulness, but yet a power of growth, and we expect shortly to see them attain that maturity of which they offer promise. The titles of their subjects are encouraging and hopeful. In their treatment we find traces of much dependence of the authors upon others. It is one thing to write to order; it is another to write because we have something to tell. The educated public call these two things different.

In 1871 the Northwestern Dairymen's Association published the report of their proceedings at their fifth annual meeting, 8vo., Elgin, 1871, pp. 72. The literature represented by these reports up to date is American, and has been largely educational. In 1872 the Kansas State Board of Agriculture published a volume of transactions. The Fourth Annual Report for 1875 is mainly occupied with a census of the state, yet it is a strong move in the right direction, as it endeavors to educate the farmer through the eye, to the connections between statistics and practical agriculture. While crude and incomplete, this effort of Kansas deserves most hearty commendation. In 1862 a State Agricultural Society was organized, but we learn of no publications.

In 1874 the First Annual Report of the New Jersey Board of Agriculture appeared, but we have seen no copy. The New Jersey State Agricultural Society was founded many years before, for we find that in 1865 or 6 it was changed into a joint stock association. We find mention of a report in 1858, another 1859, as also in 1860. Then a break. In 1873 a report was published, 8vo., Newark, N. J., 1873, pp. 188.

We have now completed our unsatisfactory task. We have endeavored to use our best literary and agricultural judgment, and we feel conscious of a freedom from envy or malice. If we have judged harshly, no one will feel it more acutely than ourselves. If we have spoken unwisely, yet truthfully, we shall seek support from our own consciousness of rectitude.

It ill behooves any one, however, to approach this task with as little preparation as we have given; yet it seemed proper that something should be done this Centennial year, which would serve at least as a nucleus; or say as a spur to further work caused by a revolt against its deficiencies. If this is accomplished by us, it will be reward sufficient.

What is an American Agricultural Literature, and what should it be? is a very pertinent inquiry and a very fit conclusion to our essay. We should reply that such a literature is a product of the American fields and American life and American surroundings, as distinguished from an imported article, with a counterfeit trademark. The literature which springs from a foreign source can never be the same as that originating from home. The author who seeks material (inspiration allowable) wholly from foreign results, can scarcely hope to produce work applicable to the conditions of his home. The work should be born of the man as he is, not as a poor

judgment would have him be. American Dairying has given us an American literature. American Pomology is another instance of a national pursuit furnishing national writings. So also in gardening and floriculture, we have a recognized American standard. In agriculture proper, in stock raising, etc., we desire just such a result. We require a nationalized literature, and the indications are that this Centennial year may afford a commencement time. We do not require to reject foreign thought or foreign influence; all that is good should be ours, wherever produced, and the American citizen, filled with the pride of worth and self respect, should ever be willing to seek aid wherever it may be found, without regard to geographical or social or literary lines. But what we learn from outside, should be carefully fitted into its new surroundings, and take on that adaptability which is the secret of success. When our literature connects science and practice, it will be a success. When it connects all science with American practice, and predicts results which prove successful, then it is a successful American, as distinct from a foreign literature.

In our society and government publications we have much to hope from in the future. These will advance step in step with the population, and act as a school for the most forward minds. Let us hope that the men in charge will recognize their true province to shape agricultural thought so that it may become Americanized, i. e., adapted to our circumstances. Let us hope that they shall see fit to relegate to the newspaper all that which is but temporary in its influence and interest, and keep their publications for articles of more than temporary use; articles which mark progress and have a historical value.

The Secretary of a Board of Agriculture occupies a most honorable position, and a responsible one. Of him much should be required. Our agriculturist should ever ask, is he doing his whole duty? If not, let him be replaced by he who will. This office is at the front of our agricultural progress and has a large and enduring influence. If this influence is not being excited, or if it is excited in the wrong direction, agricultural reformers should see it, know it, act on it.

I would that all could feel with me the necessity for a higher agriculture. I would that jealousy could be sunk in the nobler inspiration of true agricultural work. I would that our leading minds could act together for the common good, and that agriculture could occupy the position by right hers—the first of the arts, the first of the sciences. It is not locality, but brain work, which is to secure agricultural followers the rights which are theirs. The agricultural papers, the agricultural societies, our agricultural colleges, our better farmers, our intellectual men fond of a country life, all have much in common, can receive mutual help, and be brought into closer relationship. The question must be not *can we do it*; but *do we wish it*. All rights are secured through knowledge. He who knows the most has the greatest power. The intelligence of the farmer must be a high one, to properly use many-faced nature; to properly subdue her opposing forces by the offsetting against them her own favoring forces. And finally our agricultural literature has a close relationship with agricultural conquest, and a higher agricultural living.

THE TRUE WORK OF NATIONAL INDUSTRIAL SCHOOLS.

[Read before the National Agricultural Congress at the Centennial Exposition, September 26th, by A. S. Welch, President Iowa Agricultural College.]

The national industrial college now established in nearly every state of the Union is the offspring of congressional enactment. It derives its origin, plan and purpose from an organizing act of the congressional grant, and this act gives to the whole project a clear and definite outline by declaring in precise terms that "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Now it will be universally conceded at the outset that the entire spirit of the national school so created, its central aims, its faculty, equipment, courses of study and methods of instruction must all be made to conform to a just interpretation of this language. And all conflicting opinions as to its real mission, and all complaints of its drifting therefrom which have been vociferated throughout the land must be settled by the law that gave it birth as the supreme and final arbiter. And this law, though liberal enough in its wording to admit of variation in manner to suit the varying soil and productions of different states, is explicit beyond cavil as to its grand intent and object. But manifest as is the meaning of the congressional enactment from which it sprang, no great educational scheme was ever so buffeted by contradictory theories respecting its actual purpose. From first to last it has been found impossible to give to the general public a correct conception of the real enterprise which the law sets forth. Multitudes in their lack of experience have evolved the new national school out of their own fancies, and then demanded that the actual one should realize the capricious picture. Though embracing by the express terms of the grant the entire circle of the industrial sciences, the agricultural journals from ocean to ocean have assumed it to be a school of agriculture pure and simple. Though limited by language without ambiguity to the teaching of industrial science as its leading object, not a few have claimed that it shall be made a school of industrial art which shall unite in its curriculum the smallest modicum of science with the largest modicum of practice in the handicrafts. Some have even developed the theory that the new scheme was to be a mere model farm whereon reluctant boys, untrammelled by the study of science, should be drilled in the manual opera-

tions of agriculture and made to earn their living. On the other hand, many have distinctly declared that the national school was to be a grand depository of general learning unlimited in quantity and kind where the industrial classes might find any thing they wanted in the educational line without stint and without expense. Meantime many a specialist in agriculture has revealed the belief that the mere educational work of the college was of minor moment—that it was rather a sort of agricultural station where experiments in his particular branch should be conducted and their results promulgated at the public cost. Finally, amid all these conflicting views, the comparatively few who had gained a just conception of its leading object demanded, nevertheless, that the whole enterprise should, Minerva like, spring into life in full panoply and enter at once upon those higher functions which are to be reached only after the successful progress of years.

Assailed on all sides by such jarring opinions and under the necessity of bringing at once a host of complicated departments into running order, the organizers of the national industrial schools in every state had in hand a stupendous task—a task which they could carry to successful completion only so far as they should be guided by a calm and careful questioning of the law. And so far as the courses of study are concerned the law responds in language sufficiently explicit. "The leading object shall be to teach such branches of learning as are related to agriculture and the mechanic arts." These branches of learning are nearly all modern sciences that may be indicated with the utmost precision. To begin with them the law prescribes for the curricula of the national school, the industrial sciences, and not the industrial arts. It does not require the teaching of trades, handicrafts or manual dexterities of whatever sort. Pruning and grafting, plowing, planting, harvesting crops and handling stock, though demanding skill, are not branches of learning, and instruction in these ought not therefore to burden the resources of the national college. Only those higher artistic processes wherein science is taught in its application to practice should be rigidly included in the training it gives. For example civil engineering, surveying, economic botany and stock breeding depend for their value on the out door experience that renders the hand skillful and the eye unerring. But the ordinary manual operations in agriculture and mechanics are taught elsewhere far more widely, more economically and even more thoroughly perhaps than in the nature of the case they possibly can be under the organization of a college. A thousand work-shops and a hundred thousand farms scattered all over the land are the actual and the adequate schools from which graduate in untold numbers the experts and the artisans that the progress of industry demands. What

farmer, gardener or mechanic would send his son to college to learn the very things which he himself could teach with far less expense at home. Nearly all the young men who seek admission to the Iowa Agricultural College bring with them a complete experience in the ordinary routine of farm labor. But the vast interests of agriculture are suffering not so much as seems to me from the lack of skilled workmen as from the lack of scientific knowledge. Even if they were, it would be quite impossible for the national schools to supply the deficiency. Its province as defined by law is not to develop carpenters, masons, plowmen and crop raisers merely, but architects, engineers, scientific breeders, veterinary surgeons, economic entomologists and the like. In maturing his noble scheme for the industrial schools, the framer of the law which declares that the leading object shall be to teach the industrial sciences, had a clear and definite perception of the real obstacles to the advancement of the great industries, namely, a wide-spread ignorance of the branches of learning that underlie them. He saw with marvelous clearness of vision that the vast treasures now sleeping in and beneath the soil demand for their development the research, the foresight and the facilities which the industrial sciences can furnish. He saw that science alone could protect the great staple productions of the country from those natural enemies which constantly threaten and often accomplish their destruction. He desired to bring learning forth from its venerable haunts into the open air and the broad sunlight where she may become sympathetic and helpful to the industries, where she may indeed reveal the secrets of nature, teaching how lightning is utilized, how ores are discovered, mined and reduced, how rivers are bridged and mountains tunneled, how plants grow, how marshes are drained and worn-out soils refertilized, how fruits and cereals and domestic animals may be improved, how every article of food and fabric may be produced with the least possible waste of muscle and material; in short where science may take the laborer by the hand and lift him up with the loving injunction "I say unto thee arise."

The sufferings and sacrifices endured in every state from a lack of that learning that underlies the industries, made the necessity for such schools the more apparent. In the very capitol for instance, erected at the cost of millions, where the bill for founding them was drawn, many valuable lives have been lost through the poisonous atmosphere of a defective ventilation. Millions on millions of dollars are invested annually in dwellings which are wanting in both convenience and beauty by reason of the absence of architectural knowledge. Uncounted sums go to waste in the erection of public structures in which some fatal defect is due to a blundering builder. Early errors of construction in the main building of the Iowa Agricult-

ural College involved a loss of at least \$50,000, and a defective heating apparatus at least \$25,000. Four years ago the rising walls of a new capitol, which the state had projected, were torn down to the tune of \$50,000, in order to remove the crumbling stone which an incompetent architect had placed therein. These instances are only an insignificant fraction of the innumerable legion of blunders which are born of incapacity in every state. The vast aggregate of treasures sunk in this way beyond hope of recovery defies enumeration. We can only touch a sample or two and leave the stupendous whole as beyond our grasp. A really competent architect would have saved to Iowa in the single instance referred to more than a hundred thousand dollars. How much would she save with a complete supply of scientific master workmen in every line of industrial art.

But there is even a more urgent call for science to give effective help in the various branches of industrial art which agriculture embraces. For a single example, all over the land there is a deplorable ignorance of the breeding and habits of the commonest pests that infest the farm and consume its products. It is high time that science should seek every where to compass the destruction of these noxious feeders. There is urgent need for a general onslaught to be made on the clouds of insects that season after season make such alarming havoc with our crops of fruit and grain. There is a need as urgent that all quadrupeds and birds which are naturally destructive to these should be carefully multiplied. With every returning summer comes the resurrection of the swarms of borers, curculios, weevils, worms, grasshoppers and the like, which combine in countless hosts to rob the farmer of the products of his labor. Particular families of these have generated with such alarming rapidity as to beget a well grounded fear that their numbers will result in the utter annihilation of the crops on which they feed. In some quarters this fear has long since been realized. The locust, once valued for its enduring wood and grateful shade, has yielded to millions of perforations which have reduced its limbs and trunk to dust. The plum tree, which once offered its sure fruits, round, ripe and melting, now, in many a section, casts them annually to the ground, blighted and worthless. In all manner of vegetable delicacies the worm is demanding to be served first. The time may come when no man can taste an apple whose skin unflecked and unstung shall forbid the apprehension that the first incision of the teeth shall reveal a slimy occupant. But most terrible of all and without remedy as yet from science and skill is the scourge that hides the sun and blackens the sky and wherever it alights turns the beauty and the bloom of the fields into the barrenness of the desert.

These various destroyers, threatening such wide-spread evils, demand the wisest and most

vigorous measures for their extermination. Such measures can be founded only on an accurate knowledge of their form, habits, metamorphoses and modes of propagation. The science of entomology reveals all the forms and phases and wonders of insect life. It shows all the mysteries of reproduction, at what season and where the egg is deposited, how long it remains an egg, when the grub comes forth, its structure, food, habits, whereabouts, duration; how with millions of fellow grubs it works its mischief to the crops, then coils itself up and lays itself away to rest awhile in the chrysalis state, from which, after all these vicissitudes it emerges at last a perfect insect, lives its brief period, lays innumerable eggs, and is gathered to its fathers. Having such intimate acquaintance with the times, seasons, changes, and modes of growth of insects that are harmful to vegetation, a man may go about their extermination intelligently, but without it he can only make, in some instances at least, such blind endeavors as will lead to blundering failure. The workers in this field are far too few. Clouds of locusts are annually devastating vast areas within its limits and yet there are not half a dozen well-known entomologists in the entire Northwest. Nor does the demand for scientific helpers in agriculture stop here. We want scientists who shall elucidate with precision every process by which the lifeless mold shall be changed into the marketable product with the least investment of muscle and money. Scientists who shall teach how to preserve our forests and to extend their areas by judicious planting until, as the generations pass, the supply of timber shall equal the consumption. Scientists who shall reveal the mysteries of economic feeding so that our vast crops may produce the largest attainable amount and the finest quality of butter, pork and beef. Scientists who can find beyond cavil the cause and cure of the strange maladies that at times sweep off our cattle and swine by the thousand. Scientists who shall expound those laws of breeding and treatment, under which the lank scrub takes on at last the caliber and contour of the symmetrical Short-horn, and so save us finally from the anomaly of raising and feeding the finest crops and masticating the poorest beef in the world.

Such is the condition of the industries, especially that of agriculture, such are their needs, and such the training of the men required to meet these needs. *Are the national colleges producing such men?* The answer, though an affirmative one, cannot be given in a single sentence. Nearly all of them have organized with the simple purpose of pursuing the leading object set forth in the congressional grant. They have gathered their faculties and equipments and arranged their courses of study in special reference to this leading object, and entered honestly and earnestly on the line of

effort assigned by law. Not two years since a committee of congress, after an investigation lasting nearly a year declared that "It is due to the whole class of these institutions to say, that there is nothing in the results thus far attained, that can be called discouraging. A considerable number of the colleges have done work which requires no apology, and a few of those earliest organized, have already found time to take high rank among the institutions of the land. The number of students in attendance upon these schools, is already between three and four thousand, and they have furnished more than 1,600 graduates to the active occupations of life. They are generally gathering about themselves material appliances in the form of farms, stock, work-shops, machinery, books, and apparatus. More than two hundred teachers are engaged in the work of instruction. There is evidence of an honest purpose to make the studies pursued, such in variety, in extent and in value as shall meet the requirements of the law to which they are indebted for their endowment. Studies connected with agriculture and the mechanic arts, are made prominent, if not par-amount, and there is reason to believe that, by these means, the taste for these branches of knowledge has been considerably increased in the whole community."

Now take notice that the report from which I have quoted a single extract was written by a committee appointed for the sole purpose of finding whether these colleges were drifting away from the spirit of the law which gave them life; that the scrutiny made into their condition was protracted and thorough to the last degree. Nevertheless it is clear beyond question that the industrial colleges have not, as yet, supplied to any degree of fulness the scientific workers which the progress of agriculture and the other great industries require. It would be indeed unreasonable to expect so large a result at so early a period. These institutions are in their infancy and the most serious obstacle they are compelled to encounter, is the insane demand by the multitude for immediate fruits. Institutions of learning may be early in their blossoming, but they are late in fruiting. It were idle folly to attempt to settle at present the value of the industrial schools by an inventory of the distinguished men who hold their diplomas. Little can be learned as yet by the inspection of actual samples. A public project organized for the improvement of *things* may reach early results, but a great public project organized for the moulding of *men* can find its ripened fruits only in the distant future. Man-making is slow business. Have patience! Scarcely can a graduate attain to such influence as to show to the public the value of his training until he has passed the middle age. The final worth of the industrial learning gained at the national

schools will appear in its fullness only after the present conductors shall have gone to their rest. Still even now the proofs are multiplying that these schools are earnestly engaged in this vitally important line of instruction and training, and the early results are beginning to appear. Many of their graduates are already giving us the votaries of industrial science the promise of future distinction. For example, Michigan Agricultural College, which is not yet twenty years old has prepared and furnished for its own faculty a professor of entomology, and a superintendent of its own gardens. It has supplied for Cornell University a professor of botany, for Kansas Agricultural College a professor of agricultural chemistry, and a professor of agriculture, for the university of Wisconsin a professor of agricultural chemistry, for Harvard University an assistant in cryptogamic botany, and for the Iowa Agricultural College a professor of economic botany.

Iowa Agricultural College, opened less than eight years ago, already numbers among its 80 graduates half a dozen professors, who give instruction in such subjects as physics, economic botany, and chemistry, practical agriculture, stock breeding, veterinary science and practice. It has sent out also several enthusiastic young naturalists, who though the ink of their diplomas is scarce yet dry, are already doing excellent service for the state. One of them collected the Iowa soils, and another the plants of Iowa, making a complete classification and arrangement of these for the Centennial Exposition. I do not mention the many from these institutions who are fine stock breeders, fruit raisers, or engaged in the larger operations of agriculture, nor do I note the hundreds of under-graduates who go back annually to the farm, adding to labor new ability and diligence and who, scattered among the distant districts, drop out of the public eye and are taken little account of. These two schools, the one of the older, and the other of the younger class, stand probably on a level in results with the national schools of the other states, and these few first fruits, I have ventured to mention, are only an earnest of the full ripened harvest which time will duly bring. The scheme devised and carried through congress by Justin Morrill, was a grand one, but its realization shall run and be glorified by the grandeur of its success.

It remains to glance at the courses of study in the national college composed of the branches related to agriculture, which if adopted and wisely carried out, will most nearly fulfill the conditions of the congressional grant. And first it seems to me that there ought, in this important department, to be two curricula—one of which, consisting of all the sciences related to agriculture, arranged with reference to the comparative value of each, should prepare the student for a large success in the most skillful and economical management of the

farm; in short make the scientific and practical farmer. The other should be made up of special courses, composed of single branches, with their adjuncts arranged for the purpose of meeting the wants of those students, who design to pursue and practice through life some special branch of learning related to agriculture. Each of these sub-courses, conducted by a competent professor, with sufficient assistance, and furnished with abundant illustration would finally supply the urgent necessity for such workers in scientific agriculture, as the economic botanist, the entomologist, the producer of new varieties of grain or fruits, the veterinary surgeon, the farm architect and engineer, the scientific breeder, and the agricultural writer.

And I here record my belief that this second course, composed of special courses for the specialist in science, will be far more beneficial to agriculture than the first. For the graduates in the general agricultural sciences, with some exceptions, expend their entire means in getting through college, have nothing left with which to buy farms, and have invested too much in their education to engage as farm laborers. Even if they did, it would scarcely answer the design of the national college. I have moreover, serious doubts whether these graduates could quicken the progress of agriculture, by giving themselves up wholly to the raising of crops. The farmers of the country cannot be helped by adding to the mere bulk of farm products; which are already so great as to cause frequently a glut in the market. It is not an increased competition already too great, that the farm needs, but such an advance rather in the skill and economy of improved processes, that a wider margin may be left between the cost of production and the market price; and the men who are helping most in this direction, are not generally employed in the raising of crops. They fill the editorial chairs, they are in the students office, in the laboratory or the workshops, or engaged wholly in observation and experiment or invention. If there be any doubt of the fact, I could give, at the present moment, such a list as would set all questions at rest.

When therefore the students of our agricultural colleges continue, after graduation, as some do, the study of economic botany, entomology or agricultural chemistry, or become the teachers of agricultural science in any of its numerous branches, it seems to me they are taking the surest course to realize the purpose of the congressional grant. I do not, however, underrate the value to the student of manual skill, and many colleges give abundant opportunity for its attainment.

The question then so often asked, "Do the graduates of the agricultural colleges go on to the farm?" will not determine the value of agricultural education. As we have seen, it is not the general farmer, who in a manner lives and labors unto himself alone, but the specialist in science by whose help the enemies of the farm shall perish, the noxious plants be subjugated, the noxious insects destroyed or rendered harmless, the domestic animals reach such perfection of form, as to answer their precise purpose, the fruits and grains yield their sure returns a hundred fold, the farm dwelling be changed to a model of convenience and beauty, the farm itself reach the topmost limit of its producing capacity, and the farmer's life become the truest life that man can live.

When all this shall be done and well done, then will a prominent purpose of the industrial colleges have been accomplished.

Read also before a convention of the Presidents of State Universities and Agricultural Colleges in the West, held in Chicago, Nov. 23d, at which the views it advocates were approved by resolution unanimously passed.

THE PROSPECTS OF AMERICAN AGRICULTURE.

By JOSEPH HARRIS.

I have been asked to write a short paper on the prospects of American Agriculture. I did not select the subject myself. I am not a prophet or the son of a prophet, and can only judge of the future from the past and the tendencies of the present.

To me the signs of the times are favorable and the prospects bright. Given a soil in the same condition and with a similar season, no one, I think, will dispute the assertion that a given amount of time and labor will produce *more* wheat, barley, oats, corn, hay, roots, clover and grass seed; more cotton, rice, hemp, flax and tobacco; and more beef, mutton, wool, pork, milk, butter and cheese to-day than it would, 25, 50, or 100 years ago.

And the same is true, as a rule, of the articles for which a farmer wishes to exchange his surplus products. A given amount of time and labor will produce more and better implements and machines; more woolen, linen and cotton cloth; more boots, shoes, stockings and gloves; more pins, needles, buttons and thread.

The same amount of labor will dig more coal, iron and silver, and will saw and plane more boards, and give us more nails, hammers, glass, putty and paint; will give us more furniture for our houses, and more and better light, and more, if not better, books, papers and pictures. In short, owing to the discoveries of science, to increased skill, and to mechanical and chemical inventions, a given amount of labor will produce more of the necessities and luxuries of life which a farmer needs to procure in exchange for his farm products than it would 25, 50 or 100 years ago.

So far as material prosperity is concerned, therefore, we are, as a nation, or a community of nations, better off than we were 25, 50, or 100 years ago. We need not work so hard, or, if we work as hard, we can have more of the necessities and luxuries of life. I am speaking now of all classes.

But, of course, it does not necessarily follow that one class in exchanging its products for the products of another class gets, at all times, a fair and just equivalent. And no acts of legislation will make a man just and liberal. If a barber in Kansas refuses to shave a farmer for less than two bushels of corn, the farmer can let his beard grow. And if a shoemaker wants 50 bushels of potatoes for a pair of boots the farmer *may* have to submit to the exchange. But such a state of things in a free and intelligent community will not last long. The farmer or his son, will turn shoemaker, and by and by the shoemaker will want to turn farmer. This matter of the exchange of labor or its products must be left to regulate itself. Monopoly, extortion, and all forms of injustice seldom prosper in the end.

To me, the prospects of American agriculture never were so bright as at the present time. There is *plenty of work to be done*. The greatest curse that can befall a man or nation is vol-

untary or involuntary idleness. "Nothing to do" means poverty and misery. The less a man does the less he is inclined to do. The more he does the more he can do. Idleness leads to weakness and inability. Work gives strength and skill, it banishes despondency and brings in hope, and hope leads to continued effort. If we fail one year we try again. We get to have faith in the soil and in ourselves. We have to compete with our brother farmers and with the farmers of the world. We feel that farming is no child's play and we must try to acquit ourselves like men and be strong.

Of our many blessings, therefore, not the least is the fact that we have now, and shall have for years to come, plenty of work to do on our farms.

There are farmers who thought that when their farms were cleared of the forest, and when the barns and fences were built and roads made, there would be little to do. Philosophers also told us, and truly, that trees absorbed carbonic acid from the atmosphere, and that when we cleared up a district we not only removed these natural purifiers of the atmosphere, but when the trees were burnt or decayed large quantities of carbonic acid were thrown off, and also that man and beast were daily and hourly polluting the atmosphere in the same way. All the processes and operations of civilized life produced enormous quantities of carbonic acid, and we at the same time were removing the trees which nature had provided to purify the atmosphere. Now all this was true enough, but the great fact was not then known, that an acre of corn would take up probably five times as much carbonic acid as an acre of forest trees, and that wheat, barley, oats, grass and clover, and all our cultivated plants were much more efficient purifiers of the atmosphere than the native forests. The fear that this continent would become a black hole of Calcutta has proved groundless; and so the idea, that when we have done the pioneer work of agriculture there will be little to do; is equally erroneous. The better we farm, the farther we advance; the more improvements we make, the more work will there be to do. Let us be thankful. On my own farm I have little or no wood to chop in winter, and yet I find no difficulty in keeping nearly as many men at work in the winter and spring months as during the month of harvest. In fact, wages being much less, I employ more men in the spring than during the summer.

Few farmers, 25 or 50 years ago, could have anticipated such a result. The truth is there is scarcely any limit to the amount of work to be done on the farm. The more we do the more there is to be done. Work makes work. And as a rule our profits come not from land but from labor.

When the duties were taken off foreign grain the English farmers thought their occupation was gone. They thought it was impossible for them to compete with the owners of cheap land. They really believed that there was land so rich that in the language of Douglas Jerrold it "needed only to be tickled with a hoe to make it laugh with a harvest." Experience has proved their fears groundless. It will be so in this country. Many of us who reside in the older settled states, think we cannot compete with the cheap rich lands of the West. And no doubt this competition demands our best thoughts, and will tax our skill and energy. We may have to make many and frequent changes in our rotations and general management. But we need not despair. We shall be able to make a living. There is no paradise on earth. "By the sweat of thy face shalt thou eat bread." There will be found advantages and disadvantages in all sections. More depends on the man than on the situation.

I read a remark a few weeks ago in one of

our leading papers that, owing to the enormous amount of land in this country, it would be 250 years before there was any real necessity for scientific agriculture. The writer evidently attached some technical and definite meaning to the phrase "scientific agriculture." The truth is, however, that what would be scientific farming in England, might not be scientific farming in America; what would be scientific farming in New England or New York might not be scientific farming in Kansas or California. He is the scientific farmer who makes the most of his labor and capital. And there is just as much necessity for scientific farming to-day as there will be 250 years hence. And true scientific farming will be just as profitable at the present time as it ever has been in the past or ever will be in the future.

I greatly mistake the signs of the times if, in the near future, we shall not find as many, and as true scientific farmers in America as are to be found anywhere in the world.

Take up an English agricultural paper and, no matter what subject is under discussion, you will not read far before allusion will be made to the question of "Tenant Rights." A farmer's club cannot discuss the science and practice of feeding stock without getting excited over the malt-tax. "If we could feed malt," they say, we could then raise cheap beef and mutton. If we could get compensation for our unexhausted improvements we could employ our skill and capital to advantage. We are not without our troubles here. We have some burdens that are hard to bear. But, at any rate, we are our own land owners. Any improvements we make are made on our own land. Our land is not entailed. We can transfer it as easily as any other property.

We sometimes grumble because our best farm laborers so soon leave us. They want farms of their own. I have a man who has worked for me 12 years, and who has now, out of his savings, bought a nice farm of his own. I lose a good man, but he will work quite as hard for himself as he did for me and put more thought, care and skill into his labor. It may be a loss to me but it is a gain to the country. He will be able to earn more money and will have more to spend.

American farmers, as a class, work harder than any other farmers in the world. We occasionally find a drone in the hive, but on the whole, we are a nation of workers, and it makes a great difference whether a man is working for himself or for others. We all know what a difference it makes in the amount of work done whether a man is working by the day or by the piece. Last autumn I had men digging potatoes by the day, I paid them \$1.25 per day. Digging, picking up and pitting, cost me over 6 cents a bushel. I then told two of the men I would give them 5 cents a bushel to do the work. They took the job, and these two men dug and pitted 100 bushels every day and then went home, they sometimes got through by 4 o'clock in the afternoon. I got the work done cheaper and the men earned double the money. Now just think what this means; these men were earning \$1.25 per day. If we assume that it cost them \$1.00 per day for family expenses, they made 25 cents a day. Now with a little more energy, care and skill they earned \$2.50 per day and, instead of making 25 cents over and above expenses, they made \$1.50 or six times as much. In other words, they really made as much money in one day as they were previously making in a week.

I mention this merely to illustrate my idea in regard to the great advantage it is to us as a nation to have such a large proportion of those engaged in agricultural pursuits directly interested in the results of their labors. They are the owners and occupiers and workers of the

land. Self-interest calls out all their energy and skill. They make every stroke tell. A nation of such farmers ought to be a rich nation.

The American agriculture of the future will not be English agriculture or European or Chinese agriculture, it will be American agriculture. We shall think for ourselves. One of the oldest and most successful farmers in the state of New York is a Scotchman. But he does not use Scotch plows or adopt the Scotch system of rotation. He uses his Scotch knowledge and experience. But his farming is essentially American. We have many good English farmers among us but we have no English farming.

We have to think for ourselves; we have to study principles and apply them. Liebig has more readers here than in Germany.

The results of Lawes and Gilbert's experiments at Rothamstead are more carefully studied in this country than in England. And there is a reason for this. The English farmer can apply Lawes's superphosphate to his turnip crop without studying Lawes and Gilbert's account of their 30 years' experiments. But here if we would get any benefit from these wonderful investigations we must study them and master the principles of agricultural science.

This we are to some extent doing. The large circulation of our numerous agricultural papers proves that American farmers are great readers as well as great workers. They do not spend their evenings at the village tavern. Their houses may be isolated, but they are the homes of much that is noble and true. We need have no fears in regard to the rising generation of American farmers.

"But are not your sons leaving the farm?" Certainly, and do not English farmers' sons leave the farm? The sons and daughters of Queen Victoria cannot all be kings and queens, and the sons and daughters of farmers cannot all be farmers and farmer's wives. I do not object to young men leaving the farm for the cities, nor to successful business men turning farmers. We need more of the latter class in the country.

But what of the active, enterprising, well-educated young man who sticks to the farm or who adopts agriculture as the business of his life; what are his prospects? The farmer's son who leaves the farm and turns carpenter, bricklayer or mason may become a builder and contractor and the owner of a dozen blocks, the quarterly rent from any one of which would buy his father's or his brother's farm.

Another farmer's son turns blacksmith, and having learned to make nails and horse-shoes by hand thinks he can make them by machinery, and becomes a millionaire. Another is a shoemaker but does not stick solely to his last. He becomes, after a few years, the President of one of the largest boot & shoe manufacturing companies in the world. Another studies law and becomes an O'Connor or an Evarts.

But I need not go through the list. We all know, and the young men on the farm know, that there are great prizes to be won in the learned professions and in trade, commerce and manufactures. And they will try for them and work for them, and I do not object to it, and if I did it would make no sort of difference. A business in which there are no prizes, will have little attraction for a young man full of hope and energy.

Are there any prizes to be won in the field of agriculture, and, if so, how shall we go to work in order to get them?

Farming is said to be a slow business, but sure. The man who cannot work and wait will not succeed. But the agriculture of to-day or of the future is very different from the agriculture of the past.

The improvement in agricultural implements and machines is something wonderful. We can

hardly realize the advantages which the men of science, inventors and manufacturers, have bestowed on agriculture. Many of the operations of agriculture are dependent on the weather. A large factory making shingles goes on, no matter what the weather may be, but a single shower will stop a whole field of hay makers.

Twenty-five or thirty years ago a farmer with a hundred acres of hay to cut and a hundred acres of grain had to hire extra men for a month or six weeks, paying extra wages and converting his home into a large boarding house. And he could not cut all his grass and grain just at the right time. But now how is it?

We start a couple of mowing machines in the afternoon; ted the grass the next morning; rake it into windrows; ted it again once or twice, if need be, in the windrows; put it into good cocks and it is safe. We can draw it in the next day, or as soon as we can get at it. In my own case this year, though the weather was unusually catching, we were all through haying and harvesting by the last week in July, the grain all thrashed and safe in the barn ready for market.

We have a bad climate for a poor farmer who gets behind-hand with his work. But we have as good a climate as any to be found in the world if we know how to take advantage of it.

I thrash my grain in the field by steam. I find that we can get in a field of grain much more expeditiously than if we put it in a stack or barn, simply because the man on the wagon can throw the grain to the machine easier than he can throw it up on a stack or bay. And when we are through we are through; the straw stack built, the grain in the barn, and men and horses ready to fight the weeds during our splendid August and September weather, when even quack grass is not difficult to kill.

This is what machinery has done for us. And it has done much more; but it is not necessary to allude to it. Machinery makes us far less dependent on the weather than formerly and *better farming* also helps us in the same direction. When I first went to Rothamstead Mr. Lawes asked me about my father's farm, the character of the soil, the rotation and yield per acre. "It is rather light land," I said, "but yields good crops, *if the season is not too dry.*" "I suspect," said Mr. Lawes, "that your father is not a very good farmer. There is nothing which a good farmer dreads so much as a wet season."

This was a new idea to me. I have an English foreman, and our climate is a sore trouble to him. From May till November, he is always wanting rain. "The mangles are growing surprisingly," he said, some weeks since, "but another shower of rain would help them."

"Perhaps so," I replied; "but as we cannot get rain when we want it, let us keep the cultivators going and kill the weeds."

For my part, I like our climate. But it makes no sort of difference whether we like it or not. We cannot change it. What we need to do is to study the climate and adapt our crops and our methods of cultivation and manuring to it. One thing may be safely said, that at least three-fourths of our seasons are very bad seasons for bad farmers, but good seasons for good farmers.

Take the barley crops as an illustration. In Western New York 20 bushels per acre, weighing 48 lbs. per bushel, is a good average. It probably will not average more than this the present year. And yet we have had rather an unusually favorable season; so favorable indeed, that the maltsters expect to get barley at a low figure, say 75 cents per bushel.

Now I feel safe in saying that on well-drained, well-prepared and properly enriched soil our climate is capable of giving us an average yield of 40 bushels of barley per acre; and I think the average price of six-rowed barley is fully \$1 per bushel.

I have said that 20 bushels is a fair average crop; and this is taking good and bad crops together. There are many crops which yield 30 bushels, and consequently there must be many that are not over 10 bushels. But we will take 15 bushels as the average crop of a rather indifferent farmer. He sows two bushels, and will be very apt to leave two bushels on the ground in harvesting the crop, and so, after deducting seed and scatterings in harvesting, he has 11 bushels to sell, which, at 75 cents is \$8.25 per acre.

The good farmer has 40 bushels. He sows two bushels, and we will reckon that he loses two bushels of scatterings, though a good crop does not scatter half as much as a poor crop. This leaves 36 bushels, which, at 75c is \$27 per acre, or over three times as much as from the poor crop; and this, mark you, is in a good season.

Now, how is it in what we call a bad season, that is, in a season unfavorable for the growth of barley on ordinary land?

In such a season we have hundreds of farmers whose barley crops will not be over 12 bushels per acre. Deducting, as before, 2 bushels for seed and two bushels for scatterings, we have 8 bushels of merchantable barley, of rather an inferior quality, weighing perhaps, 46 lbs. to the bushel.

Owing to the unfavorable season, barley will be likely to bring \$1.50 per bushel. The net returns from such a crop, therefore, will be (8 bushels of 46 lbs. at \$1.50 per bushel of 48 lbs. \$11.50) \$11.50.

The good farmer, on well-drained, well-prepared and properly enriched land, will have, say 36 bushels per acre of 48 lbs. per bushel. Deducting 2 bushels for seed and 2 bushels for scatterings we have for sale 32 bushels at \$1.50 per bushel, or \$48 per acre.

In the case of potatoes the advantage of raising a good crop in an unfavorable season is even still more striking. And since the advent of the Colorado beetle, rich land and better cultivation are absolutely essential, for the reason that it costs no more to kill the "bugs" on a crop that will yield 250 bushels per acre than on a crop that will yield only 100.

I live in a great potato-growing section. One hundred bushels per acre is a fair average crop. Last year (1875) the season was remarkably favorable for the growth of potatoes in nearly all sections of the country, and millions of bushels were sold for less than it had cost to dig and market them. In my neighborhood, I have seen many pits of potatoes that were left in the field to rot. The year before we got \$1.00 per bushel for potatoes, and it need not surprise any one if they are \$1.00 per bushel again before next spring. Such a season as this is the good potato grower's opportunity. With potatoes at \$1.00 a bushel, a good farmer can make money, and make enough to more than compensate for the loss he suffers from low prices in seasons when the average farmer has a fair crop. But I must not dwell on this point. The truth of the matter is this. With our large area, a fair average crop, such as we have in a highly favorable season, means low prices and small profits. A poor, general crop means high prices for everything we consume at home, such as beans, potatoes, barley, oats, buckwheat, &c. A poor crop of wheat and corn does not always result in high prices, for the reason that we export largely, and the price is dependent on the price in England and on the cost of transportation. As a rule, we should aim to produce those articles which we import, rather than those which we export. A short crop of barley, beans or potatoes always gives us good prices. But such is not the case with wheat and corn unless the failure is so general and so severe as to entirely stop exportation. When the price of these arti-

cles is determined by the price at which it can be delivered in our markets from foreign countries, rather than by what it is worth to export to foreign markets. The American farmer is sure of getting full compensation for his labor. And in this connection let me say that it seems strange that we have so long let the foreign seed-growers supply us with such a large proportion of the vast aggregate amount of field, vegetable and flower seeds which we annually use in this country. Depend upon it, in the near future we shall grow our own seeds.

As I have said before, the agricultural outlook in America is an inviting and prosperous one. There is plenty of work to be done. We own our own farms. We are surrounded by an active, energetic and intelligent business, commercial, and manufacturing people. And our own prosperity will be in proportion to the energy, skill and intelligence we put into our work. We shall not confine ourselves to raising wheat and corn, pork and beef. Many will do this. But others will raise products which require more capital and skill, and afford larger profits.

Our first object must be to make our farms cleaner and richer. Draining when necessary, and thorough cultivation, especially on the heavier soils, are the first steps. The real source of fertilizing matter is the soil. Draining and cultivation render a portion of the plant-food, which lies dormant in the soil, available. Mr. Lawes has raised 15 bushels of wheat *every year*, for over thirty years, without manure, the grain and straw being all removed. In other words, on his heavy lands, cultivation renders enough plant-food available every year for 15 bushels of wheat and straw. This is the normal yield of his soil. On lighter and poorer soils, the normal, annual supply of plant-food would not be so much, and on richer alluvial soils it is often much greater. But whatever the exact amount, it is evident that this annual supply is the real manurial income of the farm. Our object must be to use this annual income to the best advantage. If we sell all our crops we live up to our income, and the farm gets no richer. And if we lose any by leaching or evaporation the soil becomes to that extent poorer. If we retain half the crop at home on the farm, and use it judiciously, we add so much to our manurial capital.

Many of our farmers sow land to wheat and seed it down with clover. They then plow under the clover and sow wheat again. In this way they raise a crop of wheat every other year, and, *theoretically*, if the normal yield, or the annual supply of plant-food, is equal to 15 bushels of wheat per acre, the yield, in such a case, every other year should be 30 bushels per acre. You get no more wheat in one case than in the other, and the only advantage is the saving in seed and in the labor of preparing for and harvesting the crop. I admit that these are very great advantages. Summer fallowing on some soils would have equal advantages. But I have not time to dwell on this part of the subject. I have said that *theoretically*, if the normal yield of a soil is 15 bushels per acre, if we plow under a year's growth of clover we ought to get 30 bushels, because we have two year's supply of plant-food in the soil. There is a principle, however, which interferes with this result. The soil is very conservative. It is not easy to get out of it all we put into it. A dressing of farm-yard manure or a crop of clover plowed under, is not by any means taken up by the growing plants in a single season. In heavy soils, especially, decomposition proceeds very slowly, and it may be several years before all the plant-food supplied by a crop of clover is given up to the plants. Still the fact remains that when we plow under a year's growth of clover we have accumulated in the soil an extra quantity of plant-food equal to the annual supply rendered available by the

processes of agriculture and the decomposing and disintegrating action of sun and air, heat and cold. And it is this fact that lies at the basis of all judicious rotations of crops. I cannot but feel that we are on the eve of many important discoveries which will enable us to add greatly to the yield of our crops and the profits of our farming.

We have learned how to make a sheep produce as much mutton from one year's feed, as was obtained from three or four year's feed less than a century ago. We shall learn how to get out of our farm-yard manure all, or nearly all, its valuable plant-food in a single year, if we so wish, and consequently be able to raise a much larger crop. We shall have the matter more under control.

We plow under a crop of clover for wheat, and in this way get two year's supply of plant-food for the wheat. We ought to double our crop of wheat. We ought to get as much wheat from the one crop every other year as from two crops of wheat grown successively on the same land. The advantage of the plan, as I have said, is in saving the seed for one crop and the labor of putting in the crop and cutting it.

But I feel sure that growing a crop and plowing it under, merely to enrich another crop, is not always the most economical plan. It is good as far as it goes. It is far better than growing grain crops year after year on the same land.

But there is a better way. There is much nutriment in the clover, and this nutriment can be taken from the clover and still leave nearly all the elements of plant-food in the excrements of the animals that have eaten the clover. And what is true of clover is true of all other food. Bran is sometimes used for manure, and so are malt-roots, and a few years ago some of the Connecticut tobacco-growers used corn meal as manure. Now if a sheep only takes out from 5 to 10 per cent. of nitrogen, and a still less proportion of phosphoric acid, potash and other valuable elements of manure from the food, and if these elements are left in a more available condition in the manure than in the food itself, I think we shall be able to make a profit in feeding the clover and other food to sheep, rather than to plow it under merely for manure. I am well aware that when we feed a ton of clover, containing 100 lbs. of nitrogen, to sheep, we do not always get back 90 to 95 lbs. of nitrogen in the manure. A careless farmer might lose half the value of the manure by leaching. But there is no necessity for this. The elements are in the manure when it leaves the animal, and we shall learn how to preserve them, and I feel sure we shall soon learn how to make them more immediately available to our crops. How to get out of our soil more of the large amount of dormant elements of plant-food which it contains, and then when we have got these elements, how best to use them and save them should be the great aim of scientific and practical agriculturists. I know of no better plan than the one I have suggested:—

1st. Draining and thorough cultivation. These operations, by letting in the air and sun, decompose and disintegrate the organic and inorganic elements of plant-food.

2d. To grow such crops as will take up the largest proportion of this plant-food from the soil and subsoil. Clover, on many soils, is one of the best plants for this purpose. Peas and beans, in favorable latitudes, are also good. Grass and oats are less valuable for the purpose, but still useful, and our grand, national cereal, Indian corn, can be used with immense advantage. But we have much to learn in regard to the peculiar requirements and uses of this magnificent crop.

3d. After we have taken up and organized into useful, nutritious food the annual supply of plant-food furnished by the soil, we have to

study the best method of extracting this nutriment and turning it into meat, and at the same time save the elements of plant-food in the shape of manure for future crops.

Of course, in a paper of this kind, I cannot go into details. The crying necessity of the age is more and better meat. The better our education, the more skillful and intelligent our population; the harder we work with our brains, the more animal food we seem to require. Improved animals, like the Short-horns for instance, require richer food than Texan cattle, and bright, active, energetic men, as a rule, require, and will have, more nutritious and more easily digestible food than the slow, plodding farm laborer of the past. In all civilized countries the demand for animal food is increasing much more rapidly than the supply. England is searching the world over for meat. And what is still more strange, with all our immense area of cultivated land, New England, New York and Pennsylvania send thousands of miles for beef cattle. This is very well, but we shall soon learn that we must look to improved agriculture, rather than to cheap land and semi-wild animals, for a steady supply of good meat. The farmers of New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota need have no fears that Texan cattle will crowd out Short-horns and their grades from our markets. We shall produce better meat and we shall get better prices for it. Poor meat is the dearest of all food. Many of our farmers think they cannot afford to produce beef and mutton. And this is probably true, unless they produce beef and mutton of better than average quality. There is an astonishing amount of poor meat raised and sold even in the better farmed portions of the country. We must raise good beef and good mutton. To do this with profit we must furnish richer food and this will afford richer manure. And taking meat and manure into account we can make a profit.

A few years ago the wool from Leicester, Cotswold and other long-wooled English sheep sold for from 20 to 30 per cent. less than Merino wool. Now all this is changed. Desirable combing wool brings from 20 to 30 per cent. more than Merino. This is a great change. Congress was at one time urged to take off the duty on combing wool because it was said the farmers of the United States could not produce this kind of wool. It could be grown in Canada, but not here. On the west side of the Suspension Bridge, over the Niagara River, combing wool could be produced of excellent quality, but not on the east side. And while the Canadian farmers on the east side of the Detroit river could produce the best of combing wool, the farmers of Michigan on the west side of the river could not do so. And a member of Congress, a lawyer from the state of New York, and in many respects a very intelligent and able man, actually asked me in all sincerity and earnestness whether this was not really the fact. I need not say that there is not a particle of truth in the idea. We can raise just as good combing wool in the United States as can be raised in Canada. And the only reason why Canada combing wool sells for from 15 to 20 per cent. higher than our combing wool is that the Canadian farmers understand the management of long-wooled English sheep better than we do. They raise more roots and feed better. It is not any difference in soil or climate. We can raise just as good combing wool as can be raised in Canada, and we are learning how to do it.

Some time since I read an article in the London *Agricultural Gazette* headed "The most profitable flock in Essex, England." Merino sheep were imported into England nearly a century ago when fine wool commanded high prices. But it was found that, owing to the demand for mutton, the coarser-wooled sheep were much more profitable. Still the sheep were kept for

many years. Finally, however, the attempt to raise fine wool was abandoned, and these Merino sheep were crossed with the English mutton sheep. And it was a flock of these cross-bred English and Merino sheep that was pronounced the most profitable flock in the County of Essex. My own experience in this country is in the same direction. By selecting a flock of common Merino ewes, which averaged at full maturity 80 pounds each, and which cost me \$2.40 per head, and by putting them to a high-bred, pure Cotswold ram I got a lot of strong, healthy lambs which, with good feed, grew rapidly and afforded excellent mutton and the wool, even the first cross, sold for combing. A second cross, that is, by taking the ewe lambs from the first cross and putting them, when about 18 months old, to a pure-bred Cotswold ram, produced lambs which approximated closely to the Cotswold in size and in length of wool, while the lambs are harder and stronger, and the wool finer, and the mutton of better quality than the pure-bred Cotswolds. I killed one of these $\frac{3}{4}$ Cotswolds-Merino sheep, which, at 15 months old, dressed 25 pounds per quarter.

We have millions of these hardy, common Merino ewes, which can be bought at from \$2 to \$4 per head, and two or three crosses of Cotswold or Leicester blood will, with good feed, give us not "the most profitable flock in Essex" merely, but, in certain sections, the best and most profitable flocks in the world. The Cotswolds and Leicesters are too fat. The Merinos are too thin. The Cotswold wool is too coarse and unnecessarily long. The Merino wool is very fine but too short. By crossing, we can get just the wool and mutton most in demand. And the sheep are admirably adapted to our climate. Of course we must feed better than we are in the habit of feeding common Merino flocks, but that is precisely what the requirements of our agriculture demands. We shall feed higher and make much richer manure.

Good mutton in England brings a higher price than beef. We are shipping beef quarters to England, we shall ship mutton carcasses also just as soon as the farmers of the United States raise such sheep as I have alluded to. Well-fatted mutton will keep longer and better than beef, and I should think there would be no difficulty in transporting it across the Atlantic. And if I can trust my own taste the mutton of these grade Cotswold-Merino sheep, when well fattened, will be found nearly, or quite equal to South Down mutton, especially when kept till nearly two years old. I have just weighed (Aug. 24) one of my two year-old grade ewes that has been running with the rest of the flock, but which did not have a lamb last spring and is consequently almost fat enough to kill. She has two crosses of Cotswold blood in her, she is perfect in shape, except that her legs are a little too long, but she is a remarkably strong, vigorous sheep, admirably adapted to our climate and mode of farming. She weighed 200 $\frac{1}{2}$ lbs., and would probably dress 28 lbs. to the quarter. I do not wash my own sheep, but I sold some grade lambs to one of my neighbors who washes his sheep. He told me that one of these grade Cotswold-Merino lambs this spring sheared 12 lbs. of washed wool.

Now if we can raise such sheep, and I am sure we can, and if we can send the surplus mutton to England after we have supplied our own markets, I see no reason why we cannot adopt a higher and better system of farming—why, in other words, we cannot keep more stock, feed higher, and make more and richer manure.

There are only two points to be observed: 1st. We must use *pure-bred long-wooled* rams, and 2nd. We must feed the ewes and lambs liberally. We have plenty of corn, and clover is easily raised, and bran is usually cheap. I hope to live to see the time when we shall send less

corn and more mutton across the Atlantic, and when we can raise nearly all our own combing wool.

Hitherto we have raised few turnips or other roots for our sheep. Much has been written and said in their favor and many farmers have tried them, only to give them up. The English farmers, to a great extent, feed their turnips on the land as they grow. In our own severe climate we have to keep them in pits or cellars. We get our seed largely from England and sow the English improved varieties.

Twenty-nine years ago I was walking with Mr. Lawes in a turnip field at Rothamstead. We came to a part of the field where, up to a certain row on the right hand, the turnips were much better and larger than on the left hand. "What is the reason?" I asked. "Has one part of the field been dressed with superphosphate or manured more heavily than the other part?" "No, both were treated alike, but this fine crop is 'Ikervings Improved Purple-top Swede,' while the other is a common variety which has been grown for some years in this neighborhood. And I wish," said Mr. Lawes, "you would take a sample from both and analyze them." I did so, and we found the 'improvement' consisted principally of water. The English seed growers have for years made great efforts to improve the varieties of turnips and mangels. They have bred for size and shape, and they have attained wonderful success. But the increased size is to a large extent merely an increase of water. They have got varieties so much improved that they can grow 84 tons per acre, nearly 80 tons of which is water.

Now, in this country we do not wish to pull up, top, draw home, pit and slice up 80 tons of water to get 4 tons of food. We can pump water far cheaper with a wind mill. And turnips and mangels will never be generally grown in this country till we begin to breed for quality rather than for size. When we can get mangel wurzel that contains but little more water than fresh grass or fresh clover, we shall then be able to gather, store away, cut and feed out the crop at one-third the expense, and the roots would keep better. We should then be able to grow them for winter and early spring use as a substitute for grass. But as long as we are caught by size and sound: as long as we select varieties such as 'Norbiton Giant,' because it grows big and has a big name, we shall find little profit in root culture. I am in great hopes, now that there is a prospect of having experimental stations as fast as the means and men can be obtained to establish them, that American seed growers will breed for quality rather than for size. It is a comparatively easy matter to 'improve' a variety the wrong way; it is easy to take a sugar-beet and breed it back to a mangel wurzel. The reverse process may not be so easy, but it can be done. Our roots seldom grow so large or so watery as the same varieties do in England, and by growing our own seed and selecting bulbs that will give us the largest yield of real food per acre with the least water, we may hope to make some real improvement that will far more than pay the cost of all our experimental stations for the next 20 years. We shall then export mangel wurzel seed to England and France instead of importing it.

And I hope and firmly believe that we shall do the same thing with herds of sheep and swine. There is a grand chance for intelligent, skillful, scientific and honest breeders in this country. But we must breed for real merit and not for show. Our experimental stations must test our work as we proceed, showing us the right direction, and checking us when we are going wrong.

We have, for years, been importing the best cattle and sheep and best swine that England could produce. We have been able to hold our own in the case of pedigreed cattle. But we

have not attained like success in the case of English breeds of sheep and pigs. An English-bred sheep or pig almost always makes a better appearance in the show-yard than the home-bred, even though descended directly from the very choicest imported stock. It is worth our while to ask why this is the case. Why cannot we succeed as well with English sheep as with English Short-horns?

I think we may find an answer, at least, in part, in the fact that Short-horns have a recorded pedigree, the sheep and swine have not. The Short-horns are kept as pure in England as they are here. We compete on common ground. But how is it with sheep and swine? If I wish to show a sheep or pig at the Centennial I am required to furnish evidence that it is "imported or descended from imported animals, and that the home-bred shall be of pure blood as far back as the fifth generation."

No real American breeder will object to this rule. With my own sheep and swine I can comply with the conditions, but in reply to a request for suggestions I remarked that the same rule ought to be applied to English breeders and to imported stock as to American breeders and home-bred animals. If not, why not?

I have got Cotswold sheep imported from the best breeders in England, but I have never yet happened to see a pedigree of English sheep or of English pigs that was worth the paper on which it was written. I do not say that English sheep and pigs are not pure, but I do say that, as a rule, the records do not prove it. And I think that far greater latitude is allowed the English breeders of sheep and swine than is allowed to American breeders. When we get imported animals we put numbers in their ears and keep the stock pure. No reputable breeder resorts to crosses. And we can furnish longer pedigrees of Cotswold sheep, Essex, Berkshire and Suffolk pigs in this country than are usually furnished by English breeders.

I saw sometime since the pedigree of an imported Essex boar. The dam took this and that prize—the sire was never beaten at any show, and so of the grand dam, and the grand sire was the celebrated boar something-or-other, "the progenitor of the race."

Talk of short pedigrees! Why, it has been claimed, and perhaps justly, that Chester White and Poland China pigs are not established breeds because ten or a dozen or a score generations back the pedigree, if they have any, runs back into the American woods, and yet here is a pig, bought in England at a high price, that two or three generations carries him back to the "progenitor of the race."

To the American breeder the future looks bright. If we keep our sheep and swine pure; if we weed out vigorously; if we keep accurate records, and breed for definite, correct and useful objects, it will not be many years before we shall not only have a great demand from our own widely-extended land, but from Europe, Asia and Australia, and that at prices which will liberally compensate us for all our skill, labor and patient waiting. We shall not be able to make as fine a display in the show-yard, but our animals will be far more valuable for the purpose of improving common stock than those which are more promiscuously bred, and intelligent farmers and breeders will not be long in finding it out.

We all feel that America is destined to be the greatest country in the world. There is nothing lacking. We have abundance of coal and iron and wood and stone, and so much silver that our creditors are afraid we shall pay our debts with it. We have railroads running in every direction which must depend on agriculture largely for their future dividends. We have a rapidly increasing population, with free schools and the ballot-box for all.

And the taste of our people is for other pursuits rather than agriculture. Those who stick to the farm, study the best methods of cultivation and manuring, and aim to produce the best articles at the least cost would seem to be certain of their reward.

We shall have periods of depression in the future as in the past. But as long as people need food, the farmer is sure of a market for his products. He is sure of a fair compensation for his labor, skill and intelligence.

But this does not satisfy our young farmers. They see their brother and friends winning wealth and distinction in other pursuits, and they ask if there are any prizes to be won in agriculture.

I believe there are in farming as great and as many opportunities for "doing good and making money" as in any other business of life. We are apt to think that all the past discoveries and inventions have been made. We think that Bakewell, the Collings, Ellman, Jonas Webb, Hammond and others in the past have so improved on cattle and sheep that there is nothing more for us to do except to retain and perpetuate the improvement. There cannot be a greater mistake. Notwithstanding all that science and art have done, the production of flesh, meat and fat is still a very costly operation. To convert the carbon of grass and corn into the carbon of fat and butter we have at present to submit to a great loss. Even with our best breeds of cattle and sheep, our most experienced feeders have to submit to a loss of at least ninety per cent. of the albuminoids of the food. In other words if you feed a steer or a sheep a quantity of grass and grain containing 100 pounds of nitrogen, you rarely get in the growth of the animal consuming the food an amount of flesh, skin, hair and wool containing 10 lbs. of nitrogen. The other 90 lbs. are to a large extent used to "run the machine." Is there no chance for improvement here? We have the experience of the past and the science of the future to aid us. We have not to grope our way in the dark as Bakewell did. We know what we want and in what direction to look for it. Depend upon it, we shall yet have breeds of cattle, sheep, swine and poultry far superior as meat, milk and wool producers to anything the world has yet seen. There are great opportunities for the young farmer of the present and the future. We have in this country seen a single cow sell at public auction for over \$40,000; and I suppose it is a fact that the late Mr. Hammond refused \$30,000 for one of his rams. In one of the northern counties of New York, where the thermometer goes down 40 degrees below zero, an American breeder had a choice herd of Short-horn cattle. An English breeder purchased part of the herd at a high figure by telegraph. And only a few days ago an American breeder "cabled" to a brother breeder in England and bought his entire herd of thoroughbred Berkshire swine. A few lbs. of potatoes have been sold for \$500, and the seed of a well-bred tomato for a much higher sum. In England the offspring of a Yorkshire sow was sold for money enough to build a church, and in this country a breeder of Essex pigs has done nearly as well. The purchaser of a single pair of pure-bred Essex swine has sold pigs for over \$10,000, and has a large herd left. And there is a real substantial basis to all this. A good, pure-bred boar when put to common sows will get pigs that at five weeks old are certainly well worth \$1 a head more than common pigs; and such a boar as can be often purchased for \$20 or \$25 can directly increase this additional value to at least a thousand pigs. The breeder who sells him for \$20 gets pay for his skill and labor, and the purchaser and his neighbors obtain even still further profits. There are, therefore, prizes—grand prizes in agriculture, and they are obtained, not at the loss of some one else, but to the benefit of all concerned.

AMERICAN LIVE STOCK.

By L. F. ALLEN.

The subject on which your executive committee has invited me to address you, viz, "Our live stock interests, in their history, condition, and prospects," is far too broad in its scope to be compressed within the limits of an address on an occasion like the present. Indeed, it can only be treated in a manner suggestive, rather than practical, or even historical.

The history of the live stock of the United States, from the first settlement of our Atlantic seaboard to its present wonderful expansion to the shores of the Pacific, would be almost a history of the people themselves, so close has been the association of their domestic animals with the fortunes of the agricultural population. The limits of this paper will only allow me to touch on the introduction of our domestic animals, and follow them briefly for about two hundred and fifty years of progress into their present condition and prospects for the future.

It is a very broad subject—the entire category of our farm-stock—embracing the nobility of the horse; the utility of the ass, and the hybrid offspring of both, the mule; the branches of the bovine race: the cow for milk, the ox for labor, and the bullock for beef; the sheep for its flesh and wool; the swine for flesh, lard, and oil; not omitting poultry, and even the "little busy bee," which contributes to our household comforts and luxuries. You will therefore excuse the brevity of my remarks in each department, as any questions suggested may more fully be studied by reference to the many able works devoted to different branches of this interest.

First in order may be mentioned.

THE HORSE.

His domestic history is coeval with that of mankind. He has contributed in no small degree to man's civilization. The most ancient of human annals, both sacred and profane, have eulogized him. His prowess has been extolled in histories of war; in domestic servitude his indispensable labors have been gratefully acknowledged; in luxury he is an indispensable agent, and altogether the noblest animal ever under human control.

The first introduction of the horse to the vast territory now comprising the United States of America was in all probability made by the Spaniards on the coast of Florida, some years previous to the settlement of the early English and other European colonists on our Atlantic shores. History gives us little or no account of the breeds and characters of those early importations. The Florida Spaniards came out chiefly as gold hunters, and what horses they brought with them were in all probability of the Andalusian or ordinary Spanish race, which were for many centuries bred by the Moors in Spain, and subsequently by their Castilian conquerors. Those horses were small in size, good in draught and under the saddle, hardy in constitution, and capable of undergoing great fa-

tgline with negligent treatment; in fact the most useful class of animals for them and their successors. Without much, if any, improvement, they now plentifully inhabit Texas, California, New Mexico, and Mexico proper. They do not really belong to the class "American horse," as we now understand that classification.

The settlers on our Atlantic coast, beginning about the year 1616, brought out the horses of their own native countries; Holland, Great Britain, Ireland, Sweden, Denmark, France, and Germany being thus laid under contribution. Great variety of character was thus introduced, and as their importers were men of narrow means, the animals were probably not of the choicest kinds, either in blood or quality, but very useful in the rude agriculture of the time. As these horses shared the hardships and privations of their owners, no marked improvement could be effected until the introduction of superior animals by later immigrants.

As the colonies grew in population and strength, attracting increased attention from the English government, under which they were all ultimately combined, immigrants of wealth, official dignitaries, and army officers brought out many valuable horses, some few accounts of which date back to the year 1700. Among them were choice specimens of the draught variety, as well as saddle-horses; but the roadster, as we now know him, was then undeveloped, from the lack of good roads and light vehicles. Within a few years, however, after 1700, several fine blood horses of both sexes were known to be imported into Virginia, New York, and other States both north and south, many of the earlier and later immigrants of those States being great admirers of horse quality. These later importations were closely interbred and widely distributed, and crossed on the common mares of the country. Thus a rapid improvement was made in the style and appearance of our horseflesh generally, as well as in their superior utility and value. So marked was that improvement that at the outbreak of the revolutionary war our military officers were usually equipped with horses of superior blood, quality, and action. Indeed many of the brilliant achievements of our revolutionary army owed a share of their success to the thorough mounting of the cavalry, and the excellence of the horses ridden by the commanding and staff officers of the foot divisions and corps.

Recovering from the calamities and poverty of the war, as the circumstances of our people improved, the study and cultivation of their horses rapidly increased, and the earlier years of the present century produced many animals which, in high breeding, style, and execution of their work, equaled those of any other country, either on the race-course, under the saddle, in the harness, or the draught.

A brief notice of the various classes of horses now in approved use and cultivation among our American people may be germane to the subject; and first in order may be named the

ENGLISH THOROUGHBRED, OR RACE-HORSE.—As originally introduced into the American colonies, and since continued in our States, he has been the foundation of the highest excellence yet developed for all ordinary use, aside from the heavy and slower draught. About two hundred years ago, during the reign of Charles II, the race-course first began to attract the attention of the nobility and other wealthy aristocracy of England, and it has been continued down to the present time. As a consequence, speed, bottom, hardness and endurance were the qualities chiefly sought in the development of the race-horse. For centuries previous they had fine horses in England, yet they needed improvement, if possible, and choice selections were made from Egypt, Arabia and the Barbary states for stallions, and sometimes mares, to infuse

their good qualities into the English blood. Many crosses of foreign stallions were made on the native English mares, and no doubt decided improvements were derived from their use, but, after all, the size and more muscular qualities retained by the descendants of those crosses were mainly of the original English character, and have been perpetuated both in England and America to the present day.

Late in the last century, and occasionally down to recent years, we have received importations of choice stallions from Asia and Africa, near the Mediterranean coast; but in justice I must remark that although some of them were of the highest symmetry in form, action and appearance, yet when crossed upon our well-bred mares, a superior impress on their descendants, except in few instances, has not been eminently noticeable. Did time permit, I might go into particulars within the limits of my own observation, but the fact must remain with only a general remark of its truth. Whether the thoroughbred horse in the United States has been kept up to the standard of excellence at which he has arrived in England, or improved beyond him, an instance or two may determine. I have been unable to learn the best running time of the race-horse in England, and therefore a current comparison between the speed of the American and English horse cannot be made.

In the great national four-mile race of three heats, on Long Island, N. Y., in the year 1823, between the stallions American Eclipse, bred on Long Island, N. Y., and Henry, bred in Virginia, the first heat was taken by Henry, by a head only, in 7 minutes 37½ seconds. The other two heats were taken by Eclipse in 7 minutes 49 seconds and 8 minutes 14 seconds, yet it was never exactly known what was the very best time Eclipse could make, only when matched with a nearly equal competitor, as he was called a lazy horse, and bore the whip freely.

The Kentucky-bred stallion, Lexington, on the New Orleans four-mile course, in the year 1854, won his race in 7 minutes 19½ seconds.

Fellowcraft, also a Kentucky-bred stallion, won a race on the four-mile course at Saratoga, in the year 1874, in 7 minutes 19½ seconds. These are the two shortest races ever made, so far as records are given, thus leaving the American thoroughbred the peer of any others in the world.*

We may well suppose that the superiority of the thoroughbred horse in the combinations of speed, action, wind, bottom and fineness of proportions has been fully determined, and that an infusion of his blood would be sought and worked into a large class of our miscellaneous-bred horses for other purposes than the race-course, or simply the gratifications of taste and pleasure. Among the most notable class of the thoroughbred crosses upon the better ones of miscellaneous character, is

THE AMERICAN TROTTER, which we claim as solely an American production, within the last forty years, in the highest development of his speed.

A detailed history of the trotter would require many pages, for which no time can here be allotted, and the horse literature of the country only can give it. Suffice it to say, however, that his descent has been largely drawn from the thoroughbred for many years back in his ancestry.

Trotting horses of celebrity have been recorded in the English periodicals of years ago, particularly Bellfounder, who trotted 19½ miles in an hour; but in the trotting horse, classed by himself, England, as compared with America, has yet made no distinguished record; and that the American trotter has been most skillfully bred and trained to his recent astonishing achievement.

* Since the above sentence was written, the horse Tenbroeck made a race at Louisville, Ky., in 7 minutes 15½ seconds, beating Fellowcraft 3½ seconds.—L. F. A

ments is a testimonial to our native enterprise beyond that of any other country. Thirty years ago, a horse that could trot a mile in three minutes was considered a remarkable animal. That three minutes has been gradually reduced from year to year, until, in 1875, the mare Goldsmith Maid, at eighteen years of age, made her mile in 2 minutes and 14 seconds, and repeated it in the present year, 1876, in the same time. We now have scores of horses which make their mile in less than $2\frac{1}{2}$ minutes on the trotting courses of the country, as well as hundreds of them who easily do their mile in 3 minutes speed. Thus the American trotter stands at the head of his class over all others in the civilized world, as yet discovered.

If it be inquired in what remarkable manner the rapid speed and high qualities of the trotter have benefited the ordinary horse stock of the country, the answer is readily given in the fact that our better class of driving horses has been wonderfully improved in action, as well as in quicker movement, sureness of step, higher pleasure to all who either drive or ride after them, and in the increased marketable price they obtain for their breeders.

Next in order we may remark, in the absence of a more appropriate name, upon

THE HORSE OF ALL WORK, equally adapted to family use, the labors of the farm, or other purposes. I doubt if any part of the world, climate and soil considered, can show a better class of horses than those bred in the United States and the neighboring province of Canada. Made up of no particular breed, but an infusion of different bloods, they answer an admirable purpose for almost all uses, so far as size, endurance, muscular action, and longevity are concerned. A composite breed they may be called, if such a miscellaneous admixture can be called a breed at all. They are of all colors and all sizes, from fourteen and a half to sixteen and a half hands high, and weigh nine to twelve or thirteen hundred pounds in fair condition of flesh. They are bred and reared by all good farmers who make horse-rearing a branch of their industry, and are bought and distributed all over the country, in village, town and city, where, aside from mere fancy use, the horse is needed. Good stallions are kept for service in almost every neighborhood of the land, and of these the horse-breeder takes his choice for service to his mares, and succeeds in their production as his skill and care may determine. There is another example of the value of our horse of all work in Great Britain, which can boast as good horses, of their kind, as any part of Europe. Since the street rail-car has been introduced into Great Britain, within the past year or two, it has been found that they had no class of horses especially fitted for that work. It required the sinewy, elastic movement, coupled with the medium size and endurance in our all-work horse. As a consequence, many hundreds of American horses have been purchased in our Northern States and Canada for export to Britain, for other purposes as well as for street railways, and the trade is still continued to the mutual advantage of both countries.

Another class demanded for exclusive purposes is

THE DRAUGHT-HORSE, PROPER, needed for heavy farm labors, and drawing the weighty loads in our commercial and manufacturing cities and towns, for which the ordinary horse of our farmers is incompetent. Of this class, if we have any which may be called "ancient" among us—say a hundred years or more—first in order stands the *Conestoga*, of Pennsylvania. The name is a local one, taken from a river of the central part of that state. He is supposed to be a native of Flanders, and to have been introduced by the German immigrants soon after they settled in Pennsylvania some time in the

last century. This horse is still reared in Pennsylvania, but in smaller numbers than formerly, and in several other states, and is a decided favorite with those who breed and use them. Nearly or quite a hundred years ago, when the settlements of that state had extended westward over the Alleghany mountains, when towns began to spring up, and heavy transportation between them and the seaboard became necessary, the huge canvas-covered wagons, carrying six tons and upwards of merchandise, were drawn by spans of four to eight horses, with sometimes a ninth one in single harness as a leader. Those horses ranged from sixteen and a half to seventeen and a half hands high, with bodies solid and bulky in proportion. Long before canals and railroads were known in our country, caravans of those teams were daily seen at all seasons of the year traversing the roads over the mountains between Philadelphia and Pittsburgh, and with bear skin housings upon the hames, and an arch of bells above them, with the driver seated on the near wheel-horse; a more picturesque spectacle of the kind could rarely be imagined. Their usual rate of travel was about twelve to fourteen miles a day. But those caravans, since the construction of railways, have mostly passed away, and the descendants of the stately teams are now devoted chiefly to agricultural uses, and the drays and wagons in the cities. It is doubtful if a better class of heavy draught horses than they have ever existed. It is claimed by some writers that the *Conestoga* has been bred to his high degree of excellence by crosses of the thoroughbred English horse, but without sufficient evidence of the fact, as for the last seventy years he has developed no trait of the blood-horse in his composition, and in his characteristics has adhered solely to the type of his original progenitors.

Other foreign breeds of the draught horse of decided excellence have in later years been introduced among us, and are much approved. Among these may be named, in the order of introduction, the *Clydesdale*. This horse is of Scottish descent, of the largest size, seventeen to eighteen hands high, with a ponderous body, stout limbs, hairy at the fetlocks, of high and noble carriage, and unsurpassed in weight and strength. They occasionally reach a weight of seventeen, even eighteen hundred pounds. They were first introduced by the Scottish farmers in to Upper Canada, where they have been bred in considerable numbers and are still annually imported. There have been also some direct importations from Scotland to the United States. Many of the Canadian importations have found their way into several of our states, where, for heavy agricultural and other draught, they serve a valuable purpose.

The *Suffolk Punch*, so called, is a draught horse of English breeding and descent. He is of large size, but smaller in bulk and stature than the *Clydesdale*, somewhat similar in style of body and limb, but without the hairy fetlock. A few of them have been imported into Canada and the United States, but have not yet acquired the popularity of the *Clydes*, although of decided excellence and a model of their kind.

There are two other classes of draught horse introduced into our country, somewhat similar in character and probable descent, and may be classed in nearly a parallel category.

The *Normans* may first be named as earliest in importation. They are natives of France, not of like style altogether with the draught horses already named, as they embody more speed in action, with great strength of limb and power of locomotion. They are largely worked in the heavy diligence traveling carriages of France, which they move at five to eight miles an hour on the roads, holding a good trotting gait. They are also used for drawing heavy loads in the cities and towns and in agricultural labor. Their

usual size is sixteen to seventeen hands in height, compact in body, symmetrical in shape, clean in limb, hardy in exercise, and enduring in labor. The stallions have been of decided service in crossing with our mares of "all work," as well as in breeding with mares of their own kind; for the mixed uses to which they may be applied are a valuable addition to the horse stock of the country.

Next to and partially associated with the Normans, may be named the *Percherons*. As a rule, they are somewhat larger in size. They are also natives of France, and applicable to the same uses as the Normans, and of equally good shape, style and appearance. They have been considerably imported into several of our states, of late years, and received with approbation among those who need a beast of their kind. They may be pronounced a decided acquisition, and it is to be hoped that the enterprise of their importers may be liberally rewarded. From the numbers of both sexes now here, a healthful production of their kind, both in general excellence and purity of blood, may be anticipated.

Nor in our horse category should the lesser, and even diminutive *Pony* be overlooked. For a century or more past they have been imported into the United States, of different character and style, from the Welsh and English pony of twelve to thirteen hands, down to the diminutive little Shetland from the northern isles of Scotland, of three feet or less in stature. They are usually symmetrical in shape and appearance, of wonderful strength, docility, hardness and endurance. Although of little use as laboring beasts, they minister largely to the pleasure of our families, are the delights of our children, and worthy of attention and propagation as innocent promoters of luxury and enjoyment. Under proper care and attention they thrive as well in America as in the countries from which they came to us.

THE ASS.

This useful and indispensable animal—useful in mule-breeding as well as in the propagation of his own species—is among the most important items of our farm stock, and worthy of a discriminating notice. On the Eastern continent their utility is of as ancient date as that of the horse, and among many nations and people their labor is indispensable. They were early brought into our American colonies, and from their first introduction until some years of the present century were widely used in the Atlantic, Northern and Middle States for the propagation of mules for the West Indies and our southern domestic markets. Since about the year 1820, mule breeding and rearing in the Eastern States being superseded by the cheaper facilities for producing them in several of the more western states, the ass has ceased to be either an article of breeding or commerce where they were first imported, and is now rarely known within their boundaries. Yet in the localities where now most used, he has been improved both in size and quality. Numerous importations have been made during the last seventy years, from Spain, Malta and other adjacent countries, of the best blood of his race, and their produce, bred on the females of American stock, have so improved them that we can now exhibit the domestic ass as equal, if not superior, to those of any other country. Would time permit, we might even go into particulars, to prove our assertion, but it must now suffice to state the fact in general terms. With us he is rarely used as a laboring beast, his services being superseded by the mule, as our country is happily free from that low class of labor in which his drudgery is needed.

THE MULE.

The origin and history of this peculiar animal is almost as ancient as that of his progenitors, the ass and the horse. He has ever been

useful in the industries of the people of many nations, both ancient and modern, and to the development of certain branches of our American agriculture, traffic, and commerce he is widely appropriated and indispensable. The early mules of the Eastern States were small in size, seldom attaining a height of more than fifteen hands, and usually less, yet of great strength in labor, endurance, and longevity; but the western mule has far exceeded him in size, weight, and adaptation to the heavier work demanded of him. It is now not uncommon to find him sixteen, even seventeen hands high, with a body in proportion, and frequently a comeliness in form exciting the admiration of those who are partial to his employment. His uses in the various labors demanded of him are so well known that it is unnecessary to name them; and in comparing him with the mules of other countries, it may be truthfully said that the American mule has no superior, and but few equals, and thus constitutes an important staple of our agricultural wealth. A proper history of the progress and present condition of either the American ass or mule has never yet been written for publication other than in detached scraps or pamphlets, yet they are subjects well worthy the employment of an able pen, and it is hoped that such a labor will be undertaken by some one fully competent to its execution.

AMERICAN CATTLE.

To give a history of the rise, progress, and present condition of this important department of our industry would be to write an elaborate book, the like of which was written some four years ago; but it has fallen, I fear, too seldom under the notice of those whose interests would be promoted by its perusal, even under its shortcomings and imperfections. However that may be, I shall briefly, yet as accurately as my observation may allow, give some notes and suggestions on their very wide importance. Neat-cattle, in the sense usually understood with us, or, more strictly, animals of the bovine race, were introduced into our Atlantic States soon after the first settlers came over from Europe. Those settlers brought with them animals reared in the vicinities from which they themselves came, of various nationalities. Their cattle were of no particular breeds or distinctive names, that we have learned, but such as served the wants of the settlers in the production of milk, the propagation of their kind, their meat for food, and their labor for agriculture—animals of a common order only, as improved breeds in those days had not received much attention in the countries from which the immigrants came. Anterior, however, to the colonial settlements in what are now the United States, the Spaniards had introduced many cattle from their own country into the territories of Mexico and further south, and in the broad, luxuriant pastures of those regions they multiplied into numerous herds, with little attention to their improvement, as they are now found and known; but of late years, since the annexation of Texas, New Mexico, and California, they have become quite an article of commerce and consumption in other states.

In nearly all the grass-producing or grazing portions of our older states, as the people progressed in their modes of agriculture, their cattle, increased and multiplied, were usually well cared for, and answered all the purposes demanded of them. In some sections of the country they were better cared for than in others, and possibly improved in quality over the originals from which they sprung; yet as the settlers, after some years, began to migrate to different localities, taking portions of their herds with them, the cattle became intermixed with those derived from other nationalities, so that in process of time a general intermix-

ture took place, and the name "common cattle" was only known in their application. This name is now continued to distinguish them from the improved breeds of later years.

Occasionally, and at different times in the last century, tradition has informed us that enterprising men of wealth had imported some choice cattle of "improved" blood from Europe—the names of the breeds not remembered—but they were so few, and so little attention was paid to their propagation in their own distinct lines, that they soon became amalgamated with the common stocks. Yet that the infusion of their blood among the others to some extent made their progeny better than the older herds we have good reason to believe, particularly as the working oxen of the Eastern States, and their superior dairy cows, for some generations past, have been held in high estimation. This assertion may, however, be qualified by saying that the oxen were chiefly used in labor on the farms, and the dairy formed a considerable staple of their agriculture; consequently drawing closer attention to the cultivation of their cattle. In the more fertile soils of the Middle States, which were chiefly grain growing, horses were used for labor and cows in the dairy mainly for domestic consumption, while the steers and bullocks grown by them were for meat purposes, or, if for labor at all, only for a few years, until the forests were subdued and the land made clear for horse cultivation.

BREEDS OF CATTLE.

Of improved cattle we now have several valuable and distinct varieties. A few remarks on each of them must suffice; and first in order, as they are by far the most numerous in attracting the attention of our farmers, breeders, and graziers, I name the

SHORT-HORNS.—Soon after the revolutionary war, and previous to the year 1800, a few animals of this breed were imported by two different Englishmen into the city of New York. The fact of their importation is the chief thing known about them, as only a few results are now recognized from their breeding. One of the imported cows was taken back to England—"the American Cow," so called, of the English Herd-Book—from which, afterward, many noted and valuable animals descended. About the same years, also, two different importations of cattle, supposed to be Short-horns, were made from England into Baltimore and taken to the valley of the south branch of the Potomac River, in Virginia, and from there, within a few years afterward, some of their descendants were driven to the blue-grass region of Kentucky, where they were carefully propagated, and in after years, crossed by bulls of still later importations, became an important item of the cattle-wealth of that state.

We hear of no further Short-horn importations until after the war with England, in 1812-'15. Soon afterward, several importations of them were made into New York, Massachusetts, Kentucky, Maryland, and Pennsylvania. They were industriously bred by their enterprising owners, and the valuable qualities of their own distinct blood, and the improvement through their crosses upon the common cows of the country for most useful purposes, soon gave them a popularity and dissemination attained by no other breed, and since followed by numerous importations into many of our states and the Canadas. They now stand largely in excess of numbers over all other foreign breeds put together. The various merits of this breed it is not now necessary to discuss, as different opinions may be entertained regarding them, but the fact may be stated that their recorded pedigrees in the Herd-Book now number more than 60,000 well-bred animals, and at the present time they are increasing more rapidly than at any previous period in their history.

DEVONS.—This is a strikingly distinct breed in form and quality, medium in size, uniformly red in color, comely in appearance, and of decided excellence; the ox for labor, as his agile form indicates; the cow for milk, when cultivated for that object, and the uniform excellence of their flesh when properly fed and matured. Nor can there be any doubt of the original distinctive blood of the Devon. Their advocates in England claim them to be as ancient in blood and descent as the Roman rule in that island, many hundred years ago; but by what evidence, other than in their peculiar style of form and character, is not known. That animals allied to them in blood were brought to America from England so long ago as in the seventeenth century is altogether probable, as many of the native New England cattle, for many generations back, have borne strong resemblances to the Devon in some of their characteristics.

The first authentic knowledge we have of thoroughbred Devons being imported into our country was in the year 1817, by Messrs. Caton and Patterson, of Baltimore, Md., and in the next year by the late distinguished statesman, Rufus King, of Long Island, N. Y. By those gentlemen they were bred and cultivated, and herds from them considerably disseminated in different sections of the country. Later importations of them have been made into Maryland, Massachusetts, New York and some other states. There are now several fine herds of them existing in different sections of the country, but, we regret to say, not in the numbers which their good qualities should command, but of excellence quite equal to the original importations. It is hoped that they will still further increase, until they become numerous among the standard breeds of our country.

HEREFORDS.—Next in order of improved cattle this breed may be named. The first distinct account we have of thoroughbred ones of the kind were an importation by the great Kentucky statesman, Henry Clay, in the year 1816. An ardent admirer of fine stock, he saw them in England in 1815, and purchased two pairs of bulls and cows, which afterward came out and were placed on his farm at Ashland, near Lexington. Whether any or what number of thoroughbred produce came from them, we are not informed, as no record was kept, and they are not now known in Kentucky. The bulls were bred to some of the native cows in their vicinity, but the Short-horns, which were imported there soon afterward, superseded them in propagation, and we hear nothing further of their produce.

About the year 1824, one or more Hereford bulls, and perhaps a cow or two, were imported into Massachusetts. We hear of no thoroughbred produce from them, but the bulls were bred to a limited extent on common cows, and no marked result followed, except some grand working oxen, afterward fed into excellent carcasses of beef. In later years, a few importations of choice animals were made into New York, Ohio and Upper Canada. Their descendants have been scattered in small herds into several states, but, we regret to say, not with the popularity which such excellent grazing and beef-producing animals merit. As flesh-producers they strongly rival the Short-horns, and in size nearly equal them. They are mainly red in color, with white or mottled faces, and occasionally white legs and bellies, and stripes along the back. In England they are claimed as an ancient breed, and their distinctive uniform appearance well bears out the assertion.

The three English breeds already named may be classed as the best flesh-producers.

Next in order may be named the breeds more distinctly used for dairy purposes: the

AYRSHIRE.—This is claimed as a dairy or milking breed, and wherever known, either at their native homes in Scotland, or in their later ones

in the United States, are esteemed and cultivated for that exclusive purpose. They are said, by authentic history, to have been originated about a century ago in the district of Ayrshire, whence the name was taken, by a cross of Short-horn bulls from the north of England on the common or native Kyle cow of Scotland, and cultivated into their present excellent dairy qualities by careful and persistent breeding, until their characteristics have become fixed and enduring. They were first imported in small numbers to America between the years 1820 and 1830, as nearly as can be ascertained, and within the last thirty years in such numbers as now to be found in many considerable herds. They are highly esteemed by those who are partial to them for their large yields of milk, which render them much more profitable for dairy uses than the common cows of the country. In size they are about equal to our common cattle; in color, usually red or brown, more or less mixed with white; in shape, more like the Short-horn than any others, although lacking their fine contour and comeliness of appearance—a valuable breed of cattle.

HOLSTEINS, OR NORTH HOLLANDS.—This breed, in its present characteristic of great milk-producing quality, has been introduced here within the last twelve or fifteen years, from Holland, and first, we believe, imported by the late Mr. Chenery, of Boston, Massachusetts. They are of large size, nearly equal in bulk to the Short-horn, and have some of their strong points of character, but coarser, less refined in figure, and black and white in color. For the few years in which they have been on trial here, their dairy development has been remarkable in the *quantity* of their milk. As a flesh-producing beast they are claimed to be good, but the economical result in their consumption of food to weight of flesh has not been thoroughly solved. They are unquestionably good cattle, far superior to our native cows; and when sufficient time has passed to develop their full qualities, they may stand in the first class of dairy cows. They are evidently of an ancient stock, originating possibly in Holstein or North Holland, and may in some branches of their ancestry have had an affinity with the far-back, unimproved Short-horns, although in color and general appearance now much unlike our Short-horns of the present day.

Last, but not least in importance, may be named the

ALDERNEY, JERSEY, AND GUERNSEY, from the Channel Islands of Britain, near the coast of France. These breeds or varieties are named together, as they are unquestionably of common origin, and owe their present distinctive qualities in appearance to their manner of breeding, and the tastes and preferences of their long-time propagators. That they are an ancient breed there can be no doubt, probably French in origin, as the cows of the provinces of Normandy and Brittany bear a considerable resemblance to them; but isolated as they have been from the mainland of the continent during the centuries of their cultivation on the islands, they have assumed the characteristics which so readily distinguish them. In size they are smaller than our native cows, delicate in form, unique in shape, diversified in color, and blood-like in appearance. The prime quality claimed for the cow is the exceeding yellow color and rich quality of her milk, cream, and butter, in all which she stands without a rival, although her quantity of milk is moderate, compared with the weight of butter which it yields. For the production of meat the channel Island cow, or even bullock, (whenever suffered to become a bullock,) is inferior, the anatomy being angular, and not capable of making much flesh in the choicest parts of the carcass. Within the

last thirty years they have been numerous imported into our States, and are much sought in the vicinities of our large cities, towns, and villages as family cows. They are easily kept in small paddocks or close stables, where their rather delicate natures can receive the attention, kind treatment, and choice food usually bestowed upon them.

For all these improved breeds herd-books containing their genealogy, by way of pedigree, are kept in the United States, as well as in their native countries, and from them a full knowledge of their descent and blood is readily obtained by all who choose to inquire into their breeding. Prices might be quoted of the sale values of several of these breeds of cattle—some of them seemingly extravagant in amount—but such statistical reference is not demanded in this limited discourse, rather leaving it to the tastes, judgments, and fancies of those interested in their breeding. The introduction of these improved breeds has added enormously to the value of the neat-stock of our country, and their further dissemination is yet to add untold millions to its productive agriculture. Slow as farmers, cattle-breeders, graziers, and dairymen have proverbially been in the improvement of their herds, a rapid and more intelligent interest is every year manifested in their increase.

In addition to the breeds of cattle already named may be a few others of foreign origin introduced at different times by way of experiment or personal gratification; but as they have taken no strong hold on the attention of our stock-breeders, a further notice of them may be omitted, while in the grand specimens of the various breeds which have been mentioned we may assert, without contradiction, that no country in the universe contains better herds than the United States of America can now exhibit.

The subject of our neat-cattle can hardly be dismissed without an allusion to an important item of their increasing value in *fresh beef exportation*, which has recently been developed by the demand for fresh carcass meat from abroad, particularly in Great Britain. Refrigerators have been fitted up in Atlantic steamships, and, by the aid of ice, many tons of beef, in quarters of the carcass, have already been, and unlimited tons more may continue to be, transported to Europe with entire safety, and in perfect freshness. The prices for which it has been sold in the London and Liverpool markets have proved equal to those for the best qualities of their native beef, and profitable to the shippers. There is, however, a condition attached to our successful exports, which is, that the meat be of the best quality, and that quality can only be obtained from animals of improved breeds which have been partially described. We have only to proceed in the cultivation of those breeds, in order to add a wide, almost illimitable, field of production to the neat-stock interests of our country.

SHEEP.

These were early introduced into our American colonies as companions of the horses and cattle brought by the settlers. They were of the kinds then common to England, Scotland, Ireland and perhaps the western coast of the European continent, of various breeds, as they then locally prevailed, but without much merit, other than a tolerable carcass of ordinary flesh and a moderate fleece of coarse wool. They were so kept and propagated, with possibly an occasional importation of a better kind from England, but it was not until late in the last century that Bakewell, Ellman and other enterprising breeders made their experiments in different breeds which resulted in any considerable improvement in their condition and appearance. Thus the

American sheep were chiefly of an inferior character

MERINO.—In the early years of the present century the American ambassadors at the courts of France, Spain and Portugal, during the intense commotions of the Bonapartean wars, purchased and shipped to the United States many hundreds of Spanish Merino sheep. They were of the fine-wooled varieties, named as you will find in our books on sheep husbandry. Their introduction here was hailed with great satisfaction, and as our infant woolen manufactories were then just emerging into existence, great importance was given to their propagation, not only in their own purity of blood, but as valuable crosses on our common flocks in increasing and refining the qualities of their wool. From those days forward to the present time the cultivation of the better qualities of wool has been the study of numerous flock-masters in various parts of the United States, suitable to their rearing, and the sheep interest now presents an important branch of our agricultural production and wealth. The Spanish Merino has evidently been much improved in its American cultivation, not only through the crosses of more recent importation by several of our enterprising Americans from the royal flocks of France, Saxony and Silesia, upon the earlier Merino ewes, but by our own flock-masters at home, so that at this day no fine-wool sheep in the world excel, and few equal, the *American Merinos* in the heavy products of their fleeces, or the size and stamina of their bodies. We might examine the statistics of their annual production aggregating millions of dollars in value did opportunity permit, but we may rest content with the general facts which have been stated and the progress we have made in their cultivation, not only in the fine wool but in the other varieties.

THE COARSER-WOOLED MUTTON-SHEEP, so successfully bred in England during the last seventy years, we have for the past thirty years adopted by frequent importations. They have been successfully propagated in their own purity of blood, and by their crosses on the common flocks raised our inferior ones to a value hitherto unknown in their kind. We have now the Bakewell, or Leicester, the Cotswold, and Lincoln, all of the most valuable long-wool varieties. We have also the Southdown, the Shropshire and Oxford Downs of the middle wools, abundant in fleece, massive in the quantity and delicious in the excellence of their flesh, so that Americans may, within the next decade or two, become, as they have never yet become, a partially mutton-consuming people, and ship thousands of dressed carcasses to Britain, as is now done with our fresh beef.

SWINE.

In the category of other domestic animals brought into our country with the early immigrants came also this animal indispensable for domestic consumption, constituting an important item in our exports abroad. From the earliest history, swine have been connected with farm-husbandry, as well as untamed rangers of the forest, in which latter condition they even now exist in some of the uncultivated sections of the Eastern continent. To what degree of perfection, or even improvement, they were cultivated in ancient times, history gives us little or no account; but we do know that for many years previous to the present century, and for some years since, the common swine of the United States were inferior in the quality of their flesh, ungainly in form, slow in arriving at maturity, and repulsive in almost every phase of their character as companions to our other agricultural stock. Yet in Eastern Asia, and in portions of Europe, perhaps for a century or more past, considerable advances had been made in the improvement of their domestic swine, as a

few years after the revolutionary war, importations of improved animals of the kind were introduced into our country, and among them we have accounts that General Washington had some of them which were sent over as a present to him at Mount Vernon, from England. Early in the present century, also, the East India merchants of Massachusetts and New York imported some fine specimens from China and India, which were afterward considerably crossed on the common stocks of our Eastern States, and much improved them both in the qualities of their flesh and domestic habits. Still, until within the last fifty, or even forty years, the mass of our farmers throughout the country, and more particularly in the Western States, bred and reared swine of ordinary character, answering, to be sure, the main requirements of consumable flesh, but inferior in its high condition to that now found in our markets, either for domestic consumption or exportation.

The various foreign breeds to which we are indebted for our present swine improvement are too numerous to mention, and their history in detail, though quite interesting, is too long to narrate, but the agricultural literature of our several states will fully inform all inquirers of their various progress and present status. As an evidence of the present interest in their production and improvement, an association of swine-breeders has recently been formed, whose headquarters are at Springfield, Ill. They have issued a swine herd-book for the Berkshire breed, after the style of the various cattle herd-books, in which their genealogy and high excellences are chronicled. Not that we would exalt this particular breed above others, perhaps equally meritorious, but to signalize the enterprise of our farmers, and the magnitude of the pork and lard-producing interest of our country amounting to hundreds of millions of dollars annually. The swine of the United States now consume a great share of the product of the almost illimitable corn fields of our Western and upper Southern States, thus converting a great portion of that valuable grain into a portable commodity, which, without them, would be either a drug, or an almost inconvertible staple of their agriculture. We may, in view of the progress we have made in swine cultivation and improvement, place the United States superior to that of any other country in the world.

POULTRY.

To descend to a smaller, yet quite indispensable, item of food consumption in our households, as well as ornamental accompaniments of domestic life, the varieties of our poultry may well and profitably be mentioned. They, too, (the turkey excepted) came over with the early settlers of our American colonies, and have been the intimate associates of our people ever since. They constitute an important part of the luxury of our tables, both in their flesh and eggs, the aggregate commercial value of which, were it accurately reckoned, amounts to millions of dollars annually. The poultry literature of our country is voluminous, both in books and various agricultural periodicals, to which those in search of information may readily refer. As a general remark, it may suffice to say that importations from foreign countries, of various breeds of them, have been frequent and of rare quality, both in the estimation of the economist who propagates them for profit, as well as the amateur, for the gratification of his taste in their selection and exhibition. Poultry societies have become numerous throughout the land, and the annual exhibitions of their various specimens have been marvelous in excellence, beauty, and variety. The cultivation of the finer varieties has arrested the attention of men and women of taste, wealth and refinement to such an ex-

tent that the perfection of our poultry may even be classed among the fine arts of animated nature, and challenge competition with any portion of the universe.

Least and last of the domestic creatures which engage our attention may be named a small insect,

THE HONEY BEE.

Time, long before and ever since the bee made its honey in the carcass of the dead lion slain by Sampson, has noted this useful insect in its companionship with man, as well as in its wild habitations in the wilderness, where climate and vegetation favored its propagation. It furnishes us the most luxuriant of sweets in its honey, and an important commodity in its wax. The aggregate annual commercial value of our bee-product is probably hundreds of thousands of dollars, being difficult to determine, from the want of current statistics; yet all who choose to investigate may be assured of their importance. Of bee literature, we have public journals devoted to their interest, many volumes of printed books, and divers essays in our agricultural periodicals; and were I to relate the annals of my own personal companionship with them for many years past, I should only tell you, that at the present day they are both as untamed and uncivilized as when the great patriarch, Noah, let them out of his ark to forage among the renewed plants and flowers at the foot of Mount Ararat. They live, propagate, and subsist by *instinct* alone, and not all the invention or ingenuity of man has been able to improve their qualities, to change their habits, or invite them to a companionable docility. Even the importation of the superior Italian bee into our country in late years, and crossing them on our common stock, has not perceptibly improved their habits. So, lovable as they may be in their sweets and wax, they are barbarians now, as ever, and equally at home in the hollow trunk of a tree in the wildest forest, as in their hives amid the flowers of the field, or the refinements of the most highly cultivated orchard and garden.

Now, gentlemen, in all this long dissertation I have probably told you nothing new, and little which will prove instructive, or even worthy of publication. Yet we have seen that from the rudest material at the beginning of our agricultural settlements we have made decided progress in the breeding and cultivation of our domestic animals, and that chiefly, within the last century. We find that much has thus far been accomplished, and with the aids and lights now at our disposal, we trust a still more rapid and a more widely disseminated progress can be achieved in the future.

The present value of all our varieties of domestic live stock in the United States and its territories may be safely estimated at two thousand millions of dollars, and their annual product of all kinds at one thousand millions more. Full 30 per cent. has been added to the aggregate *per capita* value of our *graded* stock by improvements in their breeding within the last fifty years, and at no increased cost in their keeping, although those improved animals as yet extend over only a fractional part of our country. What then may be the increased measure of value when—if such a thing be possible—that improvement shall embrace the farm-stock of our entire broad nationality? It must be almost incalculable.

In review of this live-stock history and progress which has been considered, I wish here to note, and with somewhat of emphasis, that, with the exception of our finer classes of horses, the breeding, rearing, and cultivation of our farm-stock has been hitherto considered, by those not intimately acquainted with it, as an occupation of a rather vulgar order, and conducted by men of duller intellects than those

engaged in professional, scientific, commercial, or manufacturing pursuits. Such a supposition is a profound and ignorant mistake, based only on an entire misapprehension of the study of animal physiology. The cultivation of domestic animals, and their improvement, through generations of their kind, into the admirable specimens which we now see, is as much a branch of the fine arts, applied to animal physiology, as are the superb specimens of statuary and painting which you to-day witness in these Centennial rooms, produced by the successors of Phidias, Michael Angelo, Raphael, or Claude Lorraine.

Among the improvers of domestic live stock within the last two centuries, both in Europe and America, will be found men of the highest intellect, learning, refinement, position, and wealth, whose studies have been drawn to the development and exaltation of the qualities of their animals. I need not recount the names of distinguished Europeans, past and present, who have lent their influence and labors to that pursuit; nor to Americans, from George Washington, of Virginia, Chancellor Livingston, of New York, Henry Clay, the great Kentucky statesman, and a large number of eminent men of all professions and pursuits, aside from enterprising farmers proper, whose main business has been that of breeding and rearing improved classes of stock—names both dead and living, all too numerous to mention. Nor has the attention of those breeders and improvers been limited to the most valuable classes of stock, but equally so to those of minor commercial value. Women, too, of equal rank and position in society with men, both in Europe and America, may be classed in the noble array of fine-stock improvers—all in their labors benefactors of mankind.

God has appointed our lot in a country of diversified climates, and blessed it with a wondrous fertility of soils. If a due improvement of our advantages be hereafter neglected, on those guilty of that neglect will rest the penalty; and yet, when another Centennial of American Independence shall arrive, we trust that those who then succeed us may rejoice, as we, their progenitors, now do at the present, in a still higher advancement to crown their labors with thanksgiving and gratitude to the benignant Father of Mercies, for the successes they shall have achieved and enjoyed.

AMERICAN DAIRYING.

By X. A. WILLARD. A. M.

[An address before the National Agricultural Congress at Philadelphia, Sept. 13, 1876.]

Gentlemen:—Dairying is of very ancient origin. The manufacture of cheese and butter was known and practiced more than three thousand years ago. In the earliest history of the human race mention is made of cheese and butter, and there is reason to believe that these products were known and used as food many ages before the earliest record of them by the writers of antiquity.

The earliest notice of the manufacture of cheese in the Bible is where Job, complaining of life, says: "Hast Thou not poured me out as milk, and curdled me as cheese?" David was sent to his brethren in the Valley of Elah with this injunction: "Carry these *ten cheeses* to the Captain of their thousands and look how thy brethren fare."

Homer, the grand old poet of the Greeks, makes record of the dairy in the following lines, written nearly a thousand years before the Christian era:

"Around the grot we gaze, and all in view
In order ranged, our admiration drew,
The bending shelves with loaves of cheeses
pressed,
The folded flocks, each separate from the rest."

Julius Cæsar says the principal food of the Germans in his day consisted of milk, cheese and flesh, and he gives a similar account of the Gauls or ancient inhabitants of France.

Allusion to butter is several times made in the Old Testament, but the earliest is in Genesis, in Abraham's time. When he had washed the feet of the angel visitors, and given them a little cold water, it is recorded: "He took butter and milk and the calf which he had dressed, and set it before them, and he stood by them under the tree and they did eat."

Thus it will be seen that the products of the dairy—milk, butter and cheese—have a genealogy that goes far back of the "Doomsday Book." They have a history forty centuries old, and this it would seem must be old enough for the most fastidious lover of "old cheese."

But what must be considered remarkable in this connection is that these products have been regarded in all ages of the world as luxuries, or among the highest types of human food. Abraham set before his angel visitors "*milk and butter*, and they did eat." Now with all due respect for the wonderful progress of this century, and the skill of our "gilt-edged butter makers," can we not reasonably infer that the butter of Abraham's time, fit to be set before the angels, could have been anything less than excellent, and doubtless it was far superior to much of the butter made at this day, which I am sorry to say is hardly fit to set before even the wicked.

But I have proposed to speak to you upon "American Dairying," which at best as a specialty can hardly be considered a century old. Dairying as a specialty was practiced in England and Holland, and in other parts of Europe previous to the 16th century, and the early emigrants to this country must have brought with them the art of butter and cheese making. But previous to the year 1800 there seems to have been no considerable number of dairies grouped together and prosecuting the business as a specialty in any part of America. Most farmers in those days kept a stock of horned cattle—animals raised for beef, for working oxen, with cows for breeding and for producing milk, butter and cheese to supply home wants.

The farming of those days was of a mixed character, nearly every want of the family being supplied from the farm.

In the fall of 1800 a very exciting election was had for President of the United States, the candidates being Mr. Adams and Mr. Jefferson, and to this circumstance are we indebted to a bit of Dairy history. The first really notable affair concerning the dairy that had as yet occurred in the New World. In those days one of the great pulpit politicians of New England was Elder John Leland.

Politics ran high, and the contest between Federalists and Democrats was almost as bitter as that between Republicans and Democrats to-day. Puritan pulpits launched their thunderbolts against Jefferson, the great Democratic leader, charging him with being an infidel of the French revolutionary school. In the little town of Cheshire, nestling among the middle hills of Massachusetts, says Mr. Burrett (to whose history of the affair I am indebted), "a counter voice of great power was lifted up from its pulpit against the flood of obloquy and denunciation that rolled and roared against Jefferson and Democracy. This was Elder John Leland, one of the most extraordinary preachers produced by those stirring times, and he preached such stirring *Jeffersonian Democracy* to the people of Cheshire, that for generations they never voted anything but a "straight Democratic ticket."

Democracy prevailed and Jefferson was elected President, and no man had done more to bring about this result than Elder John Leland of the little hill town of Cheshire, Massachusetts. Besides influencing thousands of outsiders in the same direction, he had brought up his whole congregation and parish to vote for the father of American Democracy. Democracy in those days I fancy, was different from the Reform Democracy of to-day, but be it as it may.

He now resolved to set the seal of Cheshire to the election in a way to make the nation know there was such a town in the republic of Israel.

He had only to propose the method to command the unanimous approbation and indorsement of his people, and he did propose it to a full congregation on the Sabbath. With a few earnest words he invited every man and woman who owned a cow to bring every quart of milk given on a certain day, or all the curd it would make, to a great cider mill belonging to their townsman, Capt. John Brown, who was the first man to detect and denounce the treachery of Benedict Arnold in the Revolution. No Federal cow was allowed to contribute a drop of milk to the offering lest it should leaven the whole lump with a distasteful savor. It was the most glorious day the sun ever shone upon before or since in Cheshire. Its brightest beams seemed to bless the day's work. With their best Sunday clothes under their white tow frocks came the men and boys of the town, down from the hills, up from the valleys, with their contributions to the great offering, in pails and tubs. Mothers, wives and all the rosy maidens of these rural homes came in their white aprons and best cal-

ico dresses to the sound of the church bell, and that called young and old, rich and poor, to the great co-operative fabrication. In farm wagons, in Sunday wagons, in carts and all kinds of four wheeled and two wheeled vehicles they wended their way to the general rendezvous, all exuberant with the spirit of the occasion. It was not only a great glad gathering of all the people of the town, but of half of their yoked oxen and family horses, and these stepped off in the march with the animation of a holiday.

An enormous hoop had been prepared, placed upon the bed of the cider press, which had been well purified for the work, and covered with a false bottom of the purest material. The hoop resting on this formed a huge cheese box or segment of a cistern, and was placed directly under three powerful wooden screws which turned up the massive head block above.

A committee of arrangements met the contributors as they arrived and conducted them to the great, white, shallow vat into which they poured their contingents of curd, from the large tubs of well-to-do dairymen to the six quart pail of the poor owner of a single cow. When the last contribution was given in, a select committee of the town addressed themselves to the nice and delicate task of mixing and flavoring and tinting such a mass of curd as was never brought to press before. But the farmers' wives of Cheshire were equal to the duty and responsibility of the office.

All was now ready for the *coup de grace* of the operation. The signal was given; the ponderous screws twisted themselves out from the huge beam over head with even thread and line. And now the whey ran around the circular channels of the board bed in little foamy bubbling rivers. The machinery worked to a charm. The stout young farmers manned the long levers; the screws creaked and posts and beams responded to the pressure with a sound between a puff and groan. It was a complete success. The young men in their shirt sleeves, and with flushed and moistened faces, rested at the levers, for they had moved them to the last inch of their force. All the congregation with the children in the middle stood in a compact circle around this great press. The June sun brightened their faces with its most genial beams and brought into the happiest illumination the thoughts that beat in their hearts, then Elder Leland, standing up on a block of wood, and with his deep-lined face overlooking the whole assembly, spread out his great toil hardened hands, and looking steadfastly with open eyes heavenward, as if to see the pathway of his thanksgiving to God and the return blessing on its descent, offered up the gladness and gratitude of his flock for the one earnest mind that had inspired them to that day's deed, and invoked divine favor upon it and the national leader for whom it was designed.

When the cheese was well cured and ready for use it weighed *sixteen hundred pounds*; but as it could not be safely conveyed on wheels to its destination, it waited until mid-winter, then it was placed on a sleigh and no one but Elder John Leland could be entrusted with the precious load. He took the reins, driving all the way from Cheshire to Washington, full five hundred miles, receiving testimonials and varying acclamations in the towns through which he passed. Arriving in Washington, Mr. Jefferson received him in state, the big cheese was duly presented and speeches made, and the President's steward passed a long, glittering knife through the cheese, taking out a deep golden wedge, which was served with bread and ale in presence of the heads of Departments, Foreign Ministers and many other eminent personages. It was highly complimented for its richness, flavor and color, and was the most perfect specimen cheese ever exhibited at the White House. Then Mr. Jefferson sent a great golden wedge of the cheese back

to the makers, which they ate with double relish as the President's gift to them as well as theirs to him.

THE OLDEST DAIRY DISTRICT IN AMERICA.

Few years previous to this memorable event a sturdy young farmer from New England, crossed the Hudson and slowly made his way up the valley of the Mohawk, which has been denominated the "Gateway of the Continent." He was the first who began cheese dairying in Herkimer county. He came into the country on foot. He was rich in health and strength. He had eight silver shillings in his pocket, an axe on his shoulder and two stout arms to swing it.

Except along the Mohawk nearly the whole country was then a dense forest. Brant, the famous Mohawk chief, and his bloody warriors had been gone several years, but traces of their pillage and murders were fresh among the early settlers in the valley and along the river. The old Dutch heroine, Mrs. Shell, was then living near Fort Dayton. She was a noted character during the Revolution. Her husband being called out to fight the Tories and Indians, she took her infant to the field and helped her eldest son, a lad, to hoe the corn, with a musket strapped to her shoulder.

The savages in more than one encounter with the Shell family had learned to fear and respect Mrs. Shell. Her aim was steady and her bullets death. When the Indians besieged her log house she fought side by side with her husband all day and all night, battering the guns with an axe as they thrust them through between the logs, and fling upon the assailants until help came from the fort. The house stood on the black slate hills rising near the Mohawk to the north, overlooking a long line of charming scenery. Beyond was a valley and a still higher elevation. Here the sturdy young New Englander picked his land. His strong arms felled the timber over many acres. He built his log house and established his herd upon the soil.

From such beginning sprang the mighty giant that is now stalking over the Continent, dotting the land with countless herds.

From 1800 to 1826 cheese dairying had become pretty general in Herkimer county, but the herds were mostly small. So early as 1812 the largest herds, numbering about forty cows each, were those belonging to Wm. Ferris, Samuel Carpenter, Nathan Salisbury and Isaac Smith, in the northern part of the county, and they were regarded as extraordinary for their size.

About this time (1826) the business began to be planted in the adjoining counties in single dairies, here and there, and generally by persons emigrating from Herkimer county. The implements and appurtenances of the dairy were then very rude. The milking was done in open yards, and milking barns were unknown. The milk was curdled in tubs—the curd cut with a long wooden knife or broken with the hands and pressed in log presses standing exposed to the weather. The cheeses were thin and small. They were held through the season and in the fall when ready for market they were packed in rough casks made for the purpose, and shipped to different localities for home consumption. The leading buyers previous to 1826, were Wm. Ferris and Robert Nesbith, from Massachusetts. Nesbith was a Quaker and had a long face. Ferris, his partner, was of a gay and festive turn, and the fact of their partnership was not known to the dairymen. Their manner of conducting trade was unique and very satisfactory to themselves at least.

First, Nesbith, the Quaker went his rounds visiting every dairy. Putting on a sad lugubrious cheek, he knew how to impress dairymen as to the inferiority of their goods, and to raise serious doubt in their minds as to whether cheese could be marketed at anything like living rates.

Nesbith spoke of the difficulties of trade and the pressure of the money market. He was undecided and not exactly prepared to purchase, though sometimes in exceptional cases he was prevailed upon to buy small lots at low figures. By the time he got through his visitation the dairymen were feeling somewhat discouraged and were ardently hoping to see some other buyer. Then the festive Ferris made his appearance, and his off-hand rushing way of doing business, carried the conviction that he was a reckless operator. His prices were considerably higher than those offered by Nesbith, and the dairymen fell into the trap and sold their goods, wondering if the buyer was thoroughly posted in regard to the markets.

In 1826 Henry Burrell, of Herkimer county, then a young man full of enterprise and courage, having learned something of the markets and the game played by Nesbith and Ferris, "stole a march" on these skillful operators, buying a large share of the cheese at a price above that figured by the Massachusetts firm. He afterwards became the chief dealer in dairy goods in central New York, often purchasing the entire product of cheese made in the United States. He was the first to open a cheese trade with England, commencing shipping as a venture, about 1830 to 1832 at the suggestion of the late Erastus Corning of Albany. The first shipment was about 10,000 pounds.

He was the first also to send cheese to Philadelphia, shipping to B. & B. Cooper in 1828 and to Jonathan Palmer in 1830 and 1832. Mr. Burrell is still in the trade, though nearly eighty years of age, and has shipped cheese abroad every year during the past fifty years, his shipments the present summer (1876) being about 1,000 boxes a week. He is among the few American dealers who have amassed a colossal fortune in the trade, and by his strict integrity and honest dealing has ever retained the confidence of dairymen.

In tracing the history of cheese dairying in other states, I find the emigration of Herkimer county dairymen often gave these new localities the first impetus to this branch of industry—thus leading the way more easily to the introduction of the factory system.

Crossing the line into Canada, we find Harvey Farrington, an old Herkimer county dairyman, in 1864-5, leading the way by building the first factories in the Province of Ontario, and teaching the art of manufacture to our Canadian neighbors. Previous to this, the Canadians bought largely from the states. Now they produce from thirty to forty millions of pounds annually, and are our sharpest competitors in the export trade.

PROGRESS OF THE EXPORT TRADE.

In about 1848-9, or about eighteen years from the first shipment of cheese to Great Britain, our exports had increased to 15,000,000 pounds. The whole production of cheese that year in the United States was not far from 100,000,000 pounds, about 43,000,000 of which was received at the tide waters of the Hudson. British shippers that year (1848-9) were enthusiastic; drawing upon us for what was then considered an extraordinary quantity, viz: 15,000,000 pounds, but they met with severe losses, which caused a more moderate demand the following year, and prices fell about one cent per pound, varying for fair to strictly prime, from 5c to 6½c for Ohio cheese, and 6c to 6½c for New York State. The amount exported that year (1849-50) was 12,000,000 pounds, the supply to the tide waters of the Hudson being about 42,000,000 pounds. Five-sixths of the exports were bought and shipped by the middle of January, and the remainder, say 2,000,000 pounds, was bought by two or three parties at 5½c to 6½c, which was generally thought by the trade to be too dear.

In 1851 the whole consumption of foreign cheese in England, including that from America, had increased to 48,000,000 pounds, an increase amounting to about 250 per cent. since 1831.

From 1848 to 1858 the exports of American cheese to England were not increased and they fell back in 1858 to 5,000,000 pounds; but about this time American butter began to be exported in considerable quantities. In 1859 there were about two and one-half million pounds of butter and 9,000,000 pounds of cheese exported. During the following year the butter export was 11,000,000 pounds. There was no increase in the make of American cheese during the ten years from 1850 to 1860, the census reports giving the amount in 1850 at 105,000,000 against 103,000,000 in 1860.

The quality of the great mass of butter and cheese during this decade was undoubtedly inferior as a rule.

The principles underlying the great art of manufacturing these products were very imperfectly understood. In 1860 Samuel Perry of New York attempted to control the entire export product of American dairies. He sent his agents early in the season, throughout the whole dairy section of New York and Ohio, then the only two states from which cheese was exported, and they contracted for him the bulk of the farm dairies at an average price of from 8c to 10c per pound.

A large share of the cheese in those days was bought on credit, a small sum being paid during summer, but the final settlement and payment was made on the first of January. Mr. Perry by offering a penny or so per pound, more than other dealers believed the market would warrant, was enabled to secure almost the entire make of the season.

A great disaster as is well known followed this purchase. Much of the cheese was badly made and it rotted on his hands and was thrown into the docks. Sales, could not be made in England to cover cost. The approaching war caused troublous times and cut off our Southern trade. Financial difficulties at the opening of 1861 were frequent and pressing and the great merchants went to the wall leaving thousands of dairymen unpaid. The lesson was a severe one to all concerned, but, it was useful in this,—that ever after dairymen have been cautious in selling on long credits, while no one dealer, single handed, has since that time attempted to control a product which from its increased magnitude is beyond the grasp of our means and resources.

Although Mr. Jesse Williams of Rome, N. Y., had conceived the idea of the factory system, and put it in operation in 1857, it did not begin to attract attention until about 1860. Up to this date (1860) only 23 factories had been erected, but as the factory cheese was generally better made, and more uniform in shape, texture and quality, and as less labor resulted in making as well as in buying—(because cheese was then bought on the shelves on personal inspection,) the system began to be regarded with favor by both dealers and farmers.

Mr. Williams learned the art of cheese dairying in Herkimer. He was an original thinker, and to him are we indebted more than to any other, for the great progressive step which places American dairying to-day in the front rank among the nations of the earth. The whole frame work of the American system sprung from his brain in one harmonious whole and although, he was fruitful in the invention of implements and appliances adapted to his work, he took out no patents, but presented the result of his labors as a gratuity to the world. The inestimable benefits that have come, and yet to come from the original labors of Mr. Williams can scarcely be estimated. It put American dairying upon a footing by which it

could measure arms with any other branch of Agriculture, and in the great state of New York it towers above all other agricultural interests combined: for if we add all the adjuncts of the dairy together; the value of pork made from whey and sour milk, the calves raised and beef and milk sold, we can hardly get the annual product from the dairy farms of New York, below an hundred millions of dollars.

In 1870 the grain raised in the State, was in round numbers as follows: Wheat, 12,000,000 bushels; rye, 2,000,000; corn, 16,000,000; oats, 35,000,000; barley, 7,000,000 and buckwheat, 3,000,000 bushels. The wool clip of the state, that year, was 10,500,000 pounds.

Now in 1870 there were nearly 136,000,000 (135,175,919) gallons of milk sold in the state, which at 5 cents per quart, amounts to over 27,000,000 dollars. The butter made that year in the state was, according to the United States census, 107,147,526 pounds, and this was worth that year more than 30,000,000 dollars.

Going back to 1840, we find the value of the dairy products of New York, butter, cheese, and milk, was estimated (according to the United States census,) at only 10,496,000 dollars, and in all the States at about 34,000,000 dollars. Mark the enormous increase in 30 years, rising from \$10,000,000 to \$100,000,000.

About the year 1862-3,* Alanson Slaughter of Orange Co., N. Y., conceived the idea of adapting the associated system to butter making. He arranged his factory with pools of flowing spring water for reducing the temperature of the milk which he set in deep and narrow cans. This was the first butter factory that had been built on the continent, or indeed in the world. His plans were original and novel, and as the choicest butter was made under his system, it was the commencement of the most important improvement in butter making, hitherto known in America.

The system has been carried into Sweden and Denmark and other parts of Europe and wherever planted, whether in the old or in the new world has been the means of raising the standard of butter and promoting its consumption in a marvellous degree.

In 1862 the butter product of the United States was about 500,000,000 pounds, of which we exported about 30,000,000. To-day our annual product is estimated at from 700,000,000 to 1,000,000,000, of pounds, and we export scarcely anything. Butter factories have been carried into many states, and although the plan of setting milk has been varied in regard to deep or shallow vessels, it would have been impossible to have developed this interest to its present vast proportions if the associated system had not been inaugurated and applied to this branch of the dairy.

It promoted an inquiry and desire for better things, and consumers as they get a taste of the "golden appetizer," with its fine grainy texture and rosy aroma, become fond of it beyond measure, and they stimulate manufacturers to put forth their best efforts for perfection, by paying extraordinary prices for a "fancy article."

In 1863-4 the associated dairy system had become an established fact. Somehow, the impression became general among the farming community that the dairy was reaping enormous profits.

An intense interest prevailed, not only in New York, but in Ohio, Vermont, and other states, to obtain knowledge on the subject, and this led to the inauguration of the "New York State Cheese Manufacturers' Association." A meeting was called at Rome, Jan. 4, 1864, and the attendance was so large that it filled the largest hall in that city, delegates being present from several states.

No such enthusiastic gathering of those interested in agriculture had ever been held in

this country, and people went away from the meeting with the liveliest anticipation of amazing fortunes from the dairy. That year 210 new factories were erected in the state of New York alone, and the system was carried into other states. Subsequently, the association was merged into the "American Dairymen's Association," and state associations began to spring up in the different states. I need not speak of the success of these associations. Thousands of people flock to them year after year. They have created a dairy literature which, from its wide dissemination has had a vast influence in educating the masses in this department of farming.

Contrasting the flood of light which now illumines the path of the dairymen with the meagre knowledge he possessed twenty years ago, the slough from which we have emerged seems infinitely deep and dark. By means of our associated system and our dairy conventions, the American dairy industry now leads the world, and Europe begins to copy from us. England has inaugurated our factory system, and now is about to resort to our plan of holding conventions, in order to move her people from the lethargy and stagnation into which they and her dairy interests have fallen.

At the late meeting of the Royal agricultural Society at Birmingham, the "British Dairymen's Association" was organized, and the plan of holding conventions similar to ours will be adopted. But this is not all. It has been proposed to hold twenty-four annually at some large centre—as Birmingham, for instance. A "National and International Cheese and Butter Show" for prizes, and combined with this a congress at which papers are to be read and discussions had upon them. "A National and International Congress" upon the subject of dairying in England means something more than a rambling discussion, for it will call together many of the distinguished scientists of Europe who have made long and carefully-conducted investigations concerning the different constituents of milk and their relation to the product manufactured.

Thus, you will see, that what may be called a purely American movement or idea is being planted in England, and must inaugurate progress there as it has done here.

INVESTIGATORS AND THEIR CLAIMS.

In what I have said, I do not wish to attribute all the honor of our present position to American investigation or American originality. We have no scientist who can claim any range of investigation concerning milk and its products that will at all compare with those made by Dr. Voeleker of London. The "Germ Theory" belongs to Hallur and Pasteur, and nothing new in this direction can be claimed by Americans. It is true we are indebted to Prof. Caldwell, of Cornell, for first expounding this theory to American dairymen. The weight of his authority as a believer in it has had considerable influence with dairymen toward the acceptance of Pasteur's theory and applying it in some of the problems concerning milk.

Microscopical investigations to bring out results worthy of credit, require the eye and the mind of the trained scientist, great patience, long experience, and a peculiar aptitude for the work. It is one thing to look through a microscope, but quite another thing to be able to designate correctly what one sees. Hence the observation of the mere tyro must be taken with due caution.

Our best cheese as now made, is in all its essential principles the same as that originated in Somersetshire, and which has been in practice for more than a hundred years at the foot of the Mendis Hills. All theories in vogue from time to time diverging from their principles have ultimately proved failures.

You will say that we have been improving the character of American cheese for the last ten years or more, or that it never suited the English market so well as now. I grant it, but it is because we have come nearer and nearer the true cheddar method which was first made known to our dairymen at their convention in 1865. I do not now refer to appliances for abridging labor—then of course an original American invention, but I have yet to be shown a single original scientific principle that has been discovered and adopted by which our cheese manufacture has been improved above the old cheddar method.

The lesson which our dairymen are learning to-day is that, there is a difference between speculative theories and sound practice. We have learned the reason for many dairy operations and these have been so well expounded from time to time that our cheese makers have become better grounded in the science of the dairy, and are more intelligent than the great mass of practical dairymen in Europe.

But there are some things, concerning the care and preservation of milk that may be placed to our credit. The cooling and aeration of milk for its better flavor and condition is ours. Mr. Foster, of Oneida, N. Y., was the first to discover that the odor of putrifying animal matter like that of a dead horse may taint the milk in the bag by being breathed by the cow while at pasture. The microscopical investigations of Prof. Law, of Cornell, were the first to show how vegetable organisms may be transmitted to the milk from the water which cows drink to slake thirst. Mr. Truman, of Chenango county, was the first to discover that other fat than that obtained from the milk may be substituted for it in cheese. The late Gail Borden, of White Plains, N. Y., was the first to show how milk may be successfully eliminated of its water or condensed. He was an original thinker and investigator, whose name next to Jesse Williams will go down to posterity as the inventor of the grandest improvements in connection with the dairy known in any age of the world. The preservation of milk in all its integrity for long periods, before Mr. Borden's time, had been attempted, but without success, and eminent chemists and scientists had pronounced the condensing of milk with its cream unseparated an impossibility. Mr. Borden persevered inventing elaborate and complicated machinery entirely original for the purpose, and at last his efforts were crowned with success. Thousands of our soldiers during the Rebellion—thousands upon shipboard—in cities and upon the plains, have called down blessings upon this man for the benefaction of securing to them the luxury of pure milk—milk which could not otherwise be had. If the lives of children saved in our cities by the use of Borden's condensed milk be taken into account, we shall scarcely be able to estimate the value of his labors. His inventions and processes have been carried into Europe, and he is recognized in history to-day as one who has done an important service for humanity.

Mr. Slaughter, of Orange County, was the first to adopt the associated system of butter making, and to apply the deep setting of milk in cold water for getting the cream. This was an important step toward progress. The Swedes and Danes were the first among European nations to copy the American idea of butter factories and the setting of milk in cold water; but Sweden with her scientists under Royal patronage was not content simply to copy, and to Sweden belongs the credit of first demonstrating that cream will rise rapidly and perfectly when the milk is reduced to near the freezing point in ice water.

This principle has been a surprise to the butter

dairymen of America, and is another step in the progress of butter dairying.

Mr. Hardin, of Kentucky, is entitled to credit for a modification of this system in which the air is cooled in refrigerator boxes which are used for setting the milk, and he claims as an improvement the covering of the milk and the exclusion of the air while the cream is rising. There can be no doubt but the cold theory is the true one for making butter. It arrests decomposition from the start, and the fine quality of butter made by this plan is proof of its merit.

The heating of milk and then cooling it, to obtain the cream together with the manufacture of the skimmed milk into cheese is of ancient origin. It had been practiced in Devonshire, England, for more than a century, and hence no claim can be made of its being an American idea. The English experimenters years ago pronounced it inferior to other methods then in common use both as to quantity and quality of product.

In closing the claims of American inventors, I must add two more names to the list, that of Dr. Sturtevant, of Massachusetts, who has made some original investigations in regard to the milk globules of cows of different breeds, while Dr. H. A. Mott, of New York City, has recently made some very interesting discoveries in comparing the milk of different races. His analyses show that the milk of the Black race contains more milk solids than that of the Caucasian, particularly in milk, sugar, fat and inorganic salts. The same rule also applies to Brunettes, and it becomes an interesting question whether the color of animals is any indication as to the quality of milk yielded.

CONCLUSION.

In conclusion a word may be offered in regard to the present status of American dairying. Commissioner Wells in his celebrated report upon the "Industry, Trade and Commerce of the United States" for 1869, puts the value of the products from the dairy in the United States at \$400,000,000 per annum. If that be correct for 1869, the annual product from dairy farms to-day must be at least \$600,000,000. The New York Butter and Cheese Exchange estimates the annual butter crop at 1,400,000,000 pounds, which at 30 cents per pound would alone amount to \$420,000,000. In my opinion the Butter and Cheese Exchange has estimated the butter product too high, but it must not be far from 700,000,000 pounds per annum. But when I say that the actual product from the dairy farms of the United States amounts to \$600,000,000, it may not strike you with its full force. This amount will be better appreciated perhaps by a comparison. In 1860 the total industrial product arising from agriculture in the United States was estimated at about \$1,800,000,000; so that the dairy farms of the United States to-day produce a sum equal to one-third of the value of the entire production of agriculture in all its branches in 1860. It must be evident therefore that the dairy is second in importance to no special agricultural industry of the nation.

The associated dairy system now stretches in an almost unbroken line from the Atlantic to the Pacific, commencing in Maine it sweeps over New England, then throughout the Middle States it is the most important industry. Its foot is firmly planted in the West and Northwest. Crossing the Mississippi, it has pushed its way into Kansas, Colorado and Nebraska; even at North Platte, on the very verge of the rainless region, I last year found a prosperous cheese factory and large herds, owned by the accomplished widow of the late Post Master General Randall, associated with Hon. Mr. Webster and his son. Along the base of the Rocky Mountains and in the canyons and parks of that wonderful region, I have been surprised to find numerous

herds and large dairies. In Lake Valley, on the shores of Lake Tahoe—one of the loveliest spots to be found in the Sierras—there are no less than thirteen dairies of 150 cows each, on a tract eight miles wide by fifteen long. Here butter is made which commands a ready sale in Carson and Virginia City at 50 cents and upward per pound. The Mormons are developing the business at Utah, and already they have factories and co-operative dairies. Then in California, as you know, all along the coast range, dairies have been planted. Even so long ago as 1870, I found here the largest dairy farm I had ever seen—the dairy ranch of the Shafter Brothers, embracing 75,000 acres, and having over 400 miles of fencing. There was upon it 3,000 cows in milk, and I rode more than 100 miles on private roads as smooth and as free from ruts as any in the old dairy districts of New York. This ranch has since that time been divided into three 25,000 acre dairy farms, each of which in turn is portioned out into dairies numbering 150 cows and where the choicest butter is made for the California market. The climate here is admirably adapted to butter making, the temperature, winter and summer, never varying much from 60 degrees Fahrenheit.

The annual cheese product of the United States now averages a little under 300,000,000 pounds, of which we export nearly 100,000,000 pounds—92,000,950 pounds in 1875. The receipts in New York during 1875 were 2,322,015 boxes, against 2,046,575 boxes in 1874 and 2,007,633 boxes in 1873. In round numbers the receipts in New York during 1875 were about 130,000,000 pounds. The exports of butter from New York in 1875 were only 4,226,976 pounds.

MARKETING.

One great feature belonging to the dairy, and which gives dairymen an immense advantage over other farmers is, an organized system of marketing. The system was commenced at Little Falls, N. Y., in 1860—buyers and sellers meeting on certain days of the week in the open street to make transactions; for the business was then transacted in the open air by the side of the wagons. Attempts have been made by certain parties to falsify the truth of history by representing that the first efforts to establish "sale days," or a country cheese market was made at Utica in 1870. There is scarcely a dairyman in Central New York but is familiar with the fact that Little Falls had a regular weekly dairy market 10 years prior to 1871, when millions of pounds of cheese were sold annually, and that there were no regular sales days at Utica until 1871. On some market days at Little Falls previous to 1864 several hundred farmers have been in the streets near the railway depot, each with his wagon loaded with cheese, boxed and marked with his name, while some twenty or more buyers were scattered among them and passing from wagon to wagon—some from New York, Philadelphia, Boston, Baltimore and other cities with an occasional shipper from England could be seen examining boxing, tasting, smelling and making bids for the loads. In 1864, the first weekly reports of the Little Falls market, then and now the largest interior dairy market in the world, began to be made. Previous to 1864 farmers relied on city quotations, which were sometimes thought to be in the merchant's favor. But it was not until the early part of 1871 that a Dairy Board of Trade was organized, though the project was agitated in 1869 by residents of Little Falls. Here, as in the origin of the dairy movement, Herkimer county took the initiative, establishing a Dairyman's Board of Trade, under the general name of the "New York State Dairy-men's Association and Board of Trade." Soon after publishing and sending out circulars giving the plan of the organization and the rules by which it was to be governed, the dairymen of

Oneida took copy and also established a "Dairymen's Board of Trade" at Utica. The plan spread to other sections and now many dairy centres in New York and in other states have their Dairy Boards of Trade at which merchants and sellers meet on regular market days for the transaction of business in dairy goods. The telegraph is here brought into requisition, and sellers go upon the market knowing something of the demand and the price on both sides of the Atlantic. At the interior markets competition often runs high, and merchants sometimes complain that margins are narrow, and money not so easily made as when the goods were bought at the factory on city quotations. Be this as it may, the dairymen now have a sort of commercial education. They study the markets, home and foreign, and they judge when it is best to realize on their goods.

SHRINKAGE IN VALUES FOR 1876.

The shrinkage in values on nearly all kinds of property during 1876 has been very considerable. Real estate has depreciated from 25 to 30 per cent. The fall in cotton goods and some other manufactures has been very great. The value of nearly all our agricultural products are below the range of 1874, and it is not surprising under the pressure of the times, that dairy goods should have been comparatively low. But even under the darkest phase of the times the outlook of dairying is by no means discouraging. Indeed, there is no class of farmers better off to-day than the dairymen. They have sold their goods from month to month and from week to week for cash, and their goods have found a ready market without pushing, while other products have been dull and slow of sale even at greatly reduced rates. The European demand has been fully equal to our surplus, and exports keep values upon a gold basis. It is true prices have been low, but not nearly so low as they were years ago, when dairymen found it not difficult to amass fortunes in the business.

The one hopeful sign for our increased production is, that English production is decreasing while the increase of population in our cities and towns calls more and more for additional supplies of fresh milk and an increased quantity of butter and cheese for home consumption. That we are not over-producing is proved by the free disposal of the entire products of the dairy from year to year. Very likely if the make were less, prices would advance, but the values realized on account of scarcity press heavily upon the masses, who for the most part find it hard to make the ends meet from year to year. It is better that the people have cheap food with moderate gains to the producer, than that they should suffer for want of food, that the producer may grow suddenly rich.

Many dairymen of late years have neglected the economies of dairying, and it is the waste and extravagance that pinches harder than the low prices. He who can cut off waste and be content with moderate gains, will see a silver lining to the cloud, if indeed there be a cloud that dims the future in the far distant horizon. The merchants of the dairy at home and abroad are men who do honor to trade, and among them will be found those who would sooner lop off an arm than stoop to a mean action. The commercial integrity of the dairy stands unsullied, and this is an element which helps to place American dairying upon a substantial footing.

SOUTHERN AGRICULTURE.

Address delivered by Col. THOS. CLAIRBORNE, of Tennessee, before the National Agricultural Congress at Philadelphia, September 12, 1876.

Mr. President and Gentlemen of the Agricultural Congress; In appearing before you, I am painfully conscious that I subject myself to your criticism; that I am inadequate to the task of satisfying your just expectations. During two or three intervals snatched from actual field labor I have crudely prepared this address. I am not university-bred. I am provincial, and do not affect a contest of this sort with men of literary and scientific training; and since I am here as a modest helper, let me propitiate your fair favor.

At this moment, and, as it appears to me, under the happiest auspices, you have assembled for patriotic work, in this venerable city, famed in arts, science, literature, and other, the brightest, phases of human progress, when the eyes of a whole people are turned to this point, and many thousands are daily imbibing new lessons in viewing this mighty exhibition of the wondrous products of the talents, skill, industry and perseverance of our fellow-countrymen and foreign nationalities, you, gentlemen, with great propriety, occupy a conspicuous place amidst this grand assemblage of American citizens; for upon the labors of those whom you represent rests the whole of this magnificent display; the broad shoulders of the husbandman are the pediment of this splendid pyramid of American achievement.

I received with surprise the invitation to address you to day upon the subject of Southern agriculture, which your worthy president tendered to me in June, and accepted it reluctantly, at the request of one who should this day be here, occupying this stand—I mean Col. J. B. Killebrew, commissioner of agriculture, etc., of the State of Tennessee, a working man, "take him for all in all" the like of whom is hard to find anywhere; who, in advocating the claims of his state to the intelligent consideration of capitalists for investments in mines of coal or iron; in manufactures, whether of iron or wood, cotton or wool; in setting forth in fresh, vigorous and truthful descriptions her vast resources for happy agricultural homesteads; and also for the able instructions in the art of agriculture, which by pen and tongue he has lavishly imparted to his fellow-citizens, deserves, as he has received, their respect, their applause, their confidence. This is the man who could and would have charmed you with his happy discourse on such a subject. He has substituted me from friendly partiality, and deprived you, by his absence, of a real enjoyment.

The art of agriculture has been treated of so often, and praised so well, for its intrinsic worth to the children of men by the orators and philosophers of all ages of civilization, by so many and so happily qualified men of our country, from John Adams, Thomas Jefferson, James Madison, Judge Peters and Col. Taylor, "of Carolina," all of whom were the earnest advocates of agricultural science, with many other, the most reputable, names of this country, all along down to our own times of eager inquiry and pursuit, when able and enthusiastic men, with the vast additional aids of new discoveries in mechanical and chemical science, are seeking

to wrest from nature her most hidden mysteries, a plain farmer, like me, stands abashed and confused, and hardly knows where to begin, or on what to lay hold—a conscious trespasser.

I do not expect to advance any new ideas; I shall not consume your time in praising the art; I shall proceed to talk about Southern agriculture and its outlook; and to do this intelligently requires a reference to the geographical and political relations of the South to the whole Union of these States. May that Union be consecrated to liberty forever. Our country, in its general aspects and conditions, is essentially agricultural, while many parts admit more readily of employments in mining and manufacturing; yet, upon the whole, nature has stamped the agricultural feature as the dominant. I need not enlarge upon the fact that agriculture is the basis of all prosperity among the civilized people; nobody questions it; the great Webster has eloquently said that it is the "noblest and the grandest of the symbolic pillars that support the government." Here, then, in the South, is the great field of American agriculture; its real importance cannot be overrated. What shall be the future of this Southland?

There, spread out before you, through 12 parallels of latitude and many more of longitude, lies the fair South country; from the Chesapeake to the Cape Sable and the mouth of the Rio Grande, twelve states, one of which—Texas—equals in its fertile areas two Pennsylvanias, all chiefly best adapted to the planting of cotton and tobacco; on the coast rice and sugar; in other parts corn, wheat and the other cereals, sweet and Irish potatoes, hemp, flax, sorghum, the raising of horses, cattle, sheep, hogs, and all the other agricultural, pastoral, pomological and other infinite vegetable productions, of course varying in character and excellence according to their special habitat; the whole expanse of mountain and valley, undulating plain and "green" savannahs, capable of infinite production, and destined to be the theatre of an agricultural development that will exact the homage of the world; for *here* is best distributed the great essentials, *sunlight, warmth, and moisture* over continuously vast areas of extraordinary fertility. I do not think it worth the while to estimate this area in square miles—to state minute features; it will suit my purpose and lessen your fatigue to hasten, touching the most salient features.

The present is not the proper normal condition of the South; you will, each of you, readily assign the reasons therefor, as they may occur to you. Unless you come from, and have *lived and struggled* among the people of the South, you will not be able to discern truly, and it would require a deal of patience to acquire by recital, the facts necessary to an exact understanding of our political relation. The South needs white men to settle up waste places, to contribute to her development, and all men of patriotic feeling and sound reflection know that, to insure success, when immigration is invited, security must be extended.

The generous will not include a whole people in the errors of a few, and may find, in the ignorance of educational prejudices of even these a great deal to palliate; for the *basely wicked*, it would be a harder matter to find an apologist at home than abroad; and are not these to be found, despite of example and experience in every land? We have had our disorders.

The war wrought a prodigious waste of men and material wealth of the South; the slave property was scarcely less than \$1,200,000,000, and four years loss and consumption of crops and other material, will cover four or five billions. The chaos that greeted the vision of the soldiers returning to their homes might well have appalled them; that prospect is now greatly altered, by their labors, for the better. I shall

not dwell on a dreary recital of "woes unnumbered; that is not my purpose. You will, however, tolerate a passing remark upon the disastrous troubles political adventurers wrought in our midst: distrust, debts, municipal and state, and wholesale speculation, indicated their presence. "The evil they did will live after them." I affirm that the delays to the complete and happy restoration of fraternity and social peace and order may be attributed solely, in the first instance, to those to whom I have alluded, and this I do readily, because I know the desire of the hearts of the people of the South to be for a perpetual peace, and a firmer union of the States, as necessary to the happiness of their children, their riches and their prosperity. We believe that we have passed through the worst, and that the merciful Father, out of His abundant goodness, will soon restore us to our constitutional liberties and equalities. Therefore we invite immigrants to come and settle in our fair South, and offer to all good men our friendship and neighborly regard.

The negro is a problem to be solved. His shackles are thrown by and rusty; he will not be enslaved by the white man any more. A maritime people brought the African to us. We of the South were never a maritime people. We inherited the evil; and the good and wise do not regret its being crushed out. But he is incorporated into your political constitution as a citizen. I think I know him well, as a slave, as a freedman, as a citizen. The older and most trustworthy as laborers are daily decreasing. Their places are supplied from a thriftless and idle youth that manifest the greed of appetite; seek to escape honest rural labor, crowd into miserable tenements in city, town or village, and there find the lowest degradation. Some evince a strong desire to attend the schools, and their best representatives point the way. Common schools and colleges have sprung up with the aid and encouragement of the whites, notably so in my state. The policy that matures a true sentiment of justice in the public conscience towards the negro will find its truest advocates in the South. Who can know better than the business men on the farms and plantations how necessary his labors are to the production of our crops? His faults are both moral and physical. Emancipated, elevated to be a citizen, voter, political vagrants have practiced upon his egregious vanity to secure personal ends. Acting under their stimulus, and the unintelligible nonsense of most of their orators and preachers, who bear themselves with comic solemnity, they see visions of glory and the angels, esteem themselves chosen of God, and bide patiently the good time a-coming, when they shall put under their feet the white race; nor do they except from this pleasant category their white affiliates. A patient philosopher might endure all this comedy if, at the same time, his judicious gaze was not fixed upon the lurking spectre of a possible tragedy. To secure his liberty, his earnings, his repose, is the honorable work of all Christians. To magnify his importance above that of the humble or ignorant white man, is to abjure our blood; to guarantee higher immunities and privileges to him than to honorable and meritorious white men, is to violate, in the gravest manner, that law of God which says, "that thou shalt not do to another that you would not he should do to you." The problem remains the same. I can only see the solution of it in a mighty population of the white race, each head of a family striving upon *his own homestead* as a bread-winner and a nation builder. The lands are ours, and we invite their occupation by the white man. The feebly idle and inglorious man, or race, goes down in the struggle always. It can hardly be doubted that slavery kept out of the South the

hardest, the thriftiest, the most energetic of the crowds of home-seekers that plunged into the wilderness of our country, in pursuit of their individual gain. While New England and the older settlements of America, with the emigrant tides, were pouring to the West and Northwest, my own state had been, for forty years, pouring out from her prolific hive her thousands of poor men and ambitious young professionals,* to populate the upspringing states, West and South. The great landed proprietors were crowding them out from sheer force of circumstances; free labor would not compete with slave labor. Passing by the South, it found its enterprise best repaid where there was no slavery. This accounts for the growth of the great Northwest and West in spite of the climate, and gives the answer to the question, if asked, "Why, if your South-land is so excellent, is there so much of it vacant?" In their easy-going way, our people indifferently regarded emigration or immigration.

But what of the present? I answer, the gates are thrown wide open. As prejudice subsides and the memories that civil wars engender die out, the eyes of the home-seeker will view with pleasure and his hands will lay hold with vigor the astonishing riches of this glorious South-land.

The eye, coursing the entire sweep of the South-country, from the Chesapeake to the Rio Grande, along the Atlantic and Gulf coast plain, rests upon a vast area of tertiary and past tertiary formation that indicates the character of the soil. This is divided by the low plain of the Mississippi river, which possesses an inexhaustible fertility; on the west of this the lands slope upward to meet the great plains which extend to the Rocky Mountains. Here is to be found the largest capacity of production peculiar to such geographical features. As the Appalachian range is reached, other and older formations are encountered, possessing the most valuable characteristics, in lands of fertility, in woods, in minerals. An immense border of pine forests line the Atlantic and Gulf coasts as far as the Sabine river, furnishing lumber, pitch, tar, turpentine for naval stores and the other innumerable uses of mankind. The interior is well wooded east of the Mississippi and for some distance beyond, with a great variety of useful and beautiful trees. The live oak, of Florida and along the Gulf coasts to Indianola, is invaluable for ship timber.

In North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas and West Tennessee, lie those magnificent areas of land which yield the indispensable staple that gives employment to so many hands, feeds so many mouths, and fills the sails of so many ships, without which we should lack our commonest necessities. From 300 to 600 pounds of lint may (accidents guarded) be counted upon as the produce of a single acre. In certain special localities the sea island staple, of higher excellence than the other fibre, is grown. The culture of the cotton plant costs more exertion but less skill than the production of corn; it is perhaps more difficult to save the lint at picking time, in its highest perfection of lustre and beauty, than to cultivate it. Its careless cultivation has ruined many plantations. It will not suffer the presence of grass, and the hoe and scraper must be kept going vigorously to insure its growth and crop. Our people have learned a great deal since 1865. The tendency in the minds of cotton planters is to diversify their crops. The probability is that they will in future plant less area, and probably pick and sell more cotton.

I am, however, only a witness of the failures of Middle Tennessee cotton planting. The same

*411,000 emigrants to 219,000 immigrants.

energy expended on stock, the grasses and cereals, would have paid better, while improving the farms. For five years ending September 1st, 1876, receipts of Middle Tennessee, and North Alabama cotton at Nashville exhibit 232,259 bales.

Rice and sugar are the staples of the coasts, and these productions must inevitably increase in importance every year.

Tobacco is a staple, and can be grown almost anywhere, according to variety; those of Maryland and Virginia are renowned; so are those of Kentucky and Tennessee; and for fifty years those of Tennessee have been noted for excellence. The area of planting is steadily on the increase in Tennessee, and all that is needed is proper encouragement, to stimulate a larger production than any state in the Union. It is not destructive to land like cotton and corn, and yields a larger remuneration to labor bestowed on less area of cultivation to the hand, and at the same time admits of an easy rotation with the cereals and grasses. Judgment of, and nicety in handling the crop constitute the chief features in its productive value. Its busiest season is in August and September, and this affords ample time for raising abundant supplies for the farm. As an article of commerce it is perhaps not inferior to that of any other named; it enters into the consumption of all people, nearly a billion and a quarter of tons being annually consumed. More than 1,000,000 persons are engaged in its cultivation and preparation for market, and the states of the world gather a very large share of their revenue from it alone. In the period from 1850 to 1870 the production of tobacco in the Western States had, notwithstanding the civil war, increased 62,982,686 pounds. Tennessee had added 15,000,000 pounds to her production. The estimates for 1874 and 1875 exhibit for eight states, (of which four are Northern and Western) 113,000 hogheads. The market at Nashville last year was very active, and the outlook very hopeful for this season, but extraordinary causes combined to largely diminish the expectations of the trade. The government with the greatest ease can lay its heavy hand upon this crop, and in fact derives a large revenue from its inequitable imposts, realizing in 1875 \$37,303,461. The receipts of tobacco leaf at Nashville for the commercial year just ended, show an excess of 4,000 hogheads over any former year; they were 9,116 hogheads. At Clarksville they reached nearly 15,000 hogheads.

Wheat is largely grown in Texas. Her northern counties are capable of thirty bushels to the acre under the common treatment of the farmer. Under higher care forty bushels may be expected. Along the northern belt of the Southern States, from ten to twenty-five bushels are to be expected, according to rotation and care in the preparation of the soil. Virginia and Tennessee wheats have no superiors, producing the best and most beautiful flour, and from its quality is best adapted for shipment to foreign ports. In my state the best yield is after clover. I believe in the drill, but there is diversity of opinions among our best farmers on broadcasting and drilling. Fultz, Tappahannock and Amber are the favorite seed; the former is in great favor at present. Merchants and millers in Nashville handle 250,000 barrels of flour.

The Tennessee, Arkansas and Mississippi bottoms will yield of corn 100 bushels and more to the acre. All our Tennessee bottom lands will produce, under good handling, fifty to seventy-five bushels; our uplands thirty to forty bushels, in favorable seasons. We pay more attention to wheat and corn than heretofore, and I may add that there is a new farming impulse felt throughout the state by the whole body of farmers. Our production is largely increased. As the Appalachian range is approached, the geological features have changed, and oats, barley, rye, broom corn and sorghum produce fair

crops anywhere. Oats are liable to rust, and I do not consider them worth raising, though others may differ. A red, rust-proof oat is advertised as very valuable. I tried it, and last winter's freezes severely injured it.

Tennessee is the land for grasses and clovers. All along the slopes, in the coves, in the valleys of the Appalachian range and its offshoots, they flourish in excellence. Blue-grass gives a name to the favorite region of Kentucky, and it is almost as fine in Middle Tennessee, where indeed you find the brooklets and creeks are numerous, and flowing above ground, with a milder climate than Central Kentucky. Timothy grows finely, but is invaded by the weeds if neglected. Orchard grass grows more in favor every year with us, and grows anywhere, almost. The indispensable clovers gain new admirers every year, and are, after all, our best and cheapest renovators and fertilizers. The alfalfa will grow in West Tennessee well, and further South. I have seen it luxuriating at El Paso, 4,000 feet above sea level.

The grasses native to the Cumberland plateau, during the summer and fall fatten a great many cattle and sheep. In Texas the mesquit and other nutritious grasses, fatten, for their long drives North, tens of thousands of cattle; and other stock live almost entirely upon them, sheep especially. With the addition of pure bloods now taking place in cattle and sheep, we may look for startling results in Texas.

The sweet potato is an enormous producer everywhere, and is an invaluable product.

Irish potatoes of the early sorts, from the coasts up to the mountains, yield fairly, and bring good prices in the Northern markets, poaching severely, I suspect, upon the old monopoly of Northern gardeners; and this is true of nearly all the vegetables. A late red Irish potato is planted with us from June to July, and in very favorable seasons yield 400 bushels. Fifty thousand barrels of Irish potatoes were handled in Nashville last year.

All the garden vegetables flourish—turnips, cabbage, carrots, parsnips, salsify and okra, and are remunerative crops; but I cannot give the precise yield per acre.

Pumpkins are large, prolific, and very valuable aids as stock food. The melons are as fine from Tennessee to the Gulf as can be produced anywhere, both as to size and sweetness. Peanuts are a large and profitable crop.

Along the mountain slopes from Virginia to West Tennessee, in West Tennessee and Arkansas, apples do finely, the Cumberland plateau excelling in this respect, in color and taste, that would seem to leave little to be desired, but we do not succeed well in keeping them, and, at the best, with very few sorts. We grow fine peaches and plums in Tennessee, finer in Georgia, Alabama and Mississippi. Last year 2,000,000 pounds of dried fruit sold in Nashville at 10 cents per pound. This year 6,000,000 pounds are estimated by the trade. Pears grow finely, and are subject to blights badly. They do well in Louisiana and Georgia. In Tennessee we grow the May Duke and Morrello cherries, the Wild Goose plum, and a late red plum. There are many others wild.

The grape will one day be famous in the South. In North Carolina, West Tennessee, and below 34 degrees the Scuppernon grows finely, and will be more cultivated. It is a wonderful bearer, and produces a wine of great excellence. I could mention many valuable sorts that are grown in my state, some portions of which are admirably adapted to grape culture. Far down South the Hamburg and Golden Chasselas are grown. Wild varieties, some very excellent, grow everywhere.

The strawberry and blackberry, the raspberry and dewberry, whortleberry and gooseberry all do well, and if you are not satisfied with these,

Florida, Louisiana and Texas proffer to your taste the golden apple of the Hesperides, with figs, lemons and bananas. It would be exceedingly tiresome to enumerate the entire catalogue of what is grown in our Southern States; the range is as extensive as the wants of the most civilized people can require; somewhere a locality will suit your desires.

There can be found in Tennessee cattle, horses, sheep and hogs of the most fancy and purest blood. More money is invested in them than ever before, and the taste for first class stock grows daily. Some eminent breeders, as Gen. Wm. G. Harding of my state, have established a wide reputation, and there are some younger men of indomitable pluck and energy, who will figure largely in the future of Tennessee. Major C. Brown, Thomas Gibson, the brothers B. F. and M. S. Cockrill and many others.

It is not expected that at this time we can boast that our system of economy and modes of production approach anything like perfection. It must be confessed that there is not that enlightenment among the generality of our people which the rays of science pour upon her votaries in some more necessitous countries; yet a standard has been set up, and the diffusion of useful knowledge spreads more and more every day.

More than fifty years since, the labors of the most eminent planters of Maryland and Virginia were addressed to the grateful task of disseminating useful knowledge, and improving methods among their fellow laborers of the field. Baltimore enjoys the honor of the publication of the best agricultural paper of the times, by Mr. John S. Skinner, one of the sincerest and most praiseworthy gentlemen that ever labored in the cause of American agriculture; a reference to the files of the *American Farmer* will justify this mention. The art of agriculture found in him and his eminent contributors, able, earnest and enthusiastic ministers at her altar, which they raised high above all selfishness. New inventions of agricultural implements were introduced to the notice and approval of the farmers; their uses and designs carefully elaborated; and trials and experiments instituted, and results made known. All manures were analyzed, sea-weeds, the mud of ponds, rivers and marshes, of barn-yards, sheep-folds, fish, plaster, lime, ashes and bones, and a long list were satisfactorily tested. In fine they invaded the animal, fossil and vegetable kingdoms, by their energies and study.

To the worn lands of the older states, all this was necessary; but the South and Southwest did not as yet feel a necessity for such inquiries and additional farm labors. Our virgin soils almost spontaneously yielded a superabundance. In the absence of great national highways of trade and commerce. Our fathers are content to clear away the forests, lay out new plantations, gather and rear slaves, and were satisfied with a wealth of possessions in land, cattle and slaves, without (save exceptionally) the display of ostentation. The love of letters and learning being the peculiar province of what our people term the *liberal* professions—the lawyer and his *alter ego*, the politician, the priest, and the merchant—these esteemed it a duty to themselves to lead their agricultural neighbors; and it is but just to say that among them might be found the most patriotic and illustrious of my countrymen. The larger planters and well-to-do farmers reflected some of their light, but the great body of the farmers was scarcely felt or known out of their neighborhoods.

The old field schools could boast many a simple, honest pedagogue, and an occasional master. The rude log huts in which they presided have been the scene of the early efforts of men whom the nation has delighted to honor. It could not be expected that much emulation would spring up among a people so easy going

and satisfied with their surroundings. The youth who felt the glow of faith and burned with ambitious ardor to distinguish himself, secured with diligence his "license" to practice law, then with courage sought new countries to establish his fame and family, and how many of my Tennessee compatriots essayed it? Go wherever you will, their hospitable hands and hearts are open to receive you. Our people want nothing of natural endowment; the rays of science have heretofore fallen obliquely upon them; but the season has advanced, and this sun is evidently about to pass vertically over our heads; a new impulse is imparted, when newer and greater forces are introduced; it is a happy fact that the prejudices inseparable from ignorance, and the bias that is natural to sectional policy, seem to be passing away under our system of free schools and liberal endowments of libraries, colleges and universities by public and private liberality; by the example of the foremost citizens, and that corps of editors and writers, clerical and secular, who are daily educating our people up to a high standard in morals and physics, and a better appreciation of the forces surrounding them. More children attend school than ever before, more books, papers and magazines are in the hands of the people, and knowledge is generally sought for. The farmer class, notably, has felt the new impulse. It remained for the grange to proclaim its objects and aims, and set up its banner in the South; the effect was instantaneous; as in the Northwest our people listened and imbibed new hope of their labors, and the call secured to them, struggling under every embarrassment, a cry of succor; with the speed of the wind it flew from county to county; it enrolled under its banners the best and worthiest men of the field; there was a period of amazement, and some thrifty men might be seen to seek its altars, but these, though baleful, could not check the torrent of its overflow; wherever the principles of faith and charity, duty and fraternity, consultation and co-operation, of right and justice, were unfolded, there were the converts to be found, and they were our best men and least bigoted citizens; they exercised the God-given right to protect themselves and families against the machinations of usurers, sharpers and wits; yet they extended to all other classes a just liberality of sentiment.

This influence, then, has been at work to improve our Southern agriculture; it represses turbulence and disorder, guards public justice, discountenances illegalities, it stimulates new experiments in the productions of the soil; new inventions, when better, are sought and applied to cultivating, harvesting and securing crops; inquiries flash amongst us as the fire-fly lights up with his frequent luminations our summer nights; the agricultural aspect has changed and daily advances in improvement.

The modes of cultivation among our people vary according to the degrees of their taste and reading; some are incapable of continuous effort, cling to the lunar superstitions, and follow the narrow paths blazed by their fathers; others are full of inquiry, engaged with eagerness in the discussion of what relates to their profession, and read, and write for agricultural papers, of which class of literature the South, I say it with pride, can exhibit some among the best in the United States, the *Rural Sun* especially, published in Nashville; and it is to be regretted that there are farmers who fail to subscribe for, read and file them.

The best implements (as an evidence of Tennessee progress) find a wide sale in our state; four or five large firms in Nashville supply Middle Tennessee, and North Alabama in part, and are kept on the *qui vive* by outside competition.

I think these general remarks will cover the

question as to our modes of cultivation; to particularize would be tedious, yet I am aware that agriculture is an art, and its systems and modes the true delineators of it. I long to see the day when it shall be regarded among the highest professions, and its educated expositors regarded with that proper respect which scientific attainments can justly claim.

The great desideratum of the farmer must be a market, in which to sell or exchange his productions. If his wants extend no further than a wagon road, that should be a good and safe one, that no more time shall be consumed in travel than is necessary, and with least wear and tear of vehicle, stock and equipments. Good county and state roads should be special objects of the farmers' care. This, however, relates to inter-state trade; our surplus products must be exported. The railroads now, and perhaps in future, will continue to do most of our transportation; but this celerity is accompanied with greater expense than farm products can prudently allow of. It is, therefore, a vital question, and admits of no delay nor refusal; shall the general government improve and thus cheapen the navigation of the Mississippi river and its navigable tributaries? The most valuable areas of the United States are drained by these rivers, and such improvements should be worthy of the great prestige.

At no distant day, three-fourths of the population of this great country will occupy these areas. If the extension of population along the lake shores and west of the upper Mississippi has built up so quickly Chicago, and magnified the enterprises while increasing the prosperity of New York city, which binds this population through her great lines of water and railroad transportation, what may not be reasonably expected for New Orleans and our other favorably located Southern cities, when a perfect levee system for the great river shall be completed, and safe and easy navigation shall be secured to thirty thousand miles of Southern rivers, and the whole vitalized by the great Texas Pacific road, that magnificent enterprise, favored by every man of sense in the South; when the natural sequential railroad lines shall spread over our agricultural areas, as they do now in the North and Northwest!

I know that I reflect the sentiments of our people in expressing on this occasion their good wishes for the success of Col. Scott in carrying to completion that great national work.

Tennessee desires the improvement of the Cumberland river, which courses fourteen of her counties, and bathes her capital; the 600 miles of its navigable length wind among the splendid tobacco lands of Kentucky and Tennessee. The Muscle Shoals on the Tennessee river must be made safe and easy to navigate; the 900 miles of that beautiful river will come under the dominion of steamers, uninterruptedly plying from above Knoxville to the Ohio river. Their export freights will be corn, wheat, wool, tobacco, cattle, hogs, sheep, fruit, timber, coal, iron, lead, zinc, salt, gypsum, marble, baryta, and copper in vast quantities; and a people who can produce these riches must needs bring home for their enjoyment the rich products of the arts and labors of other states and foreign peoples.

The old-fashioned way of describing the different regions of the United States, as Eastern, Middle, Southern, etc., has in a great measure lost, and soon will finally altogether lose, what significance the expression once carried with it. The word sectional is of too little meaning to comprehend that new order of affairs that now appears; to use a Scriptural metaphor, a prophetic "little horn" is rising, and its prodigious growth removes all doubt of its ascendancy. The identity of interest, the commercial and trade intercourse daily enlarging, the national policy

of the people of the Mississippi valley from the lakes to the gulf, from Denver to Pittsburg, constitute them the great center. The Atlantic and Pacific slopes will have their policy, but it will be subsidiary to, or say auxiliary to, the immeasurable strength, the lofty stature and excellent glory of the centre, whose grandeur and importance cannot be estimated. Its spread buries old prejudices and sectionalisms from out of sight and memory forever; rears a new race of men of greater activities and wider business relations, who in their career of fortune will be so occupied with their business interests that the story of our civil war will have for them almost as little interest as an indifferent page of universal history has for us to-day.

It is manifest that the old issues between North and South are finally settled with us, and that all men may, and can, peaceably enjoy the equal protection of the law. If there be local exceptions, these must yield to the universal demand for submission to law and order which comes from the Southern people themselves, as loving peace for its salutary influence upon their labor and property; and because they are a Christian people, reverencing God; and a national people, loving the constitution of their country, and patriotically proud of their states.

Would to God that the dark period of distrust which for the last eleven years has paled the brightness of our South land might pass away, that the veil might be lifted from the glowing beauties of this land of sunshine and flowers. Then our people and their industries would revive, their old hospitalities unfold again, and a universal return to the standard of their country signal their complete happiness.

In view of that assured event, I renew the invitation to all patriotic and worthy men to come and settle in our beautiful land. It is bountiful and healthy. Those are worth receiving who come to build hearths and home altars to God and country. To such I can truly say, the South needs you, and will accord to you every social right and legal equality. The rest, as it effects your fortunes, is to be obtained by steady labor from the munificent abundance of the Great Creator, which everywhere exists, and no climatic rigors are known.

In conclusion, I return to you my thanks for your patient attention. I beg your indulgence if I have said more than I ought on the political condition of the agricultural people of the South, for their field labors have suffered and do suffer from those very conditions, and the truth, as one understands it, must needs be spoken, though it may meet with opposition.

I refer you to the admirable statistics of the United States Agricultural Bureau for May and June, ultimo, for information in detail on all Southern productions. The whole country is obliged to J. R. Dodge for his intelligent and unwearied labors in behalf of the material interests of the people. As regards our own locality, I have it in my power to gratify the curiosity of any one desiring information.

AGRICULTURAL EDUCATION IN THE UNITED STATES.

By. Prof. N. S. TOWNSHEND.

If by Agricultural Education we are to understand the systematic and complete training of the young farmer in all the branches of learning that relate to agriculture, then such education is comparatively new in our country and dates back at farthest only fifteen or twenty years. But if we regard as educational the various measures which were designed to promote the intelligence of the farmer in what pertains to his occupation, and which have been, and continue to be, important aids to his progress, we must then admit that a degree of agricultural education has been enjoyed in this country for half a century, or perhaps longer. In what follows, I hope to acknowledge our obligations to the various agencies which have contributed to our present condition; we are too thankful I trust to overlook willingly any of the means by which our progress has been secured.

The increased interest felt in agricultural education during the last quarter or half a century is in part due to a condition, among the most observing of the friends of agriculture, that it has not maintained its former honorable position among our national industries, and has not kept up with the general progress of the times. The impression prevails, though possibly not entirely justified by census returns, that the increase of agricultural products is not in proportion to the increase of lands brought into cultivation, and that production has not kept pace with the increase of population. Besides this, there is a conviction that capital employed in agriculture brings smaller returns than that which is otherwise invested; and that farmers as a class fail to secure social and political influence in proportion to their wealth and numbers. It has also become evident that the best soils in the country are deteriorated by cultivation, while those who are despoiling them of fertility are more inclined to go where they can find new lands to exhaust, than to remain and restore the old. Again farm and garden crops are seen to be liable to utter destruction by the ravages of insects, the wheat of some regions is destroyed by the Hessian fly, in other regions by the wheat midge. The corn crop has many enemies among which cut worms and wire worms are especially injurious. The potato, an important esculent, especially in the Northern States after being almost swept out of cultivation by the *Peronospora* finds an equally relentless foe in the Colorado beetle. The hay crop, the dependence for the winter food of stock through half our states, is sometimes devoured by locusts. The cotton crop if it escapes the caterpillar is liable to be spoiled

by the boll worm, and even tobacco does not escape. Innumerable insects prey upon almost all kinds of fruits; while the chinch bug and army worm are in some states ready to take anything that other depredators have left. More than all this, our domestic animals are the subjects of many serious diseases, some of which prevail epizootically, others are sporadic. Horses have had their visitations of epizootic catarrh. Cattle have had pleuro-pneumonia and Spanish or Texas Fever. Sheep are subject to the lung worm disease, hogs to cholera, and besides these and many more that visit us occasionally, there are others but little less fatal that never leave us, and make a heavy drawback upon the farmer's profits. When such obstacles lie in the farmers pathway, it is not surprising that he should become convinced that to surmount them, he must have a higher order of intelligence. Hence the employment by the farmer of various educational agencies in the hope, that by their aid, he may ultimately be able to conquer success.

Among the foremost of the means used by the farmer to quicken his thought and strengthen his hands was *association* and agricultural societies, state, county, and township, were established. The State Agricultural Society of New York was organized in 1829, that of Ohio in 1846, and now every one of our states, and probably all the territories have similar organizations; innumerable counties in all parts of the country had voluntary associations before they were united by legislative enactment in state organizations. These state societies publish an annual report, containing the official transactions of the year, detailed accounts of experiments, observations, and useful essays. The annual exhibitions held by state and county societies, have served to educate the people in regard to the comparative value of stock, fruits, domestic wares, and all farm products. The utility of these associations, exhibitions and reports has never been questioned.

More recently, or since 1868, a new association, the *Grange* has come into the field and is rapidly superseding township farmers' clubs. This organization consolidates the millions of farmers who heretofore have been isolated, and while by union it brings strength, and affords protection, and secures the respect that is everywhere yielded to power, it is proving of far more consequence as a means of mental and social culture. Every member of a Grange finds in this association duties fitted to his abilities, and opportunities for exercise sufficient to command his best endeavors. One of the noblest features of the organization is, that it admits woman to equal participation of its benefits; it is therefore free from the hoary barbarism which metes out, or withholds opportunities of usefulness or enjoyment according to sex. While these various associations have engaged

public attention, a standard agricultural literature has grown up quietly, but not the less effectively done its educational work. Such books as Youatt's on "Domestic Animals and Their Diseases," and Liebig's on the "Application of Chemistry to Agriculture," have been of inestimable service in the past, and hundreds of volumes are now accessible to the farmer, covering the whole range of agricultural subjects. The extent of this literature may be inferred from the fact that a single house in New York, that of Orange Judd & Co., advertise more than three hundred agricultural works, mostly of their own publication.

The periodical literature of agriculture, is not less important as an educational agency, sixty or more agricultural weeklies, as many monthlies, and a few semi-monthlies and quarterlies, are published in the United States; some of these do find, or *ought* to find their way to every farm house in the land for the instruction and entertainment of the farmer, his wife and children. Such journals preserve and transmit the lessons of the times, answer, or at least echo every question as it arises, and serve as a means of communication between the individual farmer, and the great interest with which he is identified.

The Agricultural Bureau established in Washington in 1863 has already done good service, the collection and timely publication of agricultural statistics serves as an index to the desirableness of increased or diminished production in given directions, and is alike indispensable to farmers, capitalists and statesmen. The contributions to economic entomology, and other topics of absorbing interest, make its monthly and annual reports more than welcome in every part of the country.

Last, but evidently not least, is this Centennial Exhibition; of its educational character and influence there can be doubt. If we learn mainly by comparison, and if our state and county exhibitions are valuable because they furnish opportunities for its exercise, here we have an unparalleled opportunity of comparing, not the products of a county or state merely, but the methods, skill and productions of almost the whole world.

The educational value of all such agencies may be fully acknowledged and still there is seen to be lacking opportunities for that systematic and thorough training of the young which only a well equipped college can afford. This had become apparent to thinking men all over the country, and prompted them to efforts to secure the establishment of such institutions, encouraged not a little by what many of them had seen or heard of their utility in various parts of Europe.

Before Congress made any provision for the scientific education of the people, a few private or local enterprises with that object had entered the field. In Northern Ohio, first at Oberlin, and then at Cleveland, the Ohio Agricultural College

was opened for students in the fall of 1855. At Ovid, N. Y., a similar institution was started about the same time. Michigan Agricultural College began in 1857, and the Maryland Agricultural College in 1858. At Mt. Airy, Pa., the Farmers High School was opened in 1853; whatever its beginnings it finally grew into a State Agricultural College.

In this country there has not been a just appreciation of the value of schools of veterinary medicine. With few exceptions, farmers are satisfied to prescribe for sick animals without competent knowledge of the nature or course of their ailment; they administer what custom or superstition dictates. In this country qualified veterinarians have been unable to earn a livelihood by their profession, except in a few of the larger cities. This is the more remarkable in view of the fact that we have in the United States domestic animals of the value of two thousand millions of dollars (\$2,000,000,000), which are probably subjected to an annual loss of some six per cent from diseases that are preventable or curable by good treatment. A loss so enormous if it could be prevented would much more than sustain a well appointed veterinary college in every state. Such colleges have been established in Philadelphia and New York but without government aid or endowment, they have invariably proved a heavy burden upon the shoulders of their founders, and have not met the encouragement and success they have deserved.

It would not be right to ignore the benefits that have accrued to agriculture from the regular medical schools of the country. These have been in the past the chief nurseries of science, and to them we are indebted for whatever of chemistry, botany and zoology has been brought within the reach of the farmer. At present the Agricultural Colleges are able to return this service with interest, the chemical, botanical and zoological courses in many of the agricultural colleges being much more complete than in any of the medical schools. They therefore afford to young men who propose to enter the medical profession the best opportunities of acquiring an important part of their preliminary education.

In 1862, Congress made a grant of land from the public domain to each of the states in aid of agricultural education; the amount to each state was in proportion to population, and was 30,000 acres for each representative and senator in the national legislature. The conditions of the grant were such that each state which should accept was required to put into operation one or more colleges, having for their leading object to teach such branches of learning as relate to agriculture and the mechanic arts. A further condition required the safe investment of this fund in trust, so as to secure to these colleges an adequate and permanent income.

This action on the part of Congress had the effect to arrest public attention at once; but as

might have been expected, where experience could not be relied on for guidance, very different views obtained in regard to the kind, and method of the education most needed by the farmer.

Many advocated the transfer of the future fund to the *literary* institutions already existing, on the supposition that the agricultural education most needed is the education as that term has always been understood of the agriculturist. His great need, they said, is the mental discipline which a literary training is best fitted to impart. To this it was replied, that whatever the benefits of a course in a literary institution, such a course would leave the student comparatively ignorant of those branches of science that are especially related to his occupation, and besides this it is found almost invariably to educate the student from instead of *for* the farm.

Others contended that *practical* schools were especially needed, schools in which the student would regularly take part in agricultural labors and thus acquire skill in all farming operations. The advocates of this plan seemed to overlook the fact that it is not agriculture as an *art* that needs to be taught so much as agriculture as a *science*; it is to the sciences upon which the art is founded that we must look for all future progress. The art of agriculture may probably be better learned, and much cheaper, on a well managed farm than in any college whatever, and young men from the farm are most of them already familiar with all farming operations. It is something more than this which the young farmer needs to enable him to grapple successfully with the difficulties that will beset his pathway in the future.

Still another view, and one which appears to have prevailed, maintained that colleges very different from ordinary literary institutions, were required to meet the wants of the farmer and other industrial classes, or to comply with the terms of the law which called the agricultural colleges into existence. That a new course of instruction must be devised to give the student useful familiarity with all the physical sciences on which the productive industries of the country are based, and a different method of instruction pursued so that the objective and concrete shall, as far as possible, take the place of the verbal and abstract. That work in the laboratory with the means and instruments of investigation is preferable to a lesson learned from a text book, and that the aim should be to make students as familiar with methods of investigation as with the results. In such pursuits it is claimed that the student will learn to observe, and compare, to classify, to reason, and to describe with accuracy, and, in short, obtain a mental discipline more useful to the working farmer or mechanic than that generally obtained through purely literary studies.

There is, however, no practical difficulty in uniting these different plans to some extent. It

is an advantage to the student to have variety in his studies; more in the aggregate can be accomplished, and a more systematic culture obtained. For example, if a student begins the day with mathematical studies, and after a good lesson is somewhat wearied, then botany, zoology, or chemistry will be pursued for a time in the laboratory with absolute freshness; then after a few hours spent in good, healthy, vigorous labor the study of some ancient or modern language will add little to the fatigue, and much to the scholarship. A variety of studies, mathematical, scientific, and literary, and a variety of labor, scientific, mechanical or agricultural, will best secure that liberal and practical education which the industrial classes need in the several pursuits and professions of life.

The following branches are considered important to a good agricultural education and are taught more or less thoroughly in all the colleges of this class. In some of them a much fuller course than is here indicated is provided.

Chemistry, mineralogy and geology are taught in their elements, and in their applications to improvement of the soil, to the arts and manufactures, and to mining and metallurgy.

Mathematics in all its branches and applications to business accounts, to surveying, engineering, navigation and astronomy.

Physics, and its applications to the mechanical and useful arts, and meteorology.

Botany—structural, physiological and systematic in its relations to field crops, gardening, orcharding and forestry.

Zoology, etc., the structure and classification of animals, the laws of life as applied to their profitable management in health, and their treatment in disease.

Political economy and civil government.

The ample means of illustrating such applications of science to the various arts and industries, constitutes the peculiar feature of the agricultural colleges. The extent of the means of illustration may differ in different institutions according to their resources, but the method of employing abundant and practical illustration is alike in all. The lesson is not simply given by book or voice, the student is made to see it with his own eyes, and do it with his own hands.

The following state institutions have already been established upon the national endowment, together with the date of their foundation.

Agricultural and Mechanical College of Alabama.....	1872
Arkansas Industrial University.....	1872
Agricultural, Mineralogical and Mechanical University of California.....	1869
Sheffield Scientific Laboratory, Yale College.....	1846
Agricultural Department Delaware College.....	1870
Georgia State Collection of Agricultural and Mechanical Arts.....	1872
North-Georgia Agricultural College at Dahlonega.....	1873
Illinois Industrial University.....	1867
Purdue University, Agricultural College of Indiana.....	1814
Iowa State Agricultural College.....	1869
Kansas Agricultural College.....	1863
Agricultural and Mechanical College, Kentucky University.....	1886
Agricultural and Mechanical College, Louisiana.....	1874
Maine State Collection of Agricultural and Mechanical Arts.....	1863

United States Naval Academy.....	1845
Maryland Agricultural College.....	1858
Massachusetts Agricultural College.....	1867
Massachusetts Institute of Technology.....	1861
Michigan State Agricultural College.....	1857
Collection of Agricultural and Mechanical Arts, Minnesota.....	1870
Collection of Agricultural and Mechanical Arts, Mississippi.....	1871
Alcorn University, Mississippi.....	1871
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Many literary institutions have also adapted their instruction to the popular demand by the arrangement of scientific departments or courses. These are doubtless of service, and might be more so if such institutions were better provided with material and apparatus. But in many literary institutions the physical sciences are unfortunately held at a discount, and their utility as a means of discipline is underrated or absolutely denied.

What proportion of young farmers will pursue a thorough course in agricultural colleges we cannot predict; many of them at the present evidently do not see the necessity of such training, and the short time that has elapsed since the establishment of these colleges has not been sufficient to furnish unassailable demonstration of their utility. We may, however, with confidence expect that a sufficient number will attend to be of great use to the farming interest. To men thoroughly educated in our agricultural colleges must be committed the solution of most of the knotty problems that now stand in the way of the farmers' progress.

Shorter and special courses having direct relation to some prospective business may possibly be more popular at the outset than the fuller course. Even such a course it is hoped may suffice to put students in possession of the means and methods of investigation, and to open to them the various sources of useful information.

It should be borne in mind that agricultural colleges were not intended to supersede common schools but to supplement them. A good common school education should be obtained before the student enters the college, and the young man who has failed to make good use of the common school or its equivalent has clearly no place in the college. If examinations for admission are sufficiently strict, so far as common school branches are concerned, a very beneficial influence will be exerted on the pupils and studies of the common schools. Students who attend college for a special course might, however, be admitted on showing themselves prepared to pursue that specialty with success.

An objection has been raised to the appropriation of public monies for agricultural schools, on the ground that, while the benefits can be enjoyed by a part of the people, the cost is levied upon the whole. To this it may be said that a kind of education which is confessedly necessary to develop the material resources of the country, and supply material for the arts in peace, and

also the sinews of war, is as much a matter of national concern as the naval or military training by which government seeks to provide for the common defense. But the objection is based on the mistaken notion that these agricultural colleges, so-called, are really monoteknic, when in fact, they were designed to teach, and do teach *all* the branches of learning that relate to agriculture and the *mechanic arts*, and are therefore truly polytechnic. If exception is taken to the name because one art is named while many are taught, it will be remembered that there is at least the same propriety in naming a school of all the arts after one or two of them, that there is in calling all the phonetic symbols of the language the A B C, or the *alpha beta*.

The provision so munificently made in this country for agricultural education is one of the most noteworthy facts of the times. It is so recent that at present the effect is not clearly seen, and can only be foreshadowed by an effort of the imagination; some results, however, we may confidently anticipate. We may hope to diminish the immense distance between our possible and our actual attainments in farming—as seen in the largeness of all our premium crops, and the meagreness of our general averages. The best wheat crops in Great Britain, do not exceed the best in this country, but the average crop there is more than twice as great as the average crop here.

Not only may we expect an increase in the *quantity* of farm products, but also an improvement in the *quality*. This is already seen in regard to cheese, and in some localities in regard to butter. It is especially true of many fruits and vegetables, and still more notably true of almost all varieties of domestic animals.

The adaptation and employment of machinery in farming operations instead of hand labor, will have the effect to reduce greatly the cost of production. The use of steam will, in many cases, enable us to diminish the expense of animal forces.

From the improved drainage of the country, which a better agriculture will necessitate, there will result increased salubrity. Malarious diseases, and even consumption have been almost banished from well drained regions. Improved sewerage about dwellings and farm buildings will prevent many of the most fatal diseases both of men and animals.

Increased comfort and beauty of the dwellings of the agricultural population is another benefit we may safely anticipate. When rural architecture and landscape gardening, and horticulture in all its branches are better understood by the farmer, the effect on his home will soon be manifest and the improvement of the home will promote the refinement and happiness of his family.

Improved agriculture is intimately connected with general prosperity, the chief production of the raw material to be used in the arts is important, as is also the cheapness of living. The good of all classes requires that the farmer should be enabled to realize his cherished ideal *viz.: of producing the best of everything, at the least possible cost.*

Gentlemen, this Centennial year of our national existence might very well begin a new era in regard to agricultural education. If the American farmer instead of feeling that no special preparation of himself is required, would at once endeavor to secure for himself and for his sons and daughters, a thorough acquaintance with all the branches of knowledge that relate to his noble calling, as soon as this knowledge could be applied to the practical details of farm life, we should see the quantity and quality of our farm products equal to the best of other countries, or even as much superior as we now consider the most of our agricultural implements and machinery.

MONEY CONSIDERED AS OUR INDUSTRIAL TOOL.

HON. W. C. FLAGG, PRESIDENT OF THE
NATIONAL AGRICULTURAL CONGRESS
OF THE UNITED STATES. }

Dear Sir :—I feel much flattered by your kind invitation to attend the annual session of your Congress which will appropriately meet, this year, at Philadelphia, the centre of so much that is attractive and interesting to the people of all civilized nations. If my engagements will permit I will endeavor to avail myself of the time and the opportunity to be present, and listen to the discussions on the many interesting topics embraced in the programme of proceedings, which you were good enough to send me. Having learned, by several years of practical experience, the business of farming, in early life, I always take a special interest in every plan concerted by the agricultural classes to promote their material, moral and social condition, cut off and isolated as the individuals of the farming community necessarily are, from many of the advantages enjoyed by the dwellers in cities.

Turning to a question of great individual and national importance, the currency, or money question, I feel tempted by the gratifying reception which my paper on that subject received at the hands of the Illinois Farmers Association, last year, to offer some remarks for the consideration of the National Congress, on a branch of the science of money that has not, until quite recently, received clear and demonstrative elucidations. I refer to what may be called the fundamental principles of money itself—what money actually is, what exact services it performs, and how it performs them. When we are told that "money is a medium of exchange" that it is "some material which society agrees to accept and use to effect the exchange of commodities, or the products of labor," we are not much wiser for the definition. Such general explanations of the principles or uses of money do not carry us back to the foundation of the subject, or to what is fundamental, and I have ventured to question the correctness of some of the received expressions and theories. I have even ventured to give a new direction to thought, and to claim that money must be regarded mainly, if not wholly, in the light of a *tool*; used, not to effect or facilitate exchanges, but to abolish them, and render exchanges, of commodities, which means barter, unnecessary.

I must here anticipate, as it were, my subject, in order to prepare the minds of those I address, for what is to follow, and point out what is now an accepted principle in monetary science, namely capital, and not money considered by itself, is the motive power that sets labor in motion, and distributes its products to consumers and ultimate buyers. Money, in fact, forms only a very insignificant part of the capital employed in

these innumerable processes. In Great Britain, it has been found, by analyses of bankers accounts, that money (metallic and paper together) is used in carrying on the industries of the people to the extent of barely three per cent., and the experience of bankers in America shows that not above five per cent of money is so employed. But whatever may be the exact proportion between money, in its capacity of capital, and of other things representing capital, it is necessary to a clear understanding of the subject to bear in mind this well drawn distinction, which will become more apparent when we get a clear view of the offices performed by money in its other and much more important characteristic of a tool or measure of value.

I will now proceed to quote some of the postulates of monetary science, published by me in a London journal last spring, which I have corrected and extended in a manuscript work entitled "The Principles of Monetary Science Considered," which I propose to publish on my return to London.

POSTULATES AND PRINCIPLES OF MONETARY SCIENCE.

I. Money is something that all the members of a community, or nation, by universal agreement, are willing to accept in exchange for their labor or for such things as they possess and desire to sell, in order to purchase with the avails, other things which they do not possess or produce.

II. All civilized nations (ancient and modern) have adopted *gold* and *silver*, or one of these metals, out of which to fabricate their money, or the chief part of it—the preference for these metals having, no doubt, arisen from their comparative freedom from fluctuations in value, and their superior fitness for coining. Hence, gold and silver coins, or the coins of one of these metals, constitute the true money of every civilized nation.

III. Money derives its *trading*, or purchasing power, and ability to circulate, as currency, and to circulate and distribute commodities, from the market value of the material of which it is made.

IV. Money abolishes barter, or the exchange of labor, and the products of labor in specified quantities.

V. Money, in its denominations as coin, specifying a given, or measured quantity of metal, constitutes a *tool* or measure of the value of labor, and of all commodities, gold and silver included. It also metes out capital in the loan—improperly called the "money market," in specified sums—as so many dollars or pounds.

VI. The stamp of the state, or the impress of a denomination on a coin, is the warranty of the state that such coin contains a specific weight of metal of given fineness, but adds nothing to its market value, for a shilling cannot be made to circulate for a sovereign, or a dollar, nor the latter for the former, by merely exchanging the

stamp from one to the other. As an example, the iron money of Sparta only exchanged for its market value as iron, of which it took nearly the weight of an ox or a horse to pay for his purchase.

VII. Paper money—a term that very well defines the circulating notes of a solvent bank, or nation, when payable in lawful coin on demand, will not depreciate or fall below the market value of the metal in which they are made convertible; nor will any more of such money remain in circulation than is needed to meet the requirements of industry for this description of tools, because of their costliness to the present holders. Any more than is so needed will return to the issuer for conversion. Hence there can not, in the long run, be a redundancy of convertible paper money. Hence, also, the great advantage of convertibility in paper money, as a regulator of the quantity actually needed by the people.

VIII. Paper money, not convertible into metal on demand, when made a legal tender by the Government, will not depreciate below the value of metal (and may even possess a higher value, because the people *must have a circulating medium*), unless issued in excess of the requirements of industry, convertibility, therefore, is not needed to sustain its value, but to regulate its volume with accuracy, so as to prevent fluctuations above or below the market value of the most staple of metals into which it is convertible.

IX. When the Government is the issuer of inconvertible paper money, it is a fundamental error, and a fraud on the public, to make it legal tender between individuals, and refuse to accept it in payment of a large proportion of taxes. Such a Government discredits its own obligations, and lowers the character and credit of its own paper, and, hence, it is responsible for the serious fluctuations of its paper currency, the market value of which is dependent wholly on supply and demand.

The foregoing propositions have been framed in language intended to make the principles they contain strike the reasoner as self-evident truths or postulates, and I regret that my limits will not permit me to give the whole series. I will only cite two more to define the nature of capital as distinguished from money.

X. Commodities in transit from producers to ultimate purchasers or consumers, represented by their title deeds, such as bills of lading, warehousemen's receipts, bills of exchange, cheques, bankers credits and other devices, invented and used by bankers for the transference of debts and credits, constitute a large, if not a controlling, proportion of the floating capital dealt in in the loan market, improperly called the "money market."

XI. Floating, or trading capital, other than that representing commodities themselves, supplied to the loan market, consists of realized profits of trade, and the savings of labor, not yet

invested in more permanent undertakings, such as houses, factories and lands, and steamships, railways, mines and numerous other things not consumable, or which are not destroyed in use. Such investments are sometimes called "fixed," in contra distinction to "floating capital."

XII. Floating capital, which is defined in the two last postulates, the latter of which (No. 11) embraces money (which forms only from three to five per cent of the general mass), constitutes the true "circulating medium of commerce."

XIII. Floating capital, by the facilities afforded by modern banking, and the expedients of merchants, abolishes barter, or the exchange of commodities in specified or measured quantities. It is therefore incorrect and illogical to say that money, or capital, "facilitate exchanges." They simply render exchanges unnecessary, by facilitating the *distribution* of the products of labor from producers to consumers. The idea of an exchange of commodities is the father of much bad logic in economic science.

This method of eliminating what is clearly erroneous, or is unsupported by proof of any kind, or in other words, what rests on nothing but assertion, from what is self-evident, or has been proved by logical deduction, or induction, to be fundamental, as far as I am aware, is new in economic science, and some friends in England, whose opinions I value, have paid me the compliment to say so.

On the appearance of a portion of my "postulates and principles" in the *Anglo American Times*, Professor Bonamy Price, of Oxford, in a spirit of great frankness wrote me as follows: "So many thanks for your letter in the *American Times*. It is exceedingly good, and I rejoice over it much, especially the Postulates and 'Principles. The 21st' (10th in this communication) 'is capital. I had the thought, but not definitely and vividly expressed. The meaning 'jumps on the reader and masters him, and it is 'most true.' * * *

It will thus be seen, 1, that money, metallic and paper, constitute only an insignificant proportion of the floating capital used in conducting the business of the country; 2, that the products of labor, themselves, by the processes of modern banking and the facilities of distribution afforded by railways and steam vessels on the ocean, the lakes and the rivers, possess an inherent power *in proportion to their market value*, to circulate and distribute themselves, with the use of only a small supply of money and a greater or lesser amount of realized capital from profits and savings; 3, that the most important function performed by money is that which it exercises in its character as a *tool* to measure values and mete out capital between lender and borrower and dealers in general, and to adjust the wages of labor; and 4, that its market value depends on the market value of the material of which it is fabricated, or, if paper, on what it rests for security, and that all

market values are regulated by the great natural law of supply and demand.

Money, therefore, being in its important office of a *tool*, the general measure, or standard, by comparison with which the ratio of all values are ascertained, just as a yard stick measures cloth, it follows that only a limited supply of such tools is needed to effect the ends for which money is used, and, as a general rule, none but misers, who are the drones of society, ever desire to possess themselves of, or to lock up this very costly tool, in unnecessary quantities. It also follows that, like the measures of length and capacity, the measure of value should be made of a material, the standard of which is least variable. In other words it is most obvious that the tool, money, should be made of the very best materials that human genius and experience can invent. I think I may now say, without any one who has carefully weighed the propositions and deductions I have laid down, denying the final inference, that gold is the best of all materials for a general standard of value. It is convenient for coinage and fluctuates the least of any known metal, and hence is the best fitted for all the uses of money, and as a regulator of paper currency.

On the subject of paper money, about which so much is being said and written, I must now say something, and I shall not philosophise much on its principles, but come straight to the facts as they are at present under debate before the whole people. Paper money being, like metallic, on which it rests for its value, an industrial tool, or implement, is governed in all respects by the same principles that govern the latter. The only really important question, involved in the determination of this issue, is, who shall have the advantage of it, the nation or the national banks? This will appear the correct view to take of it when we analyze the law. As that now stands there are two kinds of paper money in circulation, for both of which the credit of the nation is fully pledged. One of these consists of legal tender notes, popularly known as "Greenbacks," the other, national currency notes, loaned by the Government to private trading companies, known as National Banks, at the almost nominal ratio of one per cent. per annum, for which the United States Treasurer holds, Government securities as indemnity against loss. This loaning of the public credit to companies of private trades in capital and credits, seems to me to be a gross violation of the Constitution of the United States, as well as of sound principles of economic science. In case of inter-state railways, the clause in the organic law which authorizes Congress to provide "post roads" has been construed, on doubtful authority, as a warrant for lending the railway companies, building such "roads," the national credit; but no such pretext is set up for the vast loans made to banking corporations. I submit the point for the consideration of the National Agricultural Congress, and as one demanding the attention of the public at large. The right of the Government to issue Treasury notes and other securities for national purposes, is unquestioned,

but the distinction between such a policy and the lending to a single class, to the exclusion of all others, is clear; and what makes the act itself appear more conspicuously wrong and illegal, is, that such loans are made at rates far below the market value of the National capital, which these public credits represent.

Perhaps, the acts of congress, under which this great and manifest wrong to society at large, is perpetrated, might receive some justification, if it could be demonstrably shown that the Treasury notes when loaned to, and issued by the banks, were improvised into better tools than the legal tender Treasury notes. But here again the fact is obviously the reverse. The legal tenders, from the circumstance that payment or tender by them extinguishes debt, while those loaned the banks may be refused by a creditor proves the legal tenders to be the best tools. View the matter as you will, there seems to be no justification either in principle, or practice for such a use of the National resources, and if it shall be found, that these loans of the public credit, to trading corporations, are, in addition, illegal, then the sooner some well digested system for providing the public with a supply of paper money, regulated by the national laws, which require it to be convertible on demand into gold, the better for the public interests. The long continued agitation of this question is injudicious as well as injurious, and should be brought to an end by the action of the people through the ballot boxes as speedily as possible.

Appropos to this subject is the question of having a double standard of values, or of making both gold and silver coins legal tender. Scientifically that question is easily solved. No government nor all the governments in the world by treaty or otherwise, can establish a permanent ratio of value between any two products of labor. It is an axiom, of political economy that the value of commodities in the market of the world will, in the long run, in spite of legislation and treaties, be determined by the law of supply and demand or by the number of producers and amount of machinery and capital, combined with the facilities for bringing them to market, on the one hand, and the number of competing buyers for consumption in the markets of the world, on the other. It, therefore, follows, that one metal should be selected as a standard of value, and gold being the fittest for coinage and handling, and the least bulky, and least liable to fluctuations, commends itself as the proper one to make an exclusive standard, silver or paper may be used for small change, or for what is called "token money" with nickel or copper, for still smaller change. With one dollar or even fifty cent notes, which I prefer to silver, there need be no difficulty or inconvenience to the public, in respect to the use of small coins of silver, nickel and copper, to be circulated as token money, and for small change, in such quantities as the wants of the public indicate.

I have given much thought to this most important question and have endeavored to submit a condensed view of the natural principles on which currency or money rests, and I feel assured that all who sufficiently value a sound system, founded on public rights, and justice to all classes, will cut loose from party affiliations and traditions, and will cast their votes for men who stand pledged to sustain those principles in the National Legislature. When it is considered how many of your public men, from the President down to the annually elected assemblyman, have prostituted the trust reposed in them by the people, to the shrine of mammon, we must all feel that "eternal vigilance is the price of liberty."

H. BOWLBY WILLSON.

New York, Aug. 24, 1876. 19 West 46th St.

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MEETING OF 1877.

The National Agricultural Congress will meet at the Grand Pacific Hotel in the City of Chicago, September 25—27, 1877.

A general representation of all persons and organizations interested in Agricultural progress is invited, and samples of Agricultural products solicited from all parts of the United States. Addresses and reports from Agriculturists of national reputation and from special scientists are expected; and these will discuss the leading questions affecting Agriculture in the United States.

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